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STUDY ON THE RELATIONSHIP BETWEEN DIET AND PHYSICAL DEVELOPMENT OF CHILDREN AT SCHOLAR AGE

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Key words: *rational nutrition, body mass index, school child health*

INTRODUCTION

The abundance of food, the offensive of culinary industry, led especially in heavily industrial countries a marked increase in overweight and obese people. This situation can be seen in our country too, both on television and in school or in the family. Because community life entails greater risks of disease is particularly important to ensure school children a balanced diet and adequate caloric nutrients.

We care too much about food abundance on the market, their variety, the diet content of adult and imposed also to children, and too little on the anatomical and physiological specific diet for school age children.

From here to the emergence of eating disorders, the pitch is very small. Lack of proper information is also another important factor and it is our duty as parents and teachers, to present this correctly to the society. In support to those presented, we conducted a survey over children from Secondary School "Nicolae Balcescu" from Nicolae Balcescu Commune and "Martin Benedict" School from Commune Galbeni, Bacau County during February-April 2014.

MATERIALS AND METHODS

The study was conducted on a sample of 160 secondary school children belonging to Secondary School "Nicolae Balcescu" from Nicolae Balcescu Commune and "Martin Benedict" School from Commune Galbeni, both from Bacau, during February to April 2014.

This sample is composed of two groups of children, one of them is composed of 80 children with age between 10 and 14 years (10-11, 11-12, 12-13 and 13-14 years old) belonging to secondary school "Nicolae Balcescu" and the second all sample consists of 80 children aged between 10 and 14 years belonging to "Martin Benedict" School from Commune Galbeni.

Following the agreement of the individuals in the study and their parents, subjects were tape measured and weigh using electronic scales, data is recorded in tables, here mentioning gender, class origin and age.

Data recorded on the sample in the study were entered electronically and subjected to statistical interpretation, focusing on BMI values, indicating that highlights the development of body mass.

Interpretations were made on age classes.

RESULTS AND DISCUTIONS

Children were measured and weighed, and as a result of BMI values we found varying degrees of health risks due to the surplus or deficit of body weight.

Of the 160 children registered at the two schools, 40 are in fifth class, with ages between 10-11 years old. BMI values shows that most of the children from this batch had normal weight (60% Secondary School "Nicolae Balcescu" and 65% Secondary School "Martin Benedict"), followed by individuals underweight (35% Secondary School "Nicolae Bălcescu "and 30% Secondary School" Martin Benedict) and overweight (5% to both schools).

The lot with ages between 10-11 years was made up of 40 children, 20 boys and 20 girls. Among Secondary School Girls "Nicolae Balcescu" was a case of overweight (BMI value of 25 to 29.9) and one case of overweight among boys of Secondary School "Martin Benedict" (with value from 25 to 29.9 BMI).

The risk of disease is increased both in overweight individuals and those underweight because the body is subjected to additional stress inducing a deficiency of substances that determine the proper development of the immune system. Individuals show a higher frequency of viral diseases, parasitic infections and bacterial diseases and fungal infections. In the lot subject to the study 40% had an increased risk of disease due to their underweight condition (35%) and overweight (5%); (Figures 1, 2, 3, 4).

The next group of children registered at the middle school was represented by 40 children of class VI, aged 11-12 years, 20 children from Secondary School "Nicolae Balcescu" and the other 20 children from Secondary School "Martin Benedict". The BMI values showed that most

subjects in this group are of normal weight (80%) followed by weight underweight individuals (15%) and overweight (5%).

This group of children consisted of 20 boys and 20 girls. In the group of boys were two cases of underweight (BMI value of 18,25) and three cases of overweight (15%) from Secondary School "Martin Benedict", unlike those at the Secondary School "Nicolae Balcescu" where we've found three cases of underweight (5%) and a case of overweight (15%). In the lot subjected to the study 20% presents increased risk of disease due to their condition: underweight (15%) and overweight (5%) (Figures 5,6,7,8).

