A STUDY CONCERNING ANTHROPOMETRIC AND MOTRIC POTENTIAL OF HIGH SCHOOL PUPILS IN SUCEAVA COUNTY

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ABSTRACT

Anthropometric and motric potential structure is dynamic, requiring careful research to determine its components and characteristics. After conducting this study there has been found the real motric potential and anthropometric profile of high school students, and could thus establish a work program to eliminate gaps of somatic development and improve motric indicators.

Suceava County has 5 municipalities, 11 towns and 98 communes and a population of 614,451. In Suceava County there are 37 high schools with more than 20000 pupils.

Our study was made in 7 high schools (from the urban and rural areas) during school year 2011/2012. At the study there were more than 2100 participants.

Identifying anthropometric and motric profile of high school student would help to optimize the Physical Education Curricula at this level and to adapt it to motric potential and somatic development level of today's students. The main goal is to shape the anthropometric and motric profile of the high school pupils.

Somatic index values are within the limits of previous studies, but there is a noticeable increase in weight, going to maximum values while the height is average values.

For the results of motric tests, the data showed low values indicating low performance, mostly contained within grades 5-8.

This research has shown that it is essential that the objectives of physical education teaching in high school should be tailored to students' motric potential, which according to our study is in decline and a tendency toward overweight pupils (BMI – from 19-20 to 21 points).

The limited aspect of the study is the fact it was performed locally when most data from previous studies are conducted at national level, in our case the number of subjects being 2128.

Keywords: potential, anthropometry, motric, high school, Suceava County

INTRODUCTION

Anthropometric and motric potential structure is dynamic, requiring careful research to determine its components and characteristics. From this point of view, experts have intensively studied in order to exactly determine its content and features.

Suceava is a county of Romania, in the historical region of Moldavia with the capital city at Suceava. In 2011, Suceava County had a population of 614451 (Romanians - 96.14%, Romas - 1.92%, Ukrainians - 0.92%, Lipovans - 0.27%, Germans - 0.11%, Poles, Slovaks, other - 0.5%) with a population density of 71.84/km^2. Suceava County has 5 municipalities, 11 towns and 98 communes. In Suceava County there are 37 high schools with more than 39000 pupils.

Our study was made in 7 high schools (from the urban and rural areas) during school year 2011/2012. At the study there were more than 2,100 participants.

In our country studies have been performed concerning somatic development of the pupils (table 1).

Table 1 Previous studies concerning somatic development of the pupils

Study, author, year	Grade / age	Male		Female	
		Height (cm)	Weight (kg)	Height (cm)	Weight (kg)
Nicu A, 1972	**IX/15-16**	166.4	57.5	162	53.5
	X/16-17	174.5	66.1	162.1	55.1
	XI/17-18	175.9	69.1	162.5	55.9
	XII/18-19	177.1	73.2	163	55.9
Mazilu V, 1980	**IX/15-16**	170.4	55.8	159.7	49.3
	X/16-17	173.2	60.6	161.5	51.7
	XI/17-18	175.4	65.7	162.1	53.6
	XII/18-19	176.1	66.8	162.4	55.3
CCPS, 1994	**IX/15-16**	171	57.3	161	53.7
	X/16-17	172.3	58.4	162.8	54.2
	XI/17-18	173.4	62.7	164.5	57.3
	XII/18-19	173.6	64.8	164.5	56.2
Tănăsescu, urban areas cited by Alexe N. (1999)	**IX/15-16**	163.6	51	157.7	49.3
	X/16-17	168.3	55.8	158.5	51.5
	XI/17-18	170.8	59.5	159	52.8
	XII/18-19	171.7	61.6	159.2	53.4
Tănăsescu, rural areas cited by Alexe N. (1999)	**IX/15-16**	156	45.1	154	46.4
	X/16-17	160.9	50.3	155.8	49.6
	XI/17-18	164.8	54.9	156.5	51.7
	XII/18-19	166.3	57.8	157.5	53.5

The study coordinated by Nicu Alexe (1972) aimed at obtaining information on the height and weight of students, making their average age. For our study there are important the data from students aged between 15 and 19 years, differentiated by sex.

