

THE DEVELOPING TREND OF BODY GROWTH IN GIRLS FROM 6-14 YEARS OLD

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(Original scientific paper)

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Abstract

A survey was conducted on 2420 respondents, aged 6-14 years, in order to determine some anthropometric measures and to determine the growth and development trend of primary school students in the municipality of Strumica. Four anthropometric variables were used to determine the developmental trend of body growth: body height, body weight, seated body height, leg length, circumference of the upper arm and circumference of the thigh. In addition to the basic descriptive parameters for determining statistically significant differences at the univariate and multivariate levels, ANOVA and MANOVA were used. Based on the results of this research, using the body height, seated body height, leg length and body weight we can conclude that the growth is not linear in all age categories, but shows periods of faster and slower intensity and that it increases in students from year to year. In the applied variables body height, seated height, leg length and body weight, statistically significant differences were found in girls in most age categories. The highest increase in body height in girls is observed between 10 and 11 years, on average about 6.51 cm and between 12 and 13 years by about 6.04 cm. The largest increase in body weight in girls was registered between the ages 10 and 11 on average by about 5.94 kg and between the 11th and 12th years by 5,88 kg, while the largest increase in the circumference of the upper arm is observed between 10 and 11 years, and the largest increase of the circumference of the thigh is observed between 12 and 13 years.

Key words: *anthropometry, measurements, analysis of variance, differences, female.*

Introduction

In the process of general physical development of an individual, the development of organic systems, skeleton, muscles and other organs and organic systems, takes place at different rates. Growth dynamics are influenced by many internal and external factors, among which physical education, sports and recreational activities occupy an important place. With the systematic use of physical education and sports in general, the proper and harmonious development of young people can be achieved and they can eliminate many negative aspects of the modern way of life.

Human growth and development are mutually conditioned and interrelated processes, from conception to adulthood. Monitoring of growth and development can be done through various indicators, including monitoring of the morphological structure and analysis of structural components. Morphological characteristics, as well as other traits, although biologically conditioned, can change significantly under the influence of the environment, lifestyle, work and upbringing.

The subject of this research is to determine the condition, developmental changes and comparative relations of some anthropometric measures in female children aged 6-14 years from primary schools in the municipality of Strumica.

The main goal of the research is to determine the condition of some anthropometric measures and to determine the growth and developmental trend of growth in female students from primary schools aged 6-14 in the municipality of Strumica.

Methods

The population from which the turnover was taken for this research is defined as the population of regular students from primary schools in the municipality of Strumica aged 6-14 years who participate in the

educational process. The research was conducted on 2420 respondents from the regular nine-year education in the municipality of Strumica, who voluntarily accepted participation in the research. Age is defined as the chronological age plus-minus 6 months of the number of years of the examined subject. Anthropometric measurements were performed according to the recommendations of the IBP-International Biological Program (Lohmann, Roche, & Martorell, 1988). The following anthropometric measures were applied to assess the morphological characteristics in this study:

- body height
- body weight
- length of the leg
- seated height
- circumference of the upper arm
- circumference of the thigh

Martin's anthropometer was used to measure body height. The height of the body was measured with a height gauge and the subjects were barefoot in an upright position on a hard horizontal surface, upright and with joined legs, below the height gauge. The heads of the respondents were in such a position that the Frankfurt Plain was in a horizontal position. The results were read with an accuracy of 0.1 cm.

The length of the leg was also measured with a Martin's anthropometer, and the subjects were barefoot in shorts, in an upright position with their heels joined on a hard horizontal surface. The tip of the anthropometer was placed on the left anterior part, the upper part of the femur (Spina iliaca anterior superior). The results were read with an accuracy of 0.1 cm.

Sitting height was measured with a height gauge (Martin's anthropometer). During the measurement, the subjects sat on a bench, with their arms resting on their bent legs. The heads of the respondents were in a position that the Frankfurt Plain was in a horizontal position. With a straight back and joined feet, the height of the seat was measured, and the results were read with an accuracy of 0.1 cm.

Body weight was measured with a medical decimal scale placed on a hard surface. Respondents who were barefoot and in light sports equipment stood in the middle of the scales, in an upright position. At the moment when the arrow on the scale was calm, the result was read with an accuracy of 0.5 kg and the lower value was take

The circumference of the upper arm was measured with a clothing measuring tape, the maximum circumference of the left upper arm was measured at a level corresponding to the middle between the acromion and the olecranon, with arms in resting position along the body. The result was read with an accuracy of 0.1 cm.