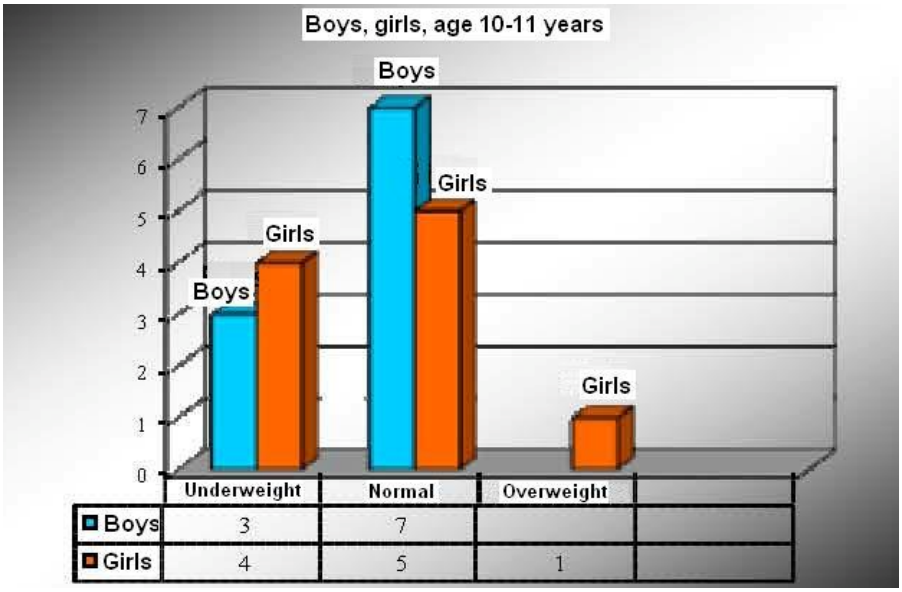
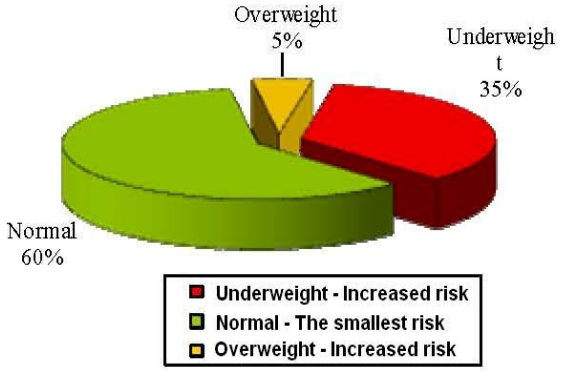


Fig.1. Distribution of pupils age 10 to 11 years after gender and BMI values from Secondary School "Nicolae Balcescu"

Interpretation of health risk



BMI values and interpretation of health risks	No. pupils
< 18.5 (Underweight) - Increased risk	7
18.5 - 24.9 (Normal) – The smallest risk	12
25 - 29.9 (Overweight) - Increased risk	1
Total	20

Fig. 2. BMI values and risk level recorded at pupils with age between 10 and 11 years from Secondary School "Nicolae Balcescu"

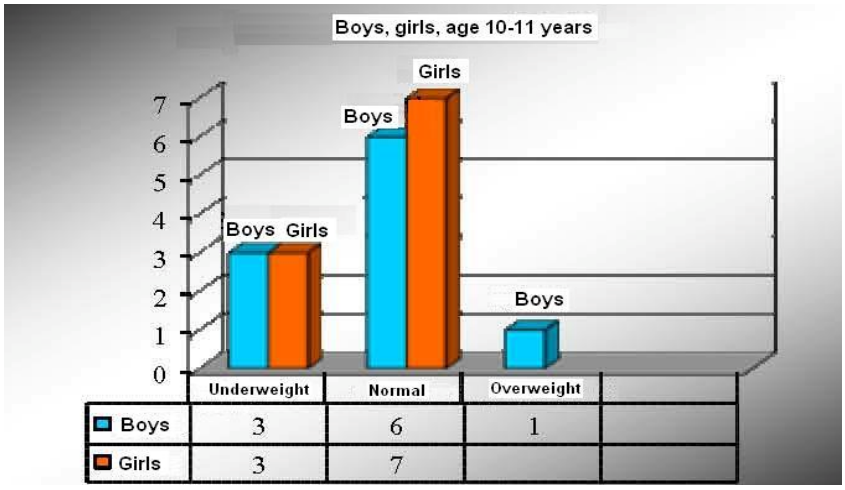


Fig. 3. Distribution of pupils age 10 to 11 years after gender and BMI values from Secondary School "Martin Benedict"

