

EXPERIMENTAL STUDY ON IMPROVING THE QUALITY OF LIFE THROUGH THE STANDARDIZATION OF AN AEROBICS PROGRAM AND OF EFFORT PARAMETERS CONTROL USING THE PULSE TESTER

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Abstract: Through the variety of aerobics means of action that are used during the physical education lesson it is traced the development of conditional and coordinative qualities, the building up of basic and specific motion abilities, the building up of a beautiful esthetic aspect and the control of obesity and increasing the attractiveness of these classes.

Physical activity is the most important way to prevent heart diseases, respiratory insufficiency, atherosclerosis and obesity. The decrease of body mass index is a secure way to reduce the risk of premature death and to ensure a more healthy way of living. The world tendencies regarding the optimization of life quality consist in developing some prevention programs that have to be the result of interdisciplinary interaction of varied knowledge and means. We consider that practicing physical activity in general and aerobics in particular can be part of the complex program to prevent and improve the life quality, because it allows rationalization and standardization of means and different treatment depending on individual particularities, and organizing classes in a varied and attractive way, which induces positive effects in the somatic-functional field, and in the motion, psychical and social field

Key-Words: - *quality of life, somatic index, functional capacity, motion capacity, aerobics, pulse tester*

1 Introduction

The new world tendency is the appearance of juvenile obesity and its early complications, fact that requires the development of health programs which ensure the increase of everyone's quality of life. Recent research shows the fact that health risk factors and of life quality manifest in the last decade at more early ages [5]. We consider that the prevention programs have to be the result of interdisciplinary efforts through which the elaboration and standardization of present research results of a gymnastics program, can be an efficient way, that completed by other means - nutritional, psychological - can determine the optimization of the quality of life. Each individual has to be aware that every excess from the normal limits of life quality has a negative impact on health, being a sure candidate for diabetes, hypertension, coronaropathy - heart attack. [4]

The human body is sustained during the aerobic exercise by active organs and tissues, being able to develop a physical effort of a cardio-vascular type, between 5-6 minutes and an hour.

The effort is a stressful agent because it mobilizes the adaptive mechanisms of the body,

determining it to correspond to specific parameters: volume, intensity, duration. Physical exercise systematically determines the body to adapt to a permanent superior level [2].

The fundamental tasks of physical education are: the optimization of biological development of the human being, referring to the optimization of morpho-functional development, the optimization of motion skills and habits, the prevention and correction of attitude deficiencies, psychical development and the building up of human personality [2]

2 Problem Formulation

Many of the juvenile weight gains and health problems from the last years are believed to be the result of a low level of physical activities. The overweight appears when a person has a bigger calorie intake as compared to the burnt calorie amount. But there are other factors which play an important role in overweight and obesity, such as: age, sex, genetics, environmental factors, physical activities, psychological factors. etc. [7]

Aerobics consists of an elaborate system of physical exercises, which requires a high level of oxygen, pursuing a better body development and maintaining it in an optimal functional state, the relaxation of the nervous system, good mood, creation, motion elegance, rhythm and musicality.

The aerobic effort runs its course in a balance between the demand and consumption of oxygen “steady – state”, which can be real or apparent. The real state is a balance between the demand and the oxygen intake at a cardiac frequency of 130 beats/minute. The apparent state of balance refers to a cardiac frequency of 130-170 beats/ minute. [3]

Motion satisfaction - illustrates the main purpose of aerobics “Mens sana in corpore sano” [6]. The professor has an essential role in pointing out the physical and psychical benefits of motion, practicing aerobics systematically. Therefore, an improvement of the physical condition is ensured by:

A very good cardio-vascular activity, where the heart becomes stronger during the effort, pumping a bigger blood quantity to the peripheral circulation which determines a performance increase during the physical exercise [5]

A very good respiratory activity due to intercostals and midriff muscle development that become stronger are increase the thoracic cavity and bringing a high oxygen intake to the lungs. Meanwhile, a higher oxygen quantity goes to the brain, leading to a faster and more efficient thinking.