The circumference of the thigh was measured with a clothing measuring tape, the maximum circumference of the left thigh was measured on its upper third in a standing position. The result was read with an accuracy of 0.1 cm.

The following statistical indicators were used in the processing of the data:

- Arithmetic mean (\bar{X});
- Standard deviation (SD);
- Minimum value (Min);
- Maximum value (Max);
- Coefficient of variation (CV);

MANOVA and ANOVA were used in order to determine the statistically significant differences on a multivariate and univariate level.

Results

From the overview of Table 1, which shows the basic statistical parameters and the results of the multivariate analysis of the variance for the anthropometric measure body height, it can be seen that there are statistically significant differences in all age categories. The data from the procedure Kolmogorov-Smirnov (KS) show that the applied anthropometric measures in all age categories do not deviate from the normal distribution and therefore it can be concluded that the necessary methodological and statistical criteria for applying the correct statistical processing for the obtained results are justified.

By applying a multi-variance analysis of variance (MANOVA) a statistically significant difference was found in girls in all age groups (accuracy, 00 in the applied variable body height). Univariate analysis of variance (ANOVA) has shown that in this anthropometric measure, there is a statistically significant difference between the groups of different ages, defined at one year, with a significance level $Q < .00$. From

the analysis of the basic statistical parameters shown in Table 1, it can be seen that body height continuously increases with age in female subjects. Growth is not linear in all age categories, but shows periods of faster and slower intensity. On average, girls' body height increases from 0.93 cm to 6.51 cm per year. The largest increase is between 10 and 11 years on average by about 6.51 cm and between 12 and 13 years of life by about 6.04 cm.

The coefficient of variation in body height is most pronounced in the 11th year. From the values of the LSD test, used to determine the differences between the arithmetic means of the adjacent age groups, it can be concluded that statistically significant differences were obtained between all adjacent age groups, except the 13 and 14 years old groups.

Table 1. Basic statistical parameters and statistically significant differences between the age categories of the anthropometric body height measure in girls aged 6-14

	Mean	Min	Max	Std.Err	SD	Skew	Kurto	KV%	F	Q
6 years	120,92	105,60	140,80	0,38	5,83	0,24	0,14	4,82	1189,4	,00
7 years	126,40	102,00	147,30	0,40	6,53	0,07	0,86	5,17		
8 years	132,62	116,30	152,10	0,38	6,57	0,09	-0,11	4,96		
9 years	137,75	118,50	158,20	0,40	6,92	0,03	0,04	5,02		
10 years	143,58	121,40	165,30	0,41	7,05	0,14	0,19	4,91		
11 years	150,09	115,30	172,20	0,45	7,80	-0,48	0,89	5,19		
12 years	156,13	131,20	174,60	0,39	6,61	0,00	0,43	4,23		
13 years	159,68	143,10	177,40	0,40	6,78	0,15	-0,20	4,25		
14 years	160,61	146,80	176,70	0,39	5,32	0,20	-0,12	3,31		

Statistically significant differences between age categories (Post-hoc LSD test)

	6 years	7 years	8 years	9 years	10 years	11 years	12 years	13 years	14 years
6 years		.00	.00	.00	.00	.00	.00	.00	.00
7 years	.00		.00	.00	.00	.00	.00	.00	.00
8 years	.00	.00		.00	.00	.00	.00	.00	.00
9 years	.00	.00	.00		.00	.00	.00	.00	.00
10 years	.00	.00	.00	.00		.00	.00	.00	.00
11 years	.00	.00	.00	.00	.00		.00	.00	.00
12 years	.00	.00	.00	.00	.00	.00		.00	.00
13 years	.00	.00	.00	.00	.00	.00	.00		.14
14 years	.00	.00	.00	.00	.00	.00	.00	.14	

From the analysis of Table 2, it can be seen that the seated height of the body is constantly increasing from year to year. Growth is not linear in all age categories, but shows periods of faster and slower intensity. The average increase in sitting height ranges from 0.77 to 3.27 cm. The largest increase in sitting height is in girls between 11 and 12 years, and on average it is about 3.27 cm.