Interpretation of health risk

BMI values and interpretation of health risks	No. pupils
< 18.5 (Underweight) - Increased risk	6
18.5 - 24.9 (Normal) – The smallest risk	13
25 - 29.9 (Overweight) - Increased risk	1
Total	20

Fig. 4. BMI values and risk level recorded at pupils with age between 10 and 11 years from Secondary School "Martin Benedict"

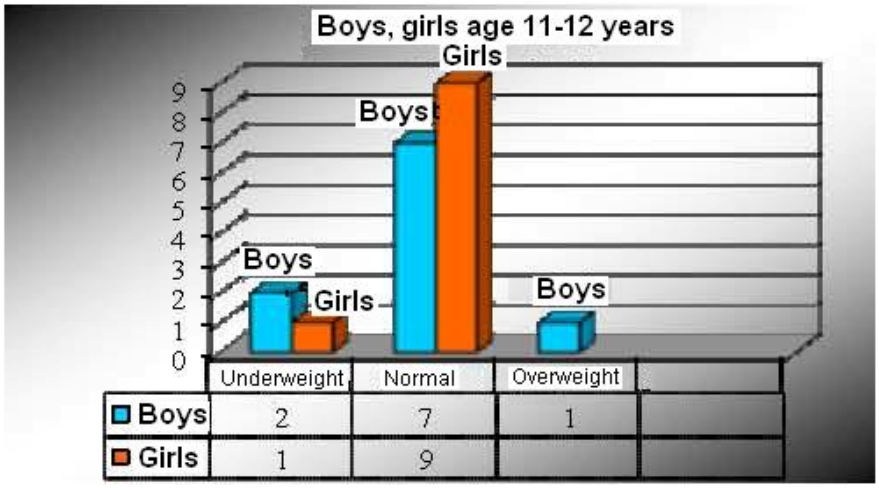


Fig. 5. Distribution of pupils age 11 to 12 years after gender and BMI values from Secondary School "Nicolae Bălcescu"

BMI values and interpretation of health risks	No. pupils
< 18.5 (Underweight) - Increased risk	3
18.5 - 24.9 (Normal) – The smallest risk	16
25 - 29.9 (Overweight) - Increased risk	1
Total	20

Fig. 6. BMI values and risk level recorded at pupils with age between 11 and 12 years from Secondary School "Nicolae Balcescu"

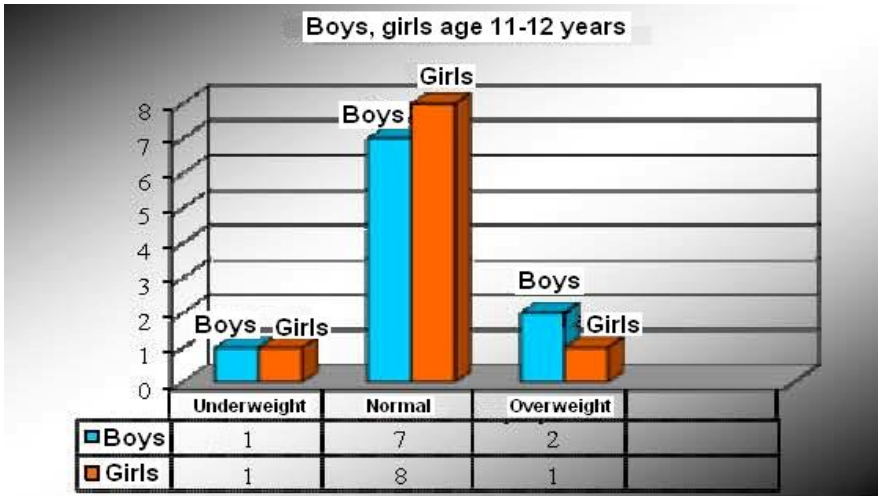
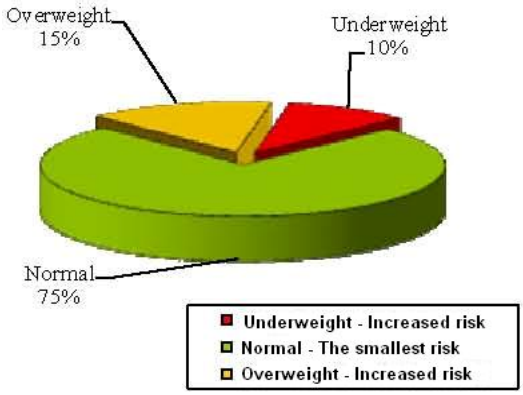