A stronger articulation and muscular system, a higher mobility which prevents insularism [1]

From a muscular perspective, a very good tonus is obtained, some muscular parts develop, and others become stronger, giving the body a correct and harmonious posture.

Under the beneficial influence of physical exercise, through a more intense activity, in the body the capillary reserves open and new ones are formed. Apart from capillary multiplication, muscular fibers develop leading to the appearance of a harmonious muscle mass and a good effort capacity.

After the systematic practice of physical exercise, the overweight begins to disappear, and the spine will be less solicited.

We think that these arguments are adequate to consider the chosen topic a modern one and necessary to run the scientific research.

3 Problem Solution

The purpose and hypothesis of the research

As a main purpose we suggested the development of an aerobics program which could be

standardized on the basis of the present research results, and the effort parameters could be rationalized individually depending on everyone's particularities, with the help of pulse tester, for improving the life's quality by optimizing the somatic indices of the functional and motion capacity of 11th grade pupils.

To elaborate the hypotheses of this paper we assumed the following:

The functional capacity, the somatic indices and motion capacity specific to gymnastics for the 11th grade pupils can be improved by specific aerobics means, practiced during the physical education class.

The premise is that oxygen recuperates faster than the cardiac frequency (FC) therefore; the FC values and the pause duration between repetitions have been registered with the pulse tester which represents a very reliable index of the global intensity of effort, but also of the recovering after effort.

Means and instruments of research

To elaborate this paper we used the pedagogical experiment.

The first concept was that by introducing exercises specific to aerobics in part 2, 3, 4 and 5 of the physical education class at the 11th grade pupils, the level of functional and motion capacity and of somatic indices will improve, as compared to the pupils practicing the standard gym class. The period of time in which the research took place was the entire school year of 2008- 2009. In this time the independent argument was applied on the experimental group which consisted of a series of specific aerobics means of action, carefully selected and adapted to improve the somatic indices, the functional and motion capacity specific to these pupils. The values of the dependent argument reflect the results and their evolution by all participants at the experiment.

From the varied statistic indices we consider useful for analyzing the results, the following:

the average: X

standard deviation: S

variability coefficient: CV

Ruffier index: (the Ruffier test is a test of sub maximal effort based on measuring the cardiac frequency after the effort). It has the following formula:

$$\text{Indicele Ruffier} = \frac{(P2 - 70) + (P3 - P1)}{10}$$

The interpretation depends on the index's value:

0-2.9 = a good index;

3-6 = medium index;

Above 6 = low index.

The intensity on effort levels and the effort intensity were made on pulse areas. For extensive intervals we used a cardiac frequency of 180p/ min and a recovery break up to FC 125-140p/min, and for the intervals of 90-100% of maximum FC (220-age).

During the field experiment, we used the telemetric machine Ciclosport Cp 12C to register FC that has the following characteristics: it measures the work FC, its average and its maximum, intermediary times, the FC, the cardiac frequency on percentage areas of max FC, the frequency limit and the acoustic and visual alarm signal. The machine allowed us to measure the exact FC during effort, of breaks and individual measuring. The registered pulsations were a precise index of the performance intensity and of the effort recovery.

We standardized the exercises according to the required coefficient by comparing the maximum values of the cardiac frequency.

The relation between the requested level and the effort intensity are pointed out by the functional values and most frequent by FC.

For the intensities of the sub maximal solicitations there is a linear increase corresponding to the effort intensity values. This linearity isn't found at efforts of high or low intensities. The FC measured with the pulse tester is a very good global index of the effort intensity, serving as a reference system to each pupil and professor.

Organizing the research

The research was carried on 90 pupils of the 11th grade, divided in two groups: the experimental group of 44 pupils from the Saguna High-school in Brasov, and the control group of 46 pupils from the Mesota High-school in Brasov.

