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A Study of the Level of Obesity Among Children Aged 6-18 Years in the City of Berat

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ABSTRACT

Background: One of the greatest problems in the civilized world today is an unhealthy lifestyle, particularly for children and young ones. For this reason, physical education plays a critical role as the first important factor that can educate the new generation. The measurement of anthropometric indicators is an immediate need for the education system, a need that is related to physical education and its impact on children's health.

Objective: This study aims to identify the anthropometric indicators in children and young ones of ages 6-18 years old, as the starting point of evaluating their health today, particularly concerning the future.

Methods: Children aged 6-18 years old, in total 14138 subjects, from which 6903 girls and 7235 boys were tested through four anthropometric indexes, starting from the main one in evaluating the development of body constituents and the level of obesity. The measurements had undergone the calculation of BMI indicators, comparing of the age groups and genders to observe possible differences and through the statistical evaluations.

Results: The results obtained show that 1% of children aged 6-11 years are overweight. While with the increase in age this index increases by 4.5 % and 8.4 % at later ages. Also, boys over the age of 15 are at a higher percentage of fat than girls. BMI assessment shows that out of the total number of the subjects about 3.71% of them are overweight to obese versus 4.36 % of the subjects, taken in the national range. This value is lower than the respective value for the same level of education

Conclusion: The curricular program of physical education 3 hours/week is convenient, enables, and helps in the reduction of obesity and overweight, for children who regularly attend classes of physical education.

Key Words: Lifestyle, Body mass index, Overweight, Obesity, Curricular program, Anthropometric measurements

INTRODUCTION

One of the greatest problems in the civilized world today is an unhealthy lifestyle, particularly for young ones and children. For this reason, physical education plays a critical role as the first important factor that can educate the new generation. Maximizing physical education classes to subjects aged 6-18 years old is the most efficient solution, to educate and form healthy citizens, intellectuals, and productive humans who guarantee the growth of national welfare.¹ Teachers of other fields nowadays recognize the important role of physical education teachers and the social and health value of their mission.² The measuring of anthropometric indicators is an immediate need for the education system, a need that is related to physical education and its impact on chil-

dren's health in general. The assessment of body mass index (BMI) presents the best indicator of the body fat and risk of pathologies,^{3,4} and in this aspect presents the first study in this city, to the extent of testing. The data for the body mass and height are related to the evidence of the condition and prevention of all diseases, starting from cardio-vascular up to the neuro-muscular syndromes. Obesity is a chronic disease that is characterized by the increase in depositing the adipose tissue in our organism, which causes a great range of dysfunctions and pathologies. This is considered as the primary cause for much serious pathology which often become a cause for sudden death.⁵ This study aims to identify the anthropometric indicators in children and young ones of ages 6-18 years old, as the starting point of evaluating their health today, particularly concerning the future, and for this

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reason, we are studying four indexes starting from the main one in evaluating the development of body constituents and the level of obesity.

During the last decades, obesity has increased at a rapid pace all over the world. In a way, obesity now represents the new epidemic that is slowly but steadily spreading all over the world. Studies have proven that if the state of obesity is present during school age, whether girls or boys, they are at risk to become obese in adulthood, almost twice as much compared to peers of normal weight.⁶ Physical activity is suggested to play a role not only in the development of childhood obesity but also in many health problems, lifestyle models, and psycho-social welfare.⁷ The etymology of obesity is multi-factorial, but the essential cause is overeating. Obesity can happen to everyone. However, some groups are more at risk of becoming obese. Other factors related to obesity are different, such as the biological factor, in some patients; the low base metabolism can often be the cause of the emergence of obesity. The genetic factor in some cases plays a key role in the emergence of obesity. Increased energy, low energy consumption, and low physical activity are some of the factors that cause an increase in BMI in children.⁸ Experts believe that obesity is the primary cause of the continuous worsening of our health, even more so than smoking. Being overweight is related to a series of health problems like diabetes, heart diseases, high blood pressure, some forms of cancer, stress, anxiety, depression, and infertility. Obesity has a significant effect on the risk factors for the development of cardiovascular diseases in children and it is important to take precautions in early life.⁹ A study had reported that children, who watch TV more and participate in physical activity less, have higher BMI values.¹⁰ Lack of physical activity is suggested as an important factor in childhood obesity and it contributes to the development of fat accumulation and obesity.¹¹ A statistically significant correlation has been found between BMI and physical fitness.¹² Emphasis regarding fighting such scenarios is put on the prevention and education of new generations towards a healthy diet and higher physical activity. Performing physical activities not only prevents chronic diseases but also improves health-related quality of life, which can be expressed as the individual response given in daily life to the physical, mental, and social impacts of the disturbances, that affect individual satisfaction.¹³ Physical activity, exercising self-efficacy, and physical self-esteem may be influential in the quality of life.¹⁴ Specific programs are needed to encourage children to perform long-term physical activity work which promotes the importance of a healthy lifestyle.