Fig. 7. Distribution of pupils age 11 to 12 years after gender and BMI values from Secondary School “Martin Benedict”



BMI values and interpretation of health risks	No. pupils
< 18.5 (Underweight) - Increased risk	2
18.5 - 24.9 (Normal) – The smallest risk	15
25 - 29.9 (Overweight) - Increased risk	3
Total	20

Fig. 8. BMI values and risk level recorded at pupils with age between 11 and 12 years from Secondary School “Martin Benedict”

In VII class also 40 children were recorded, aged 12 to 13 years. Of this group, after BMI value, it was found that the highest percentage is represented by those whose body weight is normal (80%), followed by overweight (15%) and underweight (5%).

This group, like the others, was made up of 20 boys and 20 girls. Comparing the BMI reporting values for the two sexes was found that the normal state is present at most of the children (78% boys, 80% girls). In the group of girls it was registered three cases of overweight (with BMI values of 27.30) at the "Nicolae Balcescu" School and four cases of overweight school "Martin Benedict" School. In the lot subjected to the study 20% presents an increased risk of disease due to their overweight status (5%) and underweight (5%); (Figures 9, 10,11, 12).

In VIII class were registered 40 students aged between 13 and 14 years. From this group one calculates BMI was found that the highest percentage is represented by those with optimal weight (75%) followed by those underweight (20%) and overweight (5%). This group consisted of 20 boys and 20 girls. BMI reporting values for the two sexes is found that the optimal weight but boys predominate among those at the "Nicolae Balcescu" there were four cases of underweight students and one overweight (BMI value of 27.8) . Among normal weight girls predominate, but there have been four cases of schoolgirls underweight and overweight one at the "Nicolae Balcescu" and among girls from school "Martin Benedict" were two cases of underweight and two schoolgirls cases of overweight pupils.

In the study 25% of the group exposed individuals have an increased risk of disease due to their condition underweight (20%) and overweight (5%) (Figures 13,14,15,16).

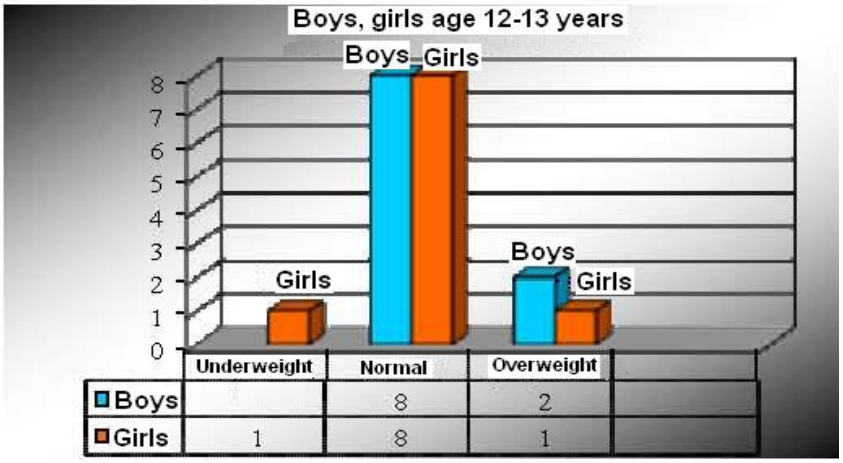
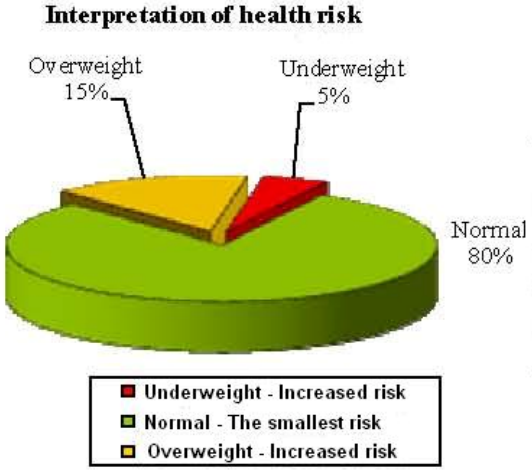


