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**SUMMARY OF THE DOCTORAL THESIS**

**TITLE OF THE THESIS: The optimization of physical fitness - an opportunity to increase the quality of life of the "Vasile Alecsandri" University of Bacau female students**

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**Introduction**

Through a regular practice of physical exercises, one can reduce the states of depression, distrust, increase the resistance to stress, the ability to focus, improve the self image and increase self-confidence, the physical exercises having beneficial effects also on one's psyche. The purpose for practicing various physical activities is to increase one's quality of life by: increasing one's physical capacity, improving one's physical fitness, increasing one's self-confidence, increasing one's enjoyment of physical activity. Considering that the "beneficial effects of practicing aerobic gymnastics are multiple, covering different aspects" (mental, physical, social, and financial), it is believed that they play a significant role in creating the premises for the manifestation of the attributes of a healthy lifestyle. The role played by physical education and sports is a very important one for the society, due to their major importance for maintaining people's health.

This research tries to improve the female students' fitness and quality of life through the use of aerobic gymnastics means, to motivate them to independently and long term practice physical exercises, both during physical education classes, and during their leisure time.

Starting from this premise, this research *aims* to obtain an optimization of the subjects' physical fitness as an opportunity for growth for the quality of life by using aerobic gymnastics means in individualized programs, created according to the subjects' individual possibilities. The main goals of this research were to: identify the female students' opinion regarding the effects of practicing aerobic gymnastics to establish the need to implement an intervention based on specific aerobic gymnastics means, based on individualized models and combining various forms of practice; know the manifestation of the young female students' somatic indices and body harmony in order to create the intervention model; increase the female students' quality of life by improving their fitness through the practice of physical exercises based on an individualized model.

The research, throughout the three studies presented in part II and part III tried to validate the hypotheses, because from them I started various conducts to confirm or not certain aspects. The research data emphasized the subjects' interest for their physical fitness, and implicitly, a better quality of life through a dynamic activity, constituting an argument

for the practice of aerobic gymnastics throughout one's entire life, as a mean to preserve one's youth and beauty.

This research verified six **hypotheses**, in three studies.

The hypothesis of the opinion study states that "the valences of aerobic gymnastics are perceived differently within the adolescent population."

The hypothesis of the observational study tries to verify whether "the manifestation levels of the body harmony indices in the researched female students are good at an age between 18 and 25," an idea supported also by the field experts. *The hypotheses of the personal contribution experimental research* tried to verify whether:

- *by applying an aerobic gymnastics-based program one can significantly improve the effort capacity and physical fitness, which also can determine an increase in the female students' quality of life;*

- *by intervening with individualized athletic activities programs based on using aerobic gymnastics means in students, one can improve the somatic development indices;*

- *by intervening with individualized athletic activities programs based on using aerobic gymnastics means in students, one can improve the motor development indices;*

- *by intervening with individualized athletic activities programs based on using aerobic gymnastics means in students, one can improve the functionality indices.*

The following **tasks** were accomplished *over the course of the research*: extending the theoretical knowledge referring to this theme, choosing the subjects for the experiment, identifying the subjects' characteristics and creating the group for the preliminary research, identifying the female students' opinion, performing a preliminary research regarding the practice of aerobic gymnastics - opinion questionnaire, identifying the level of somatic and body harmony indices, analyzing and interpreting the results of the inquiry, of the somatic and body harmony indices, and concluding after the preliminary research, identifying the subjects' characteristics and creating the group for the experimental research, applying the final training programs, tests and challenges, and the final questionnaire regarding the quality of life, analyzing and interpreting the results of the experiment and drawing the conclusions at the end of the experiment.

According to the objectives of the research, the following **research methods** were used: the study of the professional literature, the inquiry - the questionnaire, the experiment, the tests, the direct pedagogical observation, the statistical-mathematical method, the graphical representation method, the analysis and interpretation of data. For the analysis and interpretation of the data recorded during the research, I used Microsoft Office Excel 2003, to calculate the following indices: *arithmetical mean, dispersion, standard deviation (SD), variability coefficient (VC), student's T test - paired samples (Fisher), student's T test - independent samples (F Levene)*, and the calculation of the regression factor or the enhancement of the effect ( $r^2$ ) (SPSS: General linear model – univariate).