MATERIALS AND METHODS

The measurement of subjects in Berat city from ages 6 to 18 years old is performed through four indicators. The object of

the study was measuring body height, body weight, the perimeter over the gluteus, and waist perimeter for students age 6-18 years old. The subjects were tested with their consent and in optimal climatic conditions; the same for everyone and no student was experiencing any disease or metabolic disorder. The measurements were divided according to gender, separately for girls and boys, and separately from students of first grade, second grade, and so on up to 12th grade. The measurements are done from physical education teachers under the same procedure of testing which they were trained during theoretical and practical seminar training, organized by MASR (Ministry of Education, Sports, and Youth). Still, since measurements were done on humans, we applied for approval at the Committee of Ethics at the Sports University of Tirana (SUT). Approval was granted through the Ethical Clearance Letter No. 855/2. The data was collected and it was sent to the study group for further statistical processing. The measurements had undergone the calculations of BMI and obesity, based on formulas specified by the American College of Public health, according to the interpretation of body mass index (BMI), (weight/height², kg/m²).¹⁵ The range within a person's BMI falls will help determine whether they are of a healthy weight for their height. The ranges are as follows:

Weight status	BMI (kg/m ²)
Starvation	< 15
Underweight	< 18.5
Normal weight	18.5 – 24.9
Overweight	25 – 29.9
Obesity	30 – 40
Morbid obesity	> 40

The evidence and calculation of data, together with the associated tables were done with Microsoft Office Excel, from which we obtained the desired results. The second phase pertains to the measuring and comparing of the age groups and genders to observe possible differences and through the statistical evaluations; we gave such changes an average value. Through the method of analysis, not only did we clarify the obtained data, but we simultaneously defined the level of BMI for our subjects by forming an accurate overview and took a clear picture of problems regarding obesity in Berat city.

RESULTS AND DISCUSSION

The results data are obtained from measuring four indicators. In the city of Berat were tested 14138 subjects, from which 6903 girls and 7235 boys, table 1.

Table 1: The total number of tested subjects.

Education Level	Girls	Boys	Total/Education
Primary Education (PE)	2064	2869	5473
Lower Secondary Education (LSE)	2452	2568	5020
Upper Secondary Education (UPE)	1847	1798	3645
Total	6903	7235	14138

The measurements are from physical education teachers, according to a published protocol, and then further compiled by the authors of this study. All the conducted measurements were sent to the study group, which further processed them statically and comparatively. The following tables have the conclusive data obtained from measuring body weight, body mass, perimeter over gluteus and perimeter over the waist. The physical characteristics of the subjects are shown in Table 2. From these data, we have obtained indexes over height, BMI and conclusions for obesity (Table 3). A BMI value above 25 is considered overweight, while above 30, obese. Figure 1 shows the classification of overweight and obesity for boys and girls at all three levels of education. The results of all data by BMI indicators based on genders are summarized in Table 4.

Table 2: Anthropometric data for subjects in Berat city.

Parameter	Subjects	PE (6-11 years)	LSE (12-15 years)	USE (16-18 years)
Age (years)	Girls	8.4	12.8	16.4
	Boys	8.5	13.0	16.5
Body weight (kg)	Girls	28.0	45.7	53.6
	Boys	29.0	48.2	64.2
Body height (m)	Girls	1.31	1.56	1.62
	Boys	1.33	1.59	1.74
BMI (kg/m ²)	Girls	16.3	18.7	20.4
	Boys	16.5	19.0	21.3
Waist perimeter (cm)	Girls	58.3	68.0	69.0
	Boys	60.3	67.7	73.6
Gluteus perimeter (cm)	Girls	69.0	86.0	90.6
	Boys	70.4	82.6	89.7
Ratio (Pw/Pg)	Girls	0.85	0.79	0.76
	Boys	0.86	0.82	0.82

Table 3: Classification of the subjects according to the BMI.