Fig. 9. Distribution of pupils age 12 to 13 years after gender and BMI values from Secondary School "Nicolae Bălcescu"



BMI values and interpretation of health risks	No. pupils
< 18.5 (Underweight) - Increased risk	1
18.5 - 24.9 (Normal) – The smallest risk	16
25 - 29.9 (Overweight) - Increased risk	3
Total	20

Fig. 10. BMI values and risk level recorded at pupils with age between 12 and 13 years from Secondary School "Nicolae Bălcescu"

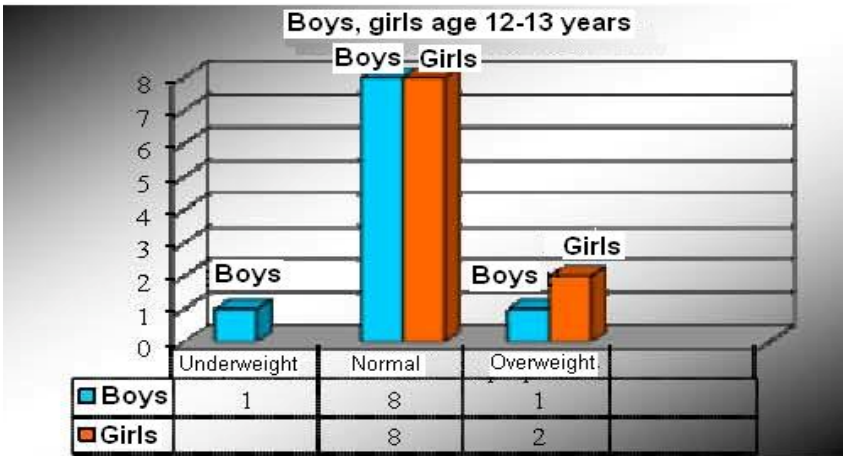


Fig.11. Distribution of pupils age 12 to 13 years after gender and BMI values from Secondary School "Martin Benedict"

BMI values and interpretation of health risks	No. pupils
< 18.5 (Underweight) - Increased risk	1
18.5 - 24.9 (Normal) – The smallest risk	15
25 - 29.9 (Overweight) - Increased risk	4
Total	20

Fig. 12. BMI values and risk level recorded at pupils with age between 12 and 13 years from Secondary School Şcoala Gimnazială "Martin Benedict"

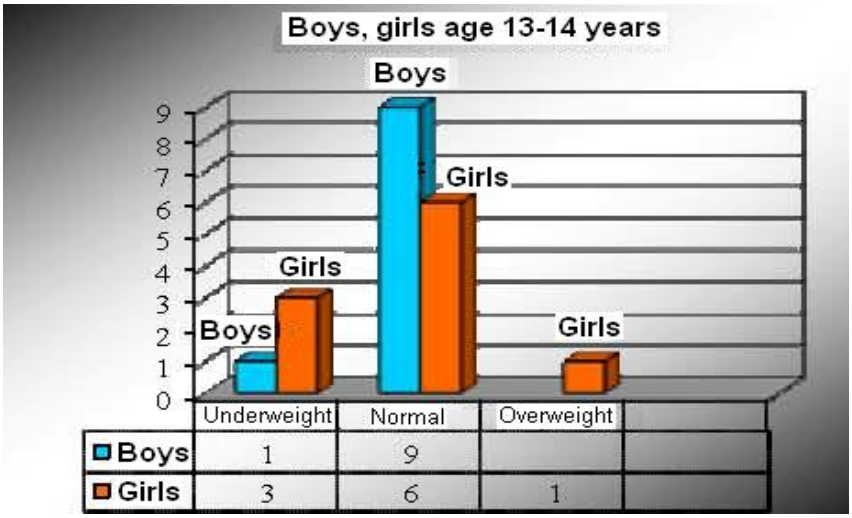


Fig.13. Distribution of pupils aged 13 to 14 years after sex and BMI values from Secondary School "Nicolae Balcescu"

BMI values and interpretation of health risks	No. pupils
< 18.5 (Underweight) - Increased risk	4
18.5 - 24.9 (Normal) – The smallest risk	15
25 - 29.9 (Overweight) - Increased risk	1
Total	20

Fig. 14. BMI values and risk level recorded at pupils aged between 13 and 14 years from Secondary School "Nicolae Balcescu"