The research took place during the school year of 2008-2009 and had more phases consisting in two tests: the initial test: in the period 12-26 September 2008

The evolution of the research by applying the independent variables on the experimental group - from the 1st of October until final tests, on 24th May 2009.

The final test: in the period: 25-30 May 2009 (somatic measuring and the functional test)

The test instruments of the research

Anthropometric measuring: the height (cm), the weight (kg), the abdominal diameter (the waist, cm), the hips diameter (cm)

The Ruffier test

Test description:

- the pulse is measured in a sitting position, marking the P1 value;
- 30 genuflexions are performed, after the first 15 seconds of effort the person is in

clinostatism, the pulse is measured and the P2 value is marked.

The number of pulsations is determined after 1 minute break in clinostatism, marking the P3 value.

Motion tests

The summative evaluation at the 11th grade (instruments of evaluation/ practical tests) – according to the National Scholar Evaluation System, the pupils get a single grade either for aerobics, acrobatic or rhythmic gymnastics.

Aerobics: test for the pupils from the experimental group:

Performing an aerobics program made of 12 exercises on music, rated from 10 according to the number, difficulty and the level of execution of the aerobic elements.

Acrobatic gymnastics – test for the pupils in the control group:

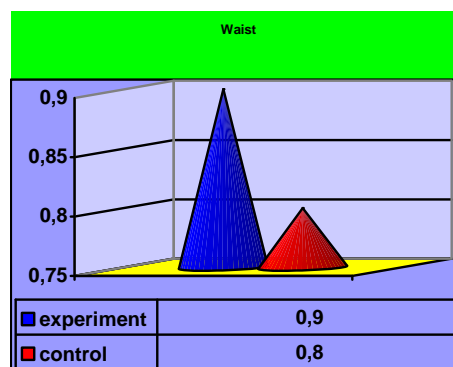
Performing a free chosen sole exercise with impose elements or an exercise of rhythmic gymnastics, rated from 10 according to the number, difficulty and the level of execution of the acrobatics elements.

Research results

EXPERIMENTAL GROUP			
Statistic indices	Ti	Tf	D
X	166,6	167,4	0,8
S	6,058	5,560	-
CV	3,63%	3,32%	-
CONTROL GROUP			
Statistic indices	Ti	Tf	D
X	166,6	167,5	0,9
S	6,112	5,893	-
CV	3,66%	3,51%	-

Table 1.

Anthropometrics measuring results –waist



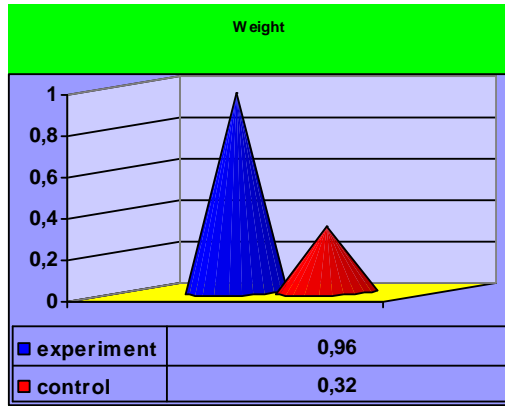
Graphic 1.

The average difference between tests - waist

EXPERIMENTAL GROUP			
Statistic indices	Ti	Tf	D
X	56,22	57,18	0,96
S	5,562	5,456	-
CV	9,89%	9,54%	-
CONTROL GROUP			
Statistic indices	Ti	Tf	D
X	56,72	57,04	0,32
S	5,174	5,259	-
CV	9,72%	9,21%	-

Table 2.

Anthropometrics measuring results – weight



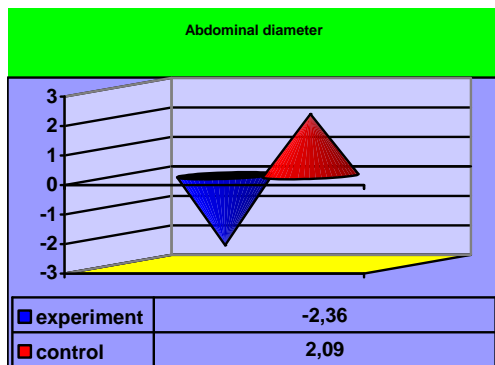
Graphic 2.