**The first preliminary study**, observational, was conducted on a target group of 205 female students from the non-physical education specializations of the "Vasile Alecsandri" University of Bacau. The subjects were between 18 and 25 years old. Through this questionnaire I tried to know the female students' opinion regarding their perception of the influence and importance of the practice of aerobic gymnastics exercises and body aspect. This study was conducted between December 2011 and January 2012.

The second preliminary study, observational, was conducted on the same target group of 205 female students from the non-physical education specializations of the "Vasile

Alecsandri" University of Bacau, to whom the opinion questionnaire was also applied, in the gymnasium of the faculty, between February and May, 2012. Through this observational study I tried to know the subjects' level of harmonious physical development by applying anthropometric measurements and calculating the somatic and body harmony indices [the Body Mass Index (BMI), the Erissman Index (EI), thoracic elasticity (Te), and abdominal tonicity (At)]. The following anthropometric evaluations were used in this study: height, weight, abdominal perimeter in standing position, abdominal perimeter in supine position, thoracic perimeter in a relaxed position, thoracic perimeter during deep inspiration and expiration, hip perimeter, left/right arm perimeter. For these measurements, a measuring tape and a weighing scale were used. The measurements were performed at the beginning of the classes under equal conditions for all of the subjects, and in conducting the scientific study I was helped by several university teachers.

*The third study*, envisaging the experimental research, observes the measures in which an aerobic gymnastics-based program can improve the functional development indices, increasing the female students' physical fitness and their quality of life. This paper tries, through the application of the aerobic gymnastics programs, to identify the level of the somatic and body harmony indices, the improvement of fitness, obtain several positive effects on the motor development, contributing to the increase of the students' quality of life. *The goal of this research* is to increase the subjects' quality of life by improving their physical fitness by practicing physical exercises based on an individualized model.

The target group of the experimental research consisted of 40 female subjects, students of the "Vasile Alecsandri" University of Bacau, aged between 18 and 25. The participating groups were randomly selected, forming the control and experimental groups. For this experiment, the subjects were divided in two groups: 20 female students forming the experimental group, and 20 female students forming the control group. They did not had any chronic diseases, and they consented to be a part of the experiment. The female students in this experiment were not former or current professional athletes, and did not practice any kind of physical exercise in an organized manner.

The experimental research was conducted at the "Vasile Alecsandri" University of Bacau, 3 teachers being involved (from Physical Education and Sports), one physiologist, and one psychologist.

The gymnasium was adequately equipped (Swedish ladders, gymnastics benches, gymnastics mattresses, exercise balls, dumbbells, medicinal bells, ropes, batons, television sets, audio system, mirrors, etc.), which allowed us to conduct our experimental research. The training sessions, the initial and final tests, the anthropometric measurements, the motor challenges, and the Ruffier test were performed in the gymnasium. The spirometry test was performed at the Human Performance Research Center of the faculty, being helped, during my endeavor, by various university teachers.

The research was conducted over the course of the academic year 2012-2013, comprising a number of 28 weeks, with 84 gymnastics lessons performed in the faculty's gymnasium. The time allocated to an aerobic gymnastics program was 60 minutes, at the end of each lesson information being given from the professional publications regarding the role of physical exercises, diet, eating, relaxation, rest.

The experiment was conducted outside the curriculum classes, during the female students' spare time. The participants benefited from three aerobic gymnastics lessons per

week, the the female students' training being in accordance with the aim and goals set for the experimental research.

In order to do the analysis of the somatic-functional and motor potential, to establish the particularities specific to each training level, age, and sex, I measured and assessed the: *somatic development, motor development, functional development, and the quality of life.*

*The applicative intervention*, through which the verification of the hypotheses was aimed, comprised the means that have a direct effect on the fitness and on the improvement of the quality of life. Specific aerobic gymnastics means were used in the experiment that were considered to be the most appropriate to achieve the set goals (classic aerobics/cardio tone, pilates, step aerobic, tae-bo, and stretching exercises). The aerobic gymnastics programs were conceived by respecting the indications of the field experts. During the development of the programs, the methodical structure of the lesson was strictly respected, the succession of the moments and sequences, this being essential to correctly influence the body from all points of view. They also contain information regarding the working formations and dosage, the program phases, the means, the methods, as well as details regarding the materials that were used, the established operational objectives and the location. Three programs per week were established, on Monday, Wednesday, and Friday, the duration of each being 60 minutes, during which aerobic gymnastics means were used, combining various forms of it. The aerobic gymnastics programs were repeated in those days, with a different dosage.