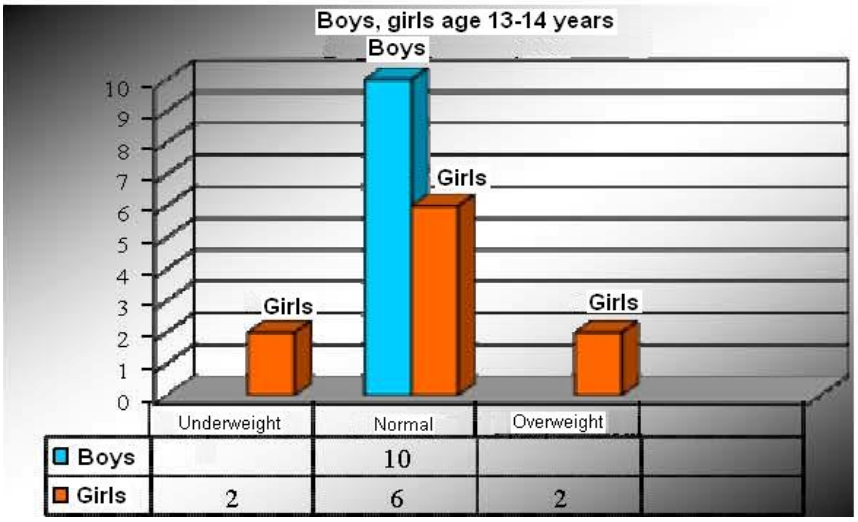
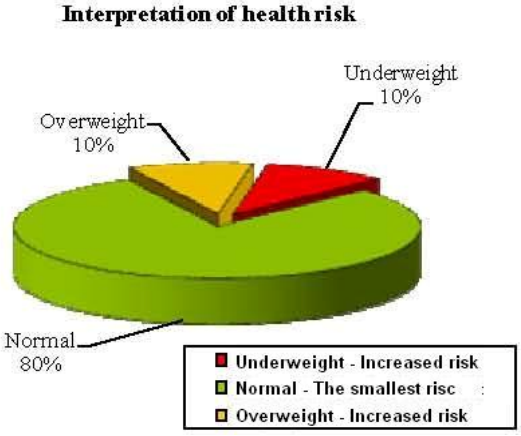


Fig.15. Distribution of pupils aged between 13 - 14 years after sex and BMI values of Secondary School "Martin Benedict"



BMI values and interpretation of health risks	No. pupils
< 18.5 (Underweight) - Increased risk	2
18.5 - 24.9 (Normal) – The smallest risk	16
25 - 29.9 (Overweight) - Increased risk	2
Total	20

Fig. 16. BMI values and risk level recorded at pupils aged between 13 and 14 years old Secondary of School "Martin Benedict"

Analyzing the global situation at the two schools in the studied sample consisting of 160 students aged 10 to 14 years, found that the greatest degree of underweight was recorded in the age group 10 - 11 years (13 children 40 analyzed, 32.5% respectively), while in the age group 12-13 is observed that there are at highest risk of obesity (7 of the 40 children analyzed, 17.5%). It follows that in all investigated children at this age (80 copies), the risk of the disease is 50%.

If we consider all children at risk of disease, 42 of the 160 investigated, it is found that the percentage of risk is also very high, 26.25% (Figures 17.18, Table 1). 26 Children at increased risk of underweight (16.25%) and 16 children at increased risk of obesity (10%).