Education	Subjects	Normal BMI		Over-weight		Obese	
		No.	%	No.	%	No.	%
PE	Girls	2580	99.17	21	0.81	3	0.01
	Boys	2841	99.02	27	0.94	1	0.03
Girls + Boys		5421	99.04	48	0.88	4	0.07
LSE	Girls	2339	95.39	97	3.95	16	0.65
	Boys	2439	94.97	96	3.73	33	1.28
Girls + Boys		4778	95.17	193	3.84	49	0.97
UPE	Girls	1765	95.56	77	4.16	5	0.27
	Boys	1647	91.60	135	7.50	16	0.88
Girls + Boys		3412	93.60	212	5.81	21	0.57

Figure 1: Overweight and obesity for boys and girls in Berat city.

Primary Education, 6-11 years old: 5473 subjects have been tested. Getting BMI rates basically, the results show that they are from the total number of 1% overweight to obese and 99% have normal body weight. Lower Secondary School, 12-15 years old: 5020 subjects have been tested. Taking base BMI rates, results in over 4.5 % of girls being overweight and obese and 5 % of boys. Upper Secondary School: 16-18 years old: 3645 subjects have been tested. The evaluation of the BMI shows that the total number of subjects, are overweight until about 8.4% of boys and about 4.4 % of girls. From the total 6903 girls of tested subjects, 195 were overweight or 2.82% and 24 girls were identified obese or 0.34%. From the total 7235 boys of tested subjects, 258 boys were identified as overweight, or 4.94%, while 50 boys obese, or 0.69%.

Table 4: Classification of the BMI indicators by gender.

Gender	Normal BMI	Overweight	Obese
Girls in %	96.82	2.82	0.34
Boys in %	95.74	4.94	0.69
Total % Girls+Boys	96.27	3.20	0.51

By comparing the study results with the respective ones of the Tirana city⁴, they have lower values for both overweight 3.2% versus 7.61% and obese subjects 0.51% versus 1.32% for the same age of groups. By comparing the results of the BMI measurements of our study with the city of Elbasan³, they also are lower values for both overweight 3.2% versus 4.84% and obese subjects 0.52% versus 1.14% for the same level of education. The results of this study, compared to the results taken from the BMI measurements of the project for all Albanian country^{2,6}, are lower for overweight 3.2% versus 3.75% and obese 0.51% versus 0.61% in total. While the measurements regarding girls are lower for the girls, specifically; overweight 2.82% versus 3.23% and obese 0.34% versus 0.52%, while for boys the overweight is slightly greater 4.94% versus 4.26%, but obesity is almost the same 0.69% for the same age group.

CONCLUSIONS

Body mass from age to age has an increase of 1% that is overweight 6-11 years old, at 4.5 % and 8.4 % at later ages. Also, boys over the age of 15 are at a higher percentage of fat than girls. In total, from 6-18 years old 14138 subjects, girls and boys tested in Berat city, BMI assessment shows that out of the total number of the subjects about 3.71% of them are overweight to obese versus 4.36 % of the subjects, taken in national range. This value is lower than the respective value for the same level of education. These values can be related to various reasons such as geographical position, economic standard of living, diet, style of life, physical activity in these age groups. It is recommended always to provide ourselves with natural food, not industrialized food. Sufficient physical activity is quite beneficial for health than any kind of diet. The multidisciplinary school programs in education culture help to reduce overweight and obesity in children. The benefits of healthy food and physical activity should be the focus of every student's education in school as well as in the family. The curricular program of physical education 3 hours/week is convenient, enables, and helps in the reduction of obesity and overweight, for children who regularly attend classes of physical education. Specific programs are needed to encourage children to perform long-term physical activity works which promote the importance of a healthy lifestyle.

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Authors' Contribution: The authors of this project have consistently worked with devotion to clarifying all details, not simply within technicality of measurements, but also to specify the testing procedure and collaboration with schools and education directorate in Berat city.

The authors' responsibilities were as follows: AB designed the research and wrote the manuscript. AB and BD analyzed data, FM edited the manuscript. AB had the primary responsibility for the final manuscript. The final version of the manuscript has been read and approved by all the authors.

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