The coefficient of variation in body height is most pronounced at the 12th and 13th year. By applying multivariate analysis of variance (MANOVA) statistically significant difference was found in girls in all age groups at the level of significance .00 in the applied variable seated height of the body, except in the age group of 13-14 at the level of significance .04. From the univariate analysis of variance (ANOVA) it is determined that in this variable there are statistically significant differences between groups of different ages, defined at one year at a significance level of $Q < .00$.

Similar to other anthropometric variables, anthropometric measure of leg length (which assesses the longitudinal dimension of the skeleton), a continuous increase with age change is evident. And in the case of this anthropometric measure, the growth is not linear in all age categories, but shows periods of faster and slower intensity. On average, leg length increases from 0.19 to 4.59 cm per year. The biggest change in leg length is in 11-year-old girls, averaging about 4.59 cm.

The coefficient of variation in the length of the leg is most pronounced in the 7th year of life. This change in leg length variability, similar to body height and sitting height, is a consequence of the unequal pace of development of individual parts. From the values of the LSD test it can be seen that there are statistically significant differences between all age groups, except in the groups of girls aged 13 and 14.

Table 2. Basic statistical parameters and statistically significant differences between the age categories of the anthropometric measure of seated height in girls aged 6-14

	Mean	Min	Max	Std.Err	SD	Skew	Kurto	KV%	F	Q
6 years	65,47	56,80	74,30	0,22	3,26	0,10	-0,23	4,99	822,62	,00
7 years	67,79	54,50	78,20	0,23	3,81	-0,18	0,64	5,62		
8 years	70,17	55,00	95,10	0,25	4,23	0,49	3,83	6,03		
9 years	72,85	63,30	84,70	0,22	3,78	0,19	0,18	5,19		
10 years	75,36	65,50	93,30	0,25	4,32	0,53	0,94	5,74		
11 years	78,71	60,50	89,50	0,26	4,55	-0,54	0,48	5,78		
12 years	81,98	70,20	91,50	0,22	3,82	-0,13	-0,12	4,66		
13 years	84,12	73,40	96,70	0,23	3,87	0,01	0,28	4,60		
14 years	84,89	76,60	95,50	0,24	3,23	0,35	0,59	3,80		

Statistically significant differences between age categories (Post-hoc LSD test)

	6 years	7 years	8 years	9 years	10 years	11 years	12 years	13 years	14 years
6 years		.00	.00	.00	.00	.00	.00	.00	.00
7 years	.00		.00	.00	.00	.00	.00	.00	.00
8 years	.00	.00		.00	.00	.00	.00	.00	.00
9 years	.00	.00	.00		.00	.00	.00	.00	.00
10 years	.00	.00	.00	.00		.00	.00	.00	.00
11 years	.00	.00	.00	.00	.00		.00	.00	.00
12 years	.00	.00	.00	.00	.00	.00		.00	.00
13 years	.00	.00	.00	.00	.00	.00	.00		.04
14 years	.00	.00	.00	.00	.00	.00	.00	.04	

Table 3. Basic statistical parameters and statistically significant differences between the age categories of the anthropometric measure leg length in girls aged 6-14

	Mean	Min	Max	Std.Err	SD	Skew	Kurto	KV%	F	Q
6 years	69,58	60,10	86,20	0,27	4,08	0,45	1,30	5,87	1006,7	,00
7 years	73,58	58,60	88,40	0,28	4,60	0,13	0,53	6,25		
8 years	78,17	64,50	92,50	0,26	4,40	0,05	0,24	5,62		
9 years	81,18	68,80	96,50	0,28	4,87	0,11	0,15	6,00		
10 years	85,64	69,00	98,70	0,29	4,95	-0,11	-0,07	5,78		
11 years	89,88	70,20	102,50	0,31	5,42	-0,38	0,65	6,03		
12 years	93,12	78,50	106,20	0,28	4,74	0,09	0,14	5,09		
13 years	94,93	81,40	110,00	0,29	4,98	0,19	0,03	5,24		
14 years	95,12	82,20	108,60	0,30	4,04	0,02	0,84	4,24		

Statistically significant differences between age categories (Post-hoc LSD test)