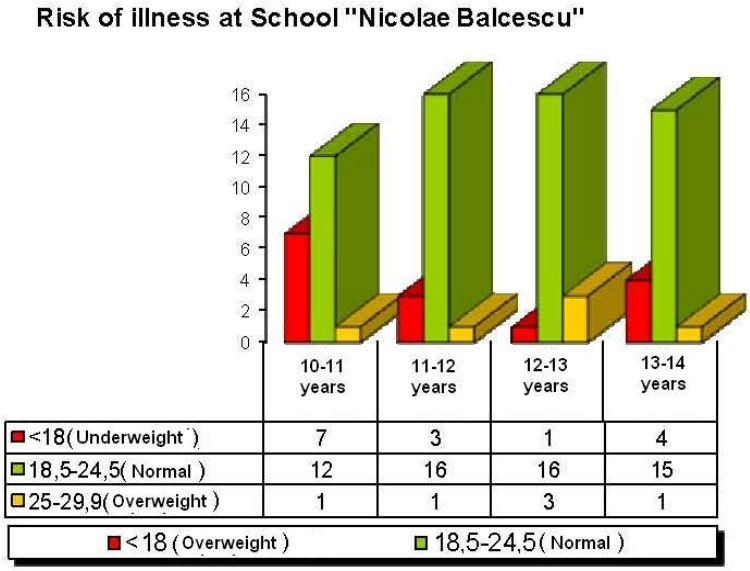


Fig. 17. Interpretation of health risks based on BMI values in all age classes students coming from Secondary School "Nicolae Balcescu"

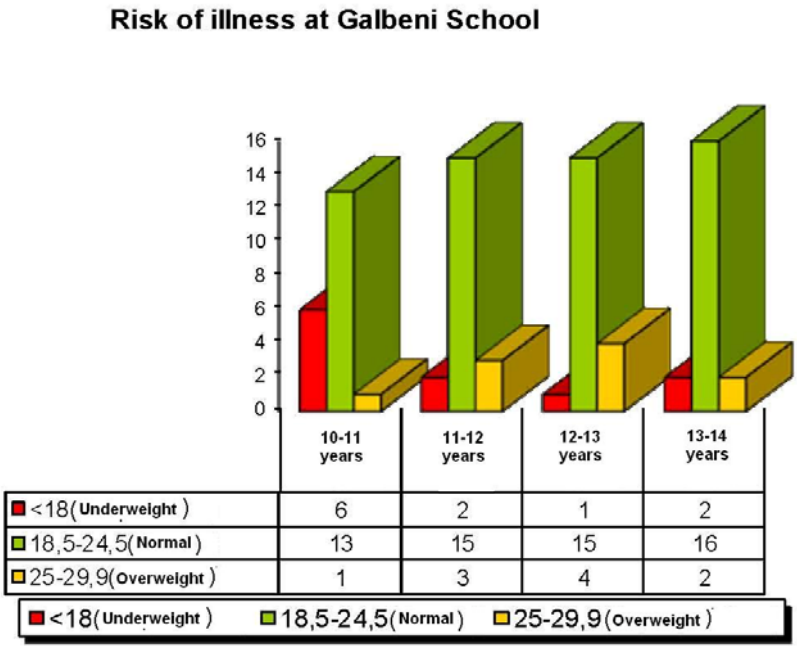


Fig. 18. Interpretation of health risks based on BMI values in all age classes students coming from Secondary School "Martin Benedict"

Analyzing at each sex separately, the schools, it is noted that both the Secondary School "Nicolae Balcescu" and the "Martin Benedict" in boys, the highest degree of underweight recorded in the age group 10-11 years old (15%) and cases of obesity are present for ages 12 to 13 years in both schools (10%).

And the girls group ages 10 - 11 years recorded the highest degree of underweight (20% Secondary School "Nicolae Balcescu" and 15% Secondary School "Martin Benedict") and the 12-14 age group have the most higher risk of obesity (10%) (tables 2, 3).

Table 1. Interpretation of health risks depending on values BMI at two schools

The degree of disease risk	CLASSES OF AGES							
	School "Nicolae Bălcescu "				School "Martin Benedict"			
	10-11 ani	11-12 ani	12-13 ani	13-14 ani	10-11ani	11-12 ani	12-13 ani	13-14 ani
< 18.5 (Underweight) - Increased risk	7	3	1	4	6	2	1	2
18.5 - 24.9 (Normal) - smallest risk	12	16	16	15	13	15	15	16
25 - 29.9 (Overweight) - Increased risk	1	1	3	1	1	3	4	2
30 - 34.9 (Obesity gr.I) - higher risk	-	-	-	-	-	-	-	-
35 - 39.9 (Obesity gr.II) – Highest risk	-	-	-	-	-	-	-	-