The average difference between tests – weight

EXPERIMENTAL GROUP			
Statistic indices	Ti	Tf	D
X	77,13	74,77	-2,36
S	4,28	5,12	-
CV	5,54%	6,84%	-
CONTROL GROUP			
Statistic indices	Ti	Tf	D
X	74,31	76,40	+2,09
S	5,49	5,03	-
CV	7,38%	6,58%	-

Table 3.

Anthropometrics measuring results – abdominal diameter

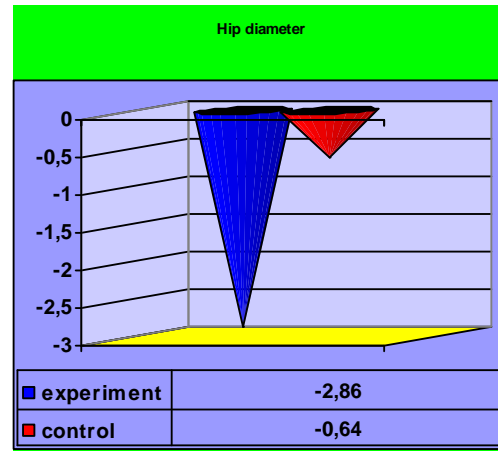


Graphic 3.

The average difference between tests - abdominal diameter

EXPERIMENTAL GROUP			
Statistic indices	Ti	Tf	D
X	96,81	93,95	-2,86
S	4,21	6,43	-
CV	4,34%	6,84%	-
CONTROL GROUP			
Statistic indices	Ti	Tf	D
X	95,54	94,90	-0,64
S	5,89	7,38	-
CV	6,16%	7,77%	-

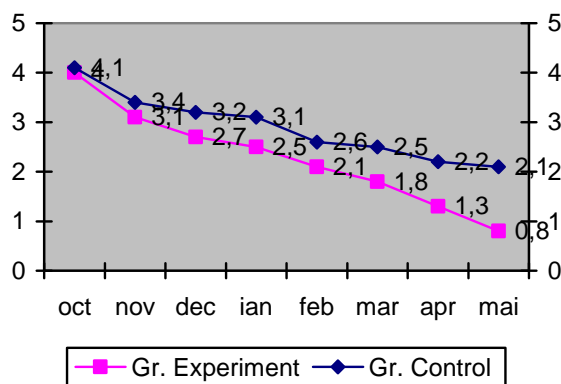
Table 4. Anthropometrics measuring results – hip diameter



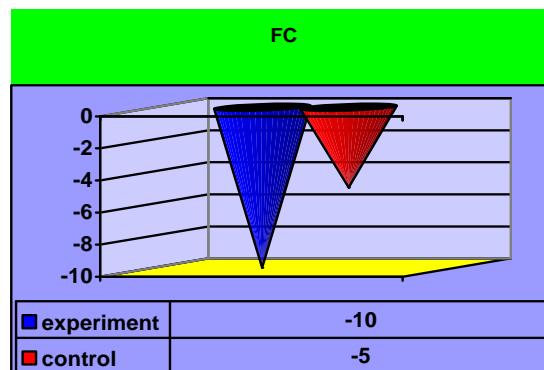
Graphic 4. The average difference between tests - hip diameter

Month of year	Experimental group- Average X	Control group- Average X
Oct	4	4,1
Nov	3,1	3,4
Dec	2,7	3,2
Jan	2,5	3,1
Feb	2,1	2,6
Mar	1,8	2,5
Apr	1,3	2,2
May	0,8	2,1
Average - X		