	6 years	7 years	8 years	9 years	10 years	11 years	12 years	13 years	14 years
6 years		.00	.00	.00	.00	.00	.00	.00	.00
7 years	.00		.00	.00	.00	.00	.00	.00	.00
8 years	.00	.00		.00	.00	.00	.00	.00	.00
9 years	.00	.00	.00		.00	.00	.00	.00	.00
10 years	.00	.00	.00	.00		.00	.00	.00	.00
11 years	.00	.00	.00	.00	.00		.00	.00	.00
12 years	.00	.00	.00	.00	.00	.00		.00	.00
13 years	.00	.00	.00	.00	.00	.00	.00		.66
14 years	.00	.00	.00	.00	.00	.00	.00	.66	

From the overview shown in Table 4, it can be seen that body weight is constantly increasing with age. The average weight gains of girls between the ages of 6 and 14 is 4.55 kg and it increases annually in the range of 1,77 kg to 5,94 kg. The coefficient of variation of body weight variable is most pronounced

between the 10th and 11th year of age, in average of 5,94 kg and between the 11th and 12th year of age for about 5,88 kg per year.

From the values of the LSD test used to determine the differences between the arithmetic means of the adjacent age groups, it can be concluded that significant statistical differences were obtained between all adjacent age groups.

Table 4. Basic statistical parameters and statistically significant differences between the age categories of the anthropometric measure body weight in girls aged 6-14

	Mean	Min	Max	Std.Err	SD	Skew	Kurto	KV%	F	Q
6 years	25,17	16,00	4,60	0,36	5,41	0,88	0,58	21,50	348,13	,00
7 years	28,36	17,00	48,10	0,41	6,67	0,96	0,44	23,52		
8 years	31,72	19,10	73,30	0,47	8,03	1,30	2,79	25,33		
9 years	35,99	20,50	67,60	0,54	9,39	0,89	0,12	26,10		
10 years	39,09	21,90	72,70	0,56	9,71	0,80	0,39	24,83		
11 years	45,03	23,00	87,00	0,64	11,22	0,74	0,70	24,91		
12 years	50,91	25,20	94,70	0,70	11,91	0,85	0,92	23,39		
13 years	54,45	30,00	93,60	0,68	11,58	0,81	0,77	21,26		
14 years	56,22	39,80	98,30	0,78	10,51	1,29	2,43	18,69		

Statistically significant differences between age categories (Post-hoc LSD test)

	6 years	7 years	8 years	9 years	10 years	11 years	12 years	13 years	14 years
6 years		.00	.00	.00	.00	.00	.00	.00	.00
7 years	.00		.00	.00	.00	.00	.00	.00	.00
8 years	.00	.00		.00	.00	.00	.00	.00	.00
9 years	.00	.00	.00		.00	.00	.00	.00	.00
10 years	.00	.00	.00	.00		.00	.00	.00	.00
11 years	.00	.00	.00	.00	.00		.00	.00	.00
12 years	.00	.00	.00	.00	.00	.00		.00	.00
13 years	.00	.00	.00	.00	.00	.00	.00		.00
14 years	.00	.00	.00	.00	.00	.00	.00	.00	

Table 5. Basic statistical parameters and statistically significant differences between the age categories of the anthropometric measure of upper arm circumference in girls aged 6-14 years

	Mean	Min	Max	Std.Err	SD	Skew	Kurto	KV%	F	Q
6 years	18,08	13,00	25,70	0,17	2,55	0,49	-0,18	14,10	153,56	,00
7 years	19,12	14,00	27,80	0,18	2,95	0,49	-0,28	15,40		
8 years	19,94	14,00	28,80	0,17	2,89	0,40	-0,34	14,50		
9 years	21,11	14,00	31,70	0,19	3,36	0,63	-0,18	15,94		
10 years	21,62	15,00	30,00	0,19	3,33	0,29	-0,65	15,41		
11 years	22,91	16,00	34,90	0,20	3,53	0,50	0,11	15,42		
12 years	24,03	16,60	35,70	0,21	3,57	0,52	0,20	14,85		
13 years	24,69	17,30	36,30	0,19	3,34	0,49	0,35	13,51		
14 years	25,35	19,20	36,70	0,24	3,24	0,76	0,77	12,76		

Statistically significant differences between age categories (Post-hoc LSD test)

	6years	7years	8years	9years	10years	11years	12years	13years	14years
6 years		.00	.00	.00	.00	.00	.00	.00	.00
7 years	.00		.00	.00	.00	.00	.00	.00	.00
8 years	.00	.00		.00	.00	.00	.00	.00	.00
9 years	.00	.00	.00		.05	.00	.00	.00	.00
10 years	.00	.00	.00	.05		.00	.00	.00	.00
11 years	.00	.00	.00	.00	.00		.00	.00	.00
12 years	.00	.00	.00	.00	.00	.00		.01	.00
13 years	.00	.00	.00	.00	.00	.00	.01		.03
14 years	.00	.00	.00	.00	.00	.00	.00	.03	