Table 2. Interpretation of health risks based on BMI values in boys

The degree of disease risk	CLASSES OF AGE							
	School "Nicolae Balcescu"				School "Martin Benedict"			
	10-11 ani	11-12 ani	12-13 ani	13-14 ani	10-11 ani	11-12 ani	12-13 ani	13-14 ani
< 18.5 (Underweight) - Increased risk	3	2	-	1	3	1	1	-
18.5 - 24.9 (Normal) - smallest risk	7	7	8	9	6	8	7	10
25 - 29.9 (Overweight) - Increased risk	-	1	2	-	1	1	2	-
30 - 34.9 (Obesity gr.I) - higher risk	-	-	-	-	-	-	-	-
35 - 39.9 (Obesity gr.II) – Highest risk	-	-	-	-	-	-	-	-

Table 3. Interpretation of health risks based on baseline BMI in girls

The degree of disease risk	CLASSES OF AGE							
	School "Nicolae Balcescu"				School "Martin Benedict "			
	10-11 ani	11-12 ani	12-13 ani	13-14 ani	10-11 ani	11-12ani	12-13 ani	13-14 ani
< 18.5 (Underweight) - Increased risk	4	1	1	3	3	1	-	2
18.5 - 24.9 (Normal) - smallest risk	5	9	8	6	7	8	8	6
25 - 29.9 (Overweight) - Increased risk	1	-	1	1	-	1	2	2
30 - 34.9 (Obesity gr.I) - higher risk	-	-	-	-	-	-	-	-
35 - 39.9 (Obesity gr.II) – Highest risk	-	-	-	-	-	-	-	-

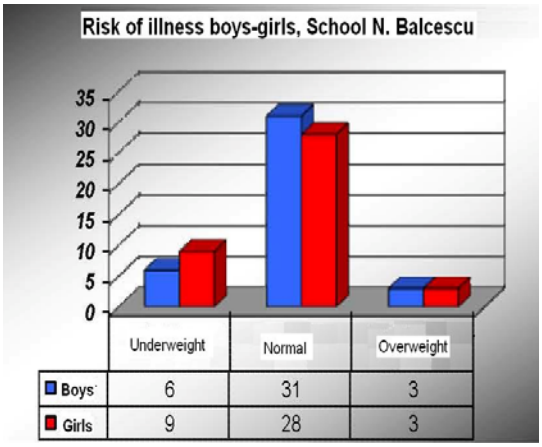


Fig.19. Graphical representation of disease risk in those 80 children investigated of Secondary School "Nicolae Bălcescu"

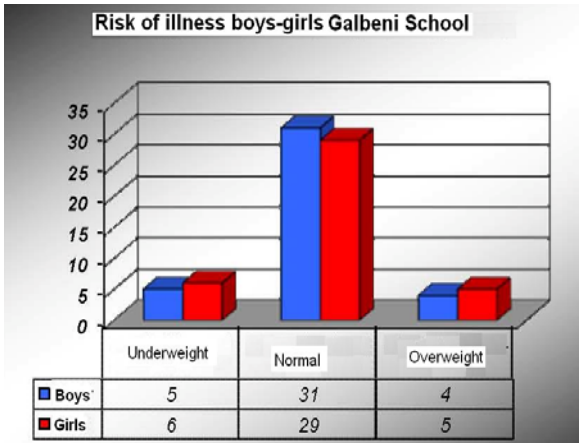


Fig.20. Graphical representation of disease risk in those 80 children investigated of Secondary Galbeni School

CONCLUSIONS

The overall situation at the two schools is as follows:

Secondary School "Nicolae Balcescu" both boys (15%) and girls (22.5%) are prone to weight underweight girls more than boys; obesity trend is the same (7.5%) for both boys and girls.

Secondary School "Martin Benedict" boys are also less prone to weight underweight (12.5%) than girls (15%), the trend in obesity is higher in girls (12.5%) than boys (10%).

Of the 160 students investigated, 16.25% of students are underweight, and 9.37% are overweight; highest percentage of underweight registered in the age group of 10-11 years old (32.5%) and 12-13 age group recorded the highest percentage students at risk of obesity (17.5%).

BMI ranges cases analyzed so that individuals predominantly in middle school have normal weight and underweight and overweight individuals. Of course, an important role is the way that food is carefully controlled by parents during preadolescence.

ABSTRACT

The study was conducted on a sample of 160 students from secondary schools: "Nicolae Balcescu" from Nicolae Balcescu and "Martin Benedict" in the village Galbeni, Bacau. The individuals were measured and weighed during February-April 2014, and calculates BMI were found varying degrees of health risks due to the surplus or deficit of body weight.

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