During these aerobic gymnastics programs, individualized programs were performed also, according to the needs of each individual, especially for the areas that needed muscular strengthening for modeling a harmonious body. The individualized programs were performed once a week, on Wednesdays, respecting the aerobic gymnastics parts of the lesson. During the warm-up part, the aerobic part, and the cool-down part, there were no modifications, the difference in regards to the individualized programs being made by the muscle group development part, through the number of repetitions performed for each area. Intermediary and stretching movements were performed between these parts, in order to not interrupt the effort, but only reduce the intensity.

*The results* recorded at the end of the first study highlight that a relatively low number of female students are practicing gymnastic activities (29%), which shows the fact that they do not have a favorable attitude toward exercise. At the same time, I observed that the female students have some knowledge about the beneficial effects of aerobic gymnastics, identifying them differently (maintaining the general muscle tone, increasing the body's endurance to physical effort, a state of well-being, mental relaxation, etc.), even if these activities are practiced in a small number. I observed that the effects of lack of exercise are known (62%), this being a good thing, proving that there is an awareness in the subjects in fighting a sedentary lifestyle. In regards to the diet, it was observed that most of the subjects (60%) did not have a balanced diet, but they were concerned with their weight. The great majority (89%) of the subjects said that they would like to have good body harmony indices, proving that they want a pleasant physical appearance. *The hypothesis* stating that *the valences of aerobic gymnastics are perceived differently within the adolescent population* was validated. The female students know the effectiveness of exercising in general, and of aerobic gymnastics in particular; even if it is practiced in a relatively small number, this perception is different.

After the measurements for the second study, the analysis of the students' results shows that the body harmony indices are close to the normal values only for the Erissman Index. Regarding the Body Mass Index, 65.37% of the subjects presented a weight excess, and only 22.44% are within normal values; regarding the thoracic elasticity, 56% of the subjects are below normal values (6 cm), and regarding the abdominal muscle tonicity (At), 42.92% presented a weak abdominal girdle. The hypothesis stating that *the body harmony indices in the researched female students are good at an age between 18 and 25* was largely not confirmed, because the Body Mass Index, the abdominal muscle tonicity index, and the thoracic elasticity index recorded different values than the normal ones, which proves that the quality of life level is low. These observations allowed me to start an experimental research using a working methodology based on individualized programs, through which I could prove the possibility of increasing the female students' quality of life and fitness by using aerobic gymnastics means.

*The preliminary research* (presented in part II of the thesis) aimed to know the female students' opinion regarding the perception of the influence and importance of practicing aerobic gymnastics exercises has on the health and body aspect, as well as assessing the somatic-functional development level and body harmony characteristics.

Based on the preliminary research results, I identified the main instructive-educational intervention directions, using specific aerobic gymnastics means and created several individualized programs to optimize the students' fitness and quality of life. *The personal contribution research* concretized in the *third experimental study* aimed to improve the female students' physical fitness and quality of life, to motivate them to independently and long term practice physical exercises, both during the physical education lessons, and during their leisure time.

The results recorded during the initial tests show that the subjects' motor training, somatic and functional level is below average values. At the end of the experiment, modifications appeared, both in the control group and the experimental group subjects regarding the dynamics of the tested parameters - somatic, motor and functional. The practice of aerobic gymnastics programs and of individualized programs determined anthropometric modifications in the body harmony, abdominal tonicity, and in the motor and functional training level of the subjects. The indices used to validate the hypotheses envisaged: the somatic, motor and functional assessment, and the assessment of the quality of life.