From the analysis in Table 5, it can be seen that the upper arm circumference is constantly increasing from year to year. The circumference is not linear in all age categories, but shows periods of faster and slower intensity. The average circumference of the upper arm increases from 0.51 to 1.34 cm. The largest increase in the circumference of the upper arm is observed between 10 and 11 years, on average by about 1.29 cm.

The coefficient of variation of the upper arm circumference is most pronounced in 11 years. By applying a multivariate analysis of variance (MANOVA), a statistically significant difference was found in girls in all age groups. From the Univariate analysis of variance (ANOVA) it has been determined that in this anthropometric variable there are statistically significant differences between the groups of different ages.

From the analysis in Table 6, it can be seen that the circumference of the thigh is constantly increasing from year to year. Volume is not linear in all age categories, but shows periods of faster and slower growth intensity. The average circumference of the upper arm increases from 0.88 to 2.64 cm. The largest increase in thigh circumference is observed between the ages of 12 and 13, averaging about 2.64 cm.

The coefficient of variation in the circumference of the thigh is most pronounced in 9 years. From the values of the LSD test it can be seen that statistically significant differences in girls exist between all age-adjacent groups except between the groups of 9 and 10 years of age.

Table 6. Basic statistical parameters and statistically significant differences between the age categories of the anthropometric measure of the circumference of the thigh in girls aged 6-14 years

	Mean	Min	Max	Std.Err	SD	Skew	Kurto	KV%	F	Q
6 years	36,45	27,00	47,00	0,28	4,19	0,25	-0,45	11,51	205,84	,00
7 years	38,58	30,00	54,60	0,32	5,24	0,65	0,07	13,52		
8 years	40,41	20,50	55,00	0,32	5,44	0,27	0,07	13,47		
9 years	42,90	30,00	63,20	0,35	6,13	0,67	-0,02	14,28		
10 years	43,78	30,00	61,20	0,34	5,93	0,38	-0,18	13,55		
11 years	46,39	31,00	65,40	0,36	6,38	0,41	-0,14	13,74		
12 years	49,03	33,80	68,30	0,37	6,35	0,40	0,19	12,96		
13 years	50,40	35,30	69,40	0,36	6,25	0,33	0,04	12,40		
14 years	51,46	40,00	70,20	0,41	5,56	0,53	0,25	10,80		

Statistically significant differences between age categories (Post-hoc LSD test)

	6years	7years	8years	9years	10years	11years	12years	13years	14years
6 years		.00	.00	.00	.00	.00	.00	.00	.00
7 years	.00		.00	.00	.00	.00	.00	.00	.00
8 years	.00	.00		.00	.00	.00	.00	.00	.00
9 years	.00	.00	.00		.06	.00	.00	.00	.00
10 years	.00	.00	.00	.06		.00	.00	.00	.00
11 years	.00	.00	.00	.00	.00		.00	.00	.00
12 years	.00	.00	.00	.00	.00	.00		.00	.00
13 years	.00	.00	.00	.00	.00	.00	.00		.05
14 years	.00	.00	.00	.00	.00	.00	.00	.05	

Discussion

Monitoring the morphological structure is an important parameter for determining the growth and development of students in order to analyze the significance of differences and the developmental trend of some anthropometric measures. The results of this study showed that body height continuously increases with age, although children's growth is not linear and shows faster and slower intensity. The largest increases in body height were observed between 10 and 11 years with an average height increase of 6.51 cm. From the values of the LSD test that was applied to determine the differences between the arithmetic means of the adjacent age groups, statistically significant differences can be concluded in all age groups, except in the 13 and 14 age groups.

In the variable seated height, it can be seen that the seated height of the body is constantly increasing from year to year, the growth is not linear in all age categories, but shows periods of faster and slower intensity. The largest increase in sitting height in girls is observed between 11 and 12 years, on average by about 3.27 cm. By applying a multivariate analysis of variance (MANOVA) a statistically significant

difference was found in girls in all age groups at the level of significance .00, only between the age categories of 13 and 14 years at the level of significance .04.