Table 5. Functional Test result–Ruffier Test



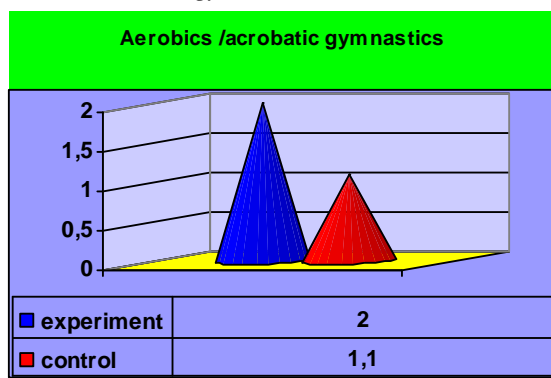
Graphic 5. Ruffier test results



Graphic 7. The average difference between tests - FC

EXPERIMENTAL GROUP			
Statistic indices	Ti	Tf	D
X	6,6	8,6	2
S	0,502	0,789	-
CV	7,60%	9,17%	-
CONTROL GROUP			
Statistic indices	Ti	Tf	D
X	7	8,1	1,1
S	0,975	0,514	-
CV	13,9%	6,34%	-

Table 6. Motion test results - aerobics/ acrobatic gymnastics



Graphic 6. The average difference between tests - aerobics/ acrobatic gymnastics

EXPERIMENTAL GROUP			
Statistic indices	TI (pulsatii/min)	TF (pulsatii/min)	D (pulsatii/min)
X (sec)	193	183	-10
S	8.4	5.4	-
CV (%)	4.35%	2.95%	-
CONTROL GROUP			
Statistic indices	TI (pulsatii/min)	TF (pulsatii/min)	D (pulsatii/min)
X (sec)	194	189	-5
S	10.7	8.8	-
CV (%)	5.51%	4.65%	-

Table 7. FC values registered with the pulse tester

4 Conclusion

The results of the research lead to the hypotheses confirmation.

The level of somatic indices, and the functional and motion capacity of the pupils from the experimental group improved considerably between the two tests, which confirms the fact that during the physical education classes, the action systems specific to aerobics have been practiced and applied according to the age particularities and the efficiency criteria, as compared to the control group that practiced classic systems of action during the physical education classes and means of action specific to athletics and basic gymnastics.

Active individuals need more energy (calories) than the ones less active, in order to maintain their weight. Moreover, physical activity tends to decrease the appetite of overweight and obese individuals, as the body's capacity to metabolize the fat as a source of energy increases.

After the research we can recommend the following:

We recommend to the high school professors to take more aerobics classes, which will contribute to the increase of the pupils' functional capacity and to the increase of the class attractiveness.

We recommend the collaboration with doctors, nutritionists, sociologists to get pupils aware of the danger of not practicing physical exercise and of the negative influence of the health's risk factors.

Introducing in the scholar program a teaching line called "Education for health" which contributes along with the physical education to building up and changing pupils' mentality regarding the health maintenance and the life quality improvement.

References:

- [1]. Bach R. A. – Health for all – Sport for all, Congress Review „Sport and health: From theory to practice”, 2008, Barcelona, pp. 12,13
- [2]. Bădău D. – Metodica disciplinelor sportive gimnice, Ed. Universității Transilvania, Brașov, 2007, pp.26,78,91
- [3]. Dumitru Gh. – Activitatea fizică – factor însemnat al păstrării sănătății în România, Ed. FSPT, București 2004, pp.45, 50,62
- [4]. Dumitru Gh. – Sănătatea prin sport pe înțelesul fiecăruia, Ed. FSPT, București 1997
- [5]. Hardman A.E.; Stensel D.S. – Physical Activity and Health, The evidence explained, by Routledge, New York, 2009, pp. 9, 102, 105, 155
- [6]. Macovei S, Vișan A - Gimnastica aerobică de întreținere – ghidul specialistului, Ed. SPT, București 2003, pp.32, 89, 104
- [7]. Macovei S. - Îndrumar metodic – mijloace asociate din educație fizică (gimnastica ritmică sportivă și aerobică), Ed. ANEFS, București 1997, pp.23,67