Chronologically, the next study was conducted in the early 80s, being coordinated by V. Mazilu.

The study conducted by the Research Centre for Sport in 1994 was conducted on high school classes.

Tanasescu and collaborators cited by Alexe N. (1999) provided data on height and weight of children aged 4 to 18 years, by sex and urban-rural differences. The first difference noted in this study is evident both in the height and weight between children in urban and rural areas, higher values being obtained from those in urban areas.

It is noted that the results of the research done in the 70s and 80s are very similar, the differences in height and weight by age are minimal.

In the 1994 study there was observed that the average height of boys in grades terminals is lower than that of previous studies (177 cm, 173 cm) and a gradual decrease in body weight by approximately 10 kg (73.2 kg, 68 kg, 64.8 kg).

For female the values are kept in the same margin over the period in which they were surveyed. A synoptic situation of data collected in studies including minimum and maximum values obtained by age and sex is as it follows (table 2).

Table 2 Minimum and maximum values obtained in previous studies concerning somatic development of the pupils

Grade / age	Male				Female			
	Height (cm)		Weight (kg)		Height (cm)		Weight (kg)	
	min	max	min	max	min	max	min	max
IX/15-16	168.5	174.5	56.7	66.1	158.5	162.1	51.7	55.1
X/16-17	170.8	175.9	59.5	69.1	159	162.8	53.5	55.9
XI/17-18	171.7	177.1	61.6	73.2	159.2	164.5	55.3	57.3
XII/18-19	172.8	177	62.4	68.2	162.8	164.5	55.3	56.8

MATERIAL AND METHOD

Identifying anthropometric and motric profile of high school pupil would help to optimize the Physical Education Curricula at this level and to adapt it to motric potential and somatic development level of today's pupils.

The main goal is to shape the anthropometric and motric profile of the high school students.

Work tasks:

- Study experts' opinion regarding this topic;
- Establish the sample on which the research will be performed;
- Test the subjects to determine the level of physical development and of motricity;
- Analysis of data obtained from the research;
- Establish the research findings.

This work is based on a study of Suceava County high school pupils during the 2011 – 2012 school year. Obtaining the necessary research data (anthropometric, motric) was made during all the school year. Research sample is composed of 2128 high school pupils of which 1169 boys and 959 girls. The breakdown by class is as it follows (table 3).

Table 3 Distribution of the subjects by gender and grade/age

Grade / age	Females	Males	Total
IX	274	360	634
X	254	247	501
XI	233	303	536
XII	198	259	457
TOTAL	959	1169	2128

In this research there have been established 7 indicators to be evaluated: 3 somatic indicators and 4 motric indicators.

To test somatic development there were measured the standing height, the weight using a mechanical scale and body mass index.

To test motric ability the pupils had to pass the following tests: 50 m running speed, standing long jump, trunk lift in 30 seconds, hanging tractions (boys) and keeping the hang (girls).

RESULTS

The data were ordered on high school classes, namely on sexes in order to be compared with those obtained from previous studies (tables 4, 5, 6; figures 1, 2).

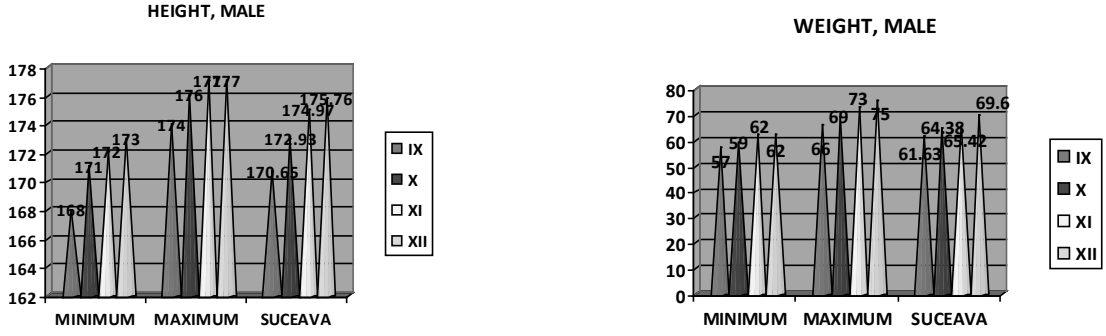

Figure 1
Height and weight for male (average, minimum and maximum values)