In the anthropometric variable, leg length, a continuous increase with age changes is seen. In the case of this anthropometric measure, the growth is not linear in all age categories, but shows periods of faster and slower intensity. The average length of the leg increases annually from 0.19 to 4.59 cm. The largest change in leg length in girls is observed at 11 years, on average by about 4.59 cm.

From the values of the LSD test it can be seen that statistically significant differences exist between all adjacent age groups, only statistically significant differences were not found between 13 and 14 years of age.

In the applied variable body weight, the biggest changes were also registered between 10 and 11 years with an average weight gain of 5.94 kg. From the values of the LSD test that was applied to determine the differences between the arithmetic means of the adjacent age groups, it can be concluded that significant statistical differences were obtained between all adjacent age groups.

The circumference of the upper arm and thigh is constantly increasing from year to year. Circumferences are not linear in all age categories, but show periods of faster and slower acceleration. The largest increase in the circumference of the upper arm is observed between 10 and 11 years, on average by about 1.29 cm. Applying multivariate analysis of variance (MANOVA), a statistically significant difference was found in girls in all age groups. From the univariate analysis of variance (ANOVA) it has been determined that in this anthropometric variable there are statistically significant differences between the groups of different ages. In the variable thigh circumference, the largest increase in thigh circumference is observed between 12 and 13 years, on average about 2.64 cm. From the values of the LSD test it can be seen that statistically significant differences in girls exist between all age-adjacent groups except between the groups between 9 and 10 years of age.

The results are not at all surprising considering the fact that this age is the period of puberty in girls, where there are many changes caused by the production of sex hormones and other functional changes in the body. Of course, this is accompanied by physical changes that are manifested through increased growth and development, as well as increased body weight. Morphological features as well as other traits, although biologically conditioned, still change significantly under the influence of the environment, lifestyle, work and upbringing. Similar results in weight and height monitoring were obtained in anthropometric studies from 1999, 2000/01/02, conducted on a sample of subjects from Novi Sad - children aged 3 to 11 years. (Bozic-Krstic et al. 2003).

Conclusion

Based on the obtained results from the conducted research in order to determine the condition of some anthropometric characteristics as well as determining the growth and developmental growth trend of female students from primary schools on the territory of the municipality of Strumica, we can conclude that the applied variables body height, seated height, leg length, and body weight, statistically significant differences were found in girls in all age categories at significance level.00.

The results show that girls' growth is not linear, but shows periods of faster and slower intensity. On average, the body height of increases from 0.93 cm to 6.51 cm per year. The highest increase in girls is between 10 and 11 years, about 6.51 cm. Statistically significant differences were found between all age groups, except in the 13 and 14 age groups. The average seated height increases with age from 0.77 to 4.09 cm., while the highest increase in seated height in girls is observed at 8 years, on average by about 3.27 cm. Similar to anthropometric measurements of body height and seated height and anthropometric measure of leg length, continuous increase with age is evident. And in the case of this anthropometric measure, the growth is not linear in all age categories, but shows periods of faster and slower intensity. On average, the length of the leg increases from 0.19 to 4.59 cm per year. The largest change in leg length is at 11 years, on average about 4.59 cm. This change in the variability of the length of the leg, similar to the height of the body and the sitting height, is a consequence of the unequal pace of development of individual subjects.

In the applied variable, the body weight was found to increase steadily with age. The average body weight gain in girls is 5.94 kg and it increases annually in the range from 2.73 kg to 5.94 kg. The highest body weight gain in girls is between 10 and 11 years, on average for about 5.94 kg and between the ages of 11 and 12, averaging about 5.88 kg. The coefficient of variation of the variable body weight is most pronounced in the 8th and 9th year. The smallest variations in body weight are observed in the 13th and 14th adjacent age group.

In the applied variable upper arm circumference, the largest increase in upper arm circumference is observed between 10 and 11 years, on average by about 1.29 cm. By applying multivariate analysis of variance (MANOVA), a statistically significant difference was found in girls in all age groups. From the univariate analysis of variance (ANOVA) it has been determined that in this anthropometric variable there are statistically significant differences between the groups of different ages. In the variable thigh circumference, the largest increase in thigh circumference is observed between 12 and 13 years, on average by about 2.64 cm. From the values of the LSD test it can be seen that statistically significant differences in girls exist between all age adjacent groups except between the groups between 9 and 10 years of age.

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