In regards to the *somatic assessment* (performed through 14 indices such as: height, weight, abdominal perimeter in standing position, abdominal perimeter in supine position, thoracic perimeter in a relaxed position, thoracic perimeter during deep inspiration and expiration, hip perimeter, left/right arm perimeter, the Body Mass Index, the Erissman index, the thoracic elasticity index, the abdominal muscle tonicity index), the experimental group subjects recorded better results than the control group subjects. These results indicate the fact that the individualized aerobic gymnastics programs and the combination of various forms of aerobic gymnastics that were performed by the experimental group subjects had a bigger effect on the somatic indices than the standard physical education programs that were used for the control group. The indices that recorded the most significant results were the anthropometric development ones, mainly the weight and the abdominal and hip perimeter (through the reduction of the adipose tissue), the Body Mass Index (obtaining an optimal weight in relation to the height and age), and the abdominal strength (increasing the

abdominal muscle tonicity), through the use of the individualized programs presented in this thesis, which lead to a better (more harmonious) development of the subjects' bodies.

In regards to the *assessment of the motor capacity* (strength of the abdomen, back, upper limbs, and static balance), the experimental group subjects recorded better results compared to the control group, in all the tested indices. Thus, one can say that the applied aerobic gymnastics programs had favorable effects also on the motor indices, the average differences being significant.

In regards to the *functional assessment* (the Ruffier test and the spirometry test), the data recorded during the initial tests emphasized an insufficient adaptation to the effort, and a poor physical fitness in both groups. The progress of the experimental group, compared to the control group's indicates the effectiveness of the aerobic gymnastics programs, through the values of the Ruffier index that increased from an insufficient adaptation (in the initial assessment) to a medium adaptation to effort (in the final assessment). For the functional capacity, the experimental group recorded significantly better result than the control group, reaching optimal values. The individualized aerobic gymnastics programs had favorable effects on the development of the respiratory system by increasing the thorax, strengthening the diaphragm, amplifying the respiratory movements and increasing the vital capacity, which proves the effectiveness of the means used to improve the fitness and the quality of life.

In regards to the *quality of life questionnaire* applied at the beginning and at the end of the experiment, through which the quality of life indices were assessed (health, family and friends relations, leisure time, self-image, socialization), one can see that all the positive modifications of the morphological, motor, and functional indices, but also of the psychological processes, bringing awareness regarding a balanced diet and improvement of social relations, have lead finally to improving and maintaining the subjects' health and implicitly increasing their quality of life.

**The general conclusions** drawn from the doctorate thesis highlight the effectiveness of the aerobic gymnastics based programs. The participation in leisure time activities represents an important indicator of the quality of life; the higher the number of participants in this kind of activities, the higher is considered to be the development level of a society. A successful person must maintain her fitness and figure even if put into a situation when she must turn to a diet and physical exercise. When we talk about the body harmony, we must see things from two perspectives: the body as a whole and the body in movement.

*The personal contribution*, as a new and original element approached in the research thesis *The optimization of physical fitness - an opportunity to increase the quality of life of the "Vasile Alecsandri" University of Bacau female students* is scientifically important. The practical knowledge won by conducting this study, which represented an original endeavor conducted in the field of sports science and physical education, regarding the participation of the female students in physical activities both during the curriculum classes and during their leisure time, allows me to create a guide on practical activities for maintaining your body fit, as a basic means in ensuring an increased level of the quality of life and an optimal physical fitness. The means created and applied in every lesson of the experiment were proven to be beneficial for modeling the subjects' bodies, visibly changing their physical aspect, getting an optimal physical fitness, leading to the participants becoming aware of the need for a systematic exercise of the "problematic" parts; this is another convincing argument to

*practice individualized athletic activities programs based on the use of aerobic gymnastics means.*

I believe it is useful to use the aerobic gymnastics structures with an adequate musical background during the female students' physical education lesson, this contributing to the creation of a good working mood, allowing the effort to be performed easier, effort that leads to the development of the psycho-motor skills, and especially to a harmonious physical development. These structures can educate and train one of the basic components of human bodily beauty, the expressiveness of movements and the moral traits of the personality.

The use of individualized programs and the combination of various forms of aerobic gymnastics contribute to maintaining one's health, to the improvement and correction of the morphological line, conferring the body a harmonious line and a correct posture, thus leading to a better quality of life.