Table 4 Male results for somatic and motric indicators

9th grade, males							
Parameters	Height (cm)	Weight (kg)	BMI	Running speed 50 m (s)	Standing long jump (cm)	Trunk lift in 30 sec (no reps)	Tractions (no reps)
X	170.65	61.63	21.16	8.12	186.96	21.32	6.81
S	4.31	6.12	0.329	0.27	7.74	2.78	2.76
C.V. (%)	2.526	9.930	1.557	3.325	4.140	13.039	40.529
10th grade, males							
X	172.93	64.38	21.53	8.05	186.87	21.94	7.68
S	8.31	13.17	0.191	0.29	9.37	2.49	3.18
C.V. (%)	4.805	20.457	0.886	3.602	5.014	11.349	41.406
11th grade, males							
X	174.97	65.42	21.37	7.94	188.26	22.67	8.83
S	6.74	9.86	0.217	0.43	8.87	2.23	4.52
C.V. (%)	3.852	15.072	1.016	5.416	4.712	9.837	51.189
12th grade, males							
X	175.76	69.60	22.53	7.77	189.56	23.31	10.28
S	4.86	4.99	0.211	0.43	6.76	2.12	2.57
C.V. (%)	2.765	7.170	0.938	5.534	3.566	9.095	25.000

Table 5 Female results for somatic and motric indicators

9th grade, females							
Parameters	Height (cm)	Weight (kg)	BMI	Running speed 50 m (s)	Standing long jump (cm)	Trunk lift in 30 sec (no reps)	Keep hanging (s)
X	157.67	50.18	20.18	8.89	174.59	19.74	48.23
S	4.83	5.07	0.217	0.36	7.48	2.49	4.78
C.V. (%)	3.063	10.102	1.077	4.049	4.284	12.614	9.911
10th grade, females							
X	158.31	50.65	20.21	8.90	173.86	19.62	46.47
S	4.58	4.97	0.237	0.41	7.52	2.19	4.88
C.V. (%)	2.893	9.812	1.172	4.607	4.325	11.162	10.501
11th grade, females							
X	159.13	52.47	20.72	8.86	174.96	20.11	47.82
S	6.82	7.17	0.154	0.49	8.29	2.74	5.36
C.V. (%)	4.286	13.665	0.744	5.530	4.738	13.625	11.209
12th grade, females							
X	159.57	51.18	20.10	8.72	177.29	20.37	48.85
S	7.04	6.87	0.139	0.38	9.14	4.31	5.27
C.V. (%)	4.412	13.423	0.690	4.358	5.155	21.159	10.788

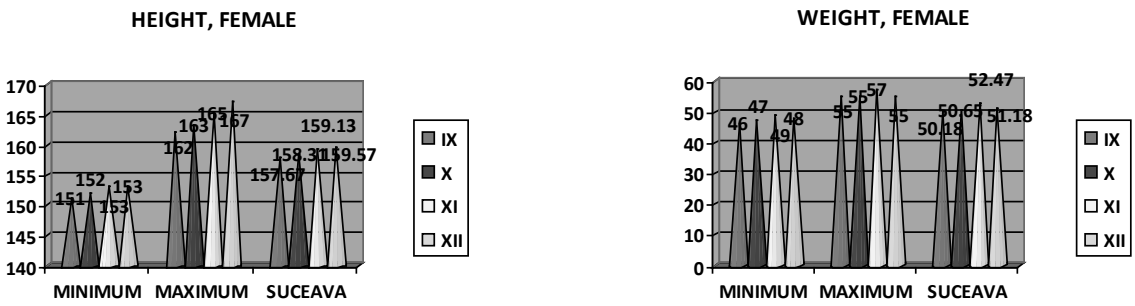

Figure 2
Height and weight for female (average, minimum and maximum values)

For tests aiming at determining the motric potential, the results are as follows (table 6).

Table 6 Averages values for motric tests

Averages – Males				
Grade	Running speed 50 m (s)	Standing long jump (cm)	Lifting the trunk in 30 sec (no reps)	Tractions (no reps)
IX	8.12	186.96	21.32	6.81
X	8.05	186.87	21.94	7.68
XI	7.94	188.26	22.67	8.83
XII	7.77	189.56	23.31	10.28
Averages – Females				
Grade	Running speed 50 m (s)	Standing long jump (cm)	Lifting the trunk in 30 sec (no reps)	Keep hanging (no reps)
IX	8.89	174.59	19.74	48.23
X	8.90	173.86	19.62	46.47
XI	8.86	174.96	20.11	47.82
XII	8.72	177.29	20.37	48.85

DISCUSSION

After conducting this study there have been found the real motric potential and the anthropometric profile of high school pupils, thus establishing a work program to eliminate gaps of somatic development and improve motric indicators.

Following measurements and analysis of all these indicators we can say that the motric and somatic potential of Suceava County high school pupils are within the margin of previous studies. Exception to this rule were males from 9th grade where the weight shows the highest value (61.63 kg) and 12th grade girls who have the lowest amount of weight (51.18 kg) (table 7).

Table 7 The results from previous studies concerning somatic development of the pupils and Suceava 2012 study

Grade / age	Gender	Somatic parameters	Nicu A, 1972	Mazilu V, 1980	CCPS, 1994	Tănăsescu, urban areas	Tănăsescu, rural areas	Suceava 2012
IX / 15-16	Male	Height (cm)	166.4	170.4	171	163.6	156	**170.65**
		Weight (kg)	57.5	55.8	57.3	51	45.1	**61.63**
	Female	Height (cm)	162	159.7	161	157.7	154	**157.67**
		Weight (kg)	53.5	49.3	53.7	49.3	46.4	**50.18**
X / 16-17	Male	Height (cm)	174.5	173.2	172.3	168.3	160.9	**172.93**
		Weight (kg)	66.1	60.6	58.4	55.8	50.3	**64.38**
	Female	Height (cm)	162.1	161.5	162.8	158.5	155.8	**158.31**
		Weight (kg)	55.1	51.7	54.2	51.5	49.6	**50.65**
XI / 17-18	Male	Height (cm)	175.9	176.1	173.4	170.8	164.8	**174.97**
		Weight (kg)	69.1	66.8	62.7	59.5	54.9	**65.42**
	Female	Height (cm)	162.5	162.4	164.5	159	156.5	**159.13**
		Weight (kg)	55.9	55.3	57.3	52.9	51.7	**52.47**
XII / 18-19	Male	Height (cm)	177.1	176.1	173.6	171.7	166.3	**175.76**
		Weight (kg)	73.2	66.8	64.8	61.6	57.8	**69.60**
	Female	Height (cm)	163	162.4	164.5	159.2	157.5	**159.57**
		Weight (kg)	55.9	55.3	56.2	53.4	53.5	**51.18**

Anthropometric data indicate values comparable to those achieved in previous studies for boys, and below this level for girls. Results and calculation of body mass index indicated an ascendant trend (20.97) confirmed by calculating body mass index compared to previous studies (19.32-20.69).

Average performance obtained from control samples indicate poor value because for the conversion values there are obtained marks between 5 and 8, according with the provisions of national system of evaluation in physical education and sports. Last revision of the national assessment in physical education and sports was made in the 90's (tables 4 and 5).

CONCLUSIONS

Somatic index values are within the limits of previous studies, but there is a noticeable increase in weight, going to maximum values while the height is average values.

For the results of motric tests, the data showed low values indicating low performance, mostly contained within grades 5-8.

This research has shown that it is essential that the objectives of physical education teaching in high school should be tailored to students' motric potential, which according to our study is in decline and it has also shown a tendency toward overweight pupils (BMI – from 19-20 to 21 points).

For physical education classes it should be kept in mind that the growth process is completed for girls but for boys is nearing completion.

The limited aspect of the study is the fact that it was performed locally when most data from previous studies are conducted at national level, in our case the number of subjects being 2128.

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