

**UNIVERSITATEA NAȚIONALĂ DE EDUCAȚIE FIZICĂ ȘI SPORT
DIN BUCUREȘTI**

Abstract of The Doctoral Thesis

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**Title of the doctoral thesis: IMPROVING QUALITY OF LIFE IN
INDIVIDUALS WITH ESSENTIAL HYPERTENSION BY
RESPIRATORY GYMNASTICS PROGRAMS**

Key-words: quality of life, essential hypertension, respiratory gymnastics

Cardiovascular disease is a major public health problem worldwide.

In Romania, they are the leading cause of death, with an estimated share of 60% of all deaths. Of these, hypertension is very common, being so independent disease and cardiovascular risk factor. The etiology of the disease is unknown in about 95% of cases of high blood pressure.

By complications arising as acute myocardial infarction, stroke or heart failure, it is positioned on the first place among the causes of cardiovascular mortality, according to World Health Organization reports (Romanian Journal of Cardiology, 2007).

The World Health Organization estimates that between 15-37% of the adult population of the world suffer from this disease, and the age group 60 years and older hypertensive share exceeds 50%.

Worldwide, hypertension is responsible for 49% of cases of myocardial infarction and 62% of strokes (Armenian, P., 2004).

The *European Statistics Cardiovascular Diseases in Europe* (M. Nichols, T., N., Scarborough, P., Luengo-Fernandez, R. et. Al., 2012) estimated that the prevalence of hypertension in Romania is 44.5% , of which 47.1% men and 41.7% women, while SEPHAR II study published at the end of 2012, indicates the prevalence of the disease by about 40% predominantly in female individuals - 56% (Dorobanțu, M., Darabont, R., George, S., Babes, K., Pop, D., Thomas, D., Vasilescu, M., Dobreanu, M., Tăutu, O., 2012).

In this context, the blood pressure is imposed by all possible means, preventing even the most modest increases of resting blood pressure and intervention on combating all cardiovascular risk factors to facilitate the fundamental activity of the heart, the muscle pump.

Increasingly rapid development of technology, with negative repercussions on human physical activity, lifestyle becoming more sedentary, exposure to pollution increasingly increased stress phenomenon, found growing

in the modern life of contemporary man is present civilization factors that can cause poor breathing and contribute to increased blood pressure and heart rate.

Thus, respiratory rehabilitation mechanisms by technique and methods of respiratory gymnastics becomes a necessity both in healthy individuals and in individuals with cardio-respiratory dysfunction as essential hypertension, and the research topic chosen answer a strong needs of present civilization namely cardiovascular recovery.

The thesis is structured in three parts.

The first part of the thesis plays its theoretical foundations.

The purpose of this paper is to reevaluation of the importance and effectiveness of respiratory gymnastics , targeting its systematization in terms of practical and methodical in order to develop programs to optimize exercise capacity and thus the quality of life in people with essential hypertension .

Considering the importance of breathing in each of our lives , our degree of importance for the vitality and longevity of our were made in the first part of the thesis a summary of the literature and were highlighted by tables and figures, issues which explains the theoretical foundations of the thesis : an overview of methodology respiratory gymnastics rules and means of implementation of its known how breathing with the main types of breathing exercises belonging Hatha Yoga system (those that can be performed without exposure to any risks) were risk factors cardiovascular play and exercise influence over them , while the adoption of an active lifestyle even in adulthood leads to lower mortality .

Also have set the main forms of exercise used in physical training of hypertensive and, not least, to shape an overview resulting from bibliographical sources , the concept of what constitutes quality of life.

In conclusion, critical analysis of the theoretical and practical aspects and their systematic documentary offers a practical work leading to the development of specific programs with positive effects on exercise capacity and, not least, the quality of life of individuals with essential hypertension.

Part II of the thesis is preliminary research on the influence of respiratory gymnastics on quality of life in people with essential hypertension.

In this part of the thesis was observed in respiratory gymnastics extent accepted by subjects and how we can intervene to improve their blood pressure in addition to optimizing their capacity for effort.

Parallel programs were developed respiratory gymnastics and try checking their effects as a means of improving health.

Preliminary research specific hypotheses were:

- 1. Using a gym respiratory therapy program for elderly people with essential hypertension lowers blood pressure.*
- 2. Introducing a respiratory gymnastics program for elderly people influences their lives in order to improve health through increased exercise capacity.*

As research methods were used methods for theoretical and practical documentation, for collection of data, hypotheses and results analysis.

To conduct preliminary research have established the following: motor content of respiratory gymnastics programs, the general structure of the specific program by presenting general objectives:

- Increased resistance cardio-respiratory
- Neuro-psychological relaxation

and specific objectives:

- Awareness of correct body alignment
- Awareness of the respiratory act
- Tone of respiratory, antigravity, abdominal and perineum muscle.

During respiratory gymnastics program have been met the conditions for the practice of respiratory gymnastics program and methodological principles needed work.

We emphasize three rules of execution resulted of our research we consider the important elements of methodically complete picture of respiratory gymnastics:

1. *Synchronizing movements of body segments with respirators times.*
2. *The correct alignment of the spine*
3. *Gradual learning of techniques of breathing exercises by the subjects.*

The subjects of this study were selected on the basis of what they had intended to avoid accidents and incidents caused by exercise.

Subjects included in the preliminary experiment were evaluated individually , taking into account the specifics of their condition . The tests were the initial and final after six weeks of application of respiratory gymnastics . Subjects received two gymnastic programs respiratory with frequency of 3 times per week, duration of the first program was 20-30 minutes , and the second of 40-50 minutes. Intensity of training of the two programs was 50 % and 60 % of heart rate reserve .

Progression of respiratory intensity gym session was done gradually individualized for each subject. During exercise , the maximum level of tolerance , the subjects expressed their general condition through a Borg scale values . This value was parameter assessing exercise intensity perceived themselves at each meeting.

Correct, systematic, progressive of respiratory gymnastics program proposed to improve practice improves cardiorespiratory function in people age III, their evolution is confirmed by the final results obtained.

Comparing data from initial testing and final octogenarian subjects leads to an important conclusion for our work: respiratory gymnastics improves lung function, decreases peripheral vascular stiffness is governed by lowering blood pressure, increase exercise tolerance and positively influence the health

component of quality of life of individuals with essential hypertension, encouraging us to continue research.

The preliminary study has helped us to confirm our preliminary research hypotheses outlined premises of experimental study.

The research purpose of *part three of the thesis* represented by *personal contributions to improve the quality of life in people with essential hypertension* is to verify the effectiveness of respiratory gymnastics means the values of these biological and functional parameters.

In parallel to the third program developed respiratory gymnastics and try checking its effects.

The general hypothesis of the research was: *respiratory gymnastics improves the quality of life of individuals with essential hypertension.*

Specific assumptions of part three of the thesis were:

1. *The practical application of a therapeutic program of respiratory gymnastics for people with hypertension improves anthropometric indicators values .*
2. *The practical application of a therapeutic program of respiratory gymnastics for people with essential hypertension improves functional indicator values with the ability to keep them optimally.*
3. *Use respiratory therapeutic gymnastics combat cardiovascular risk factors such as obesity, physical inactivity , high blood pressure , stress levels.*
4. *People with hypertension do not have knowledge about the role of breathing exercises on the body, not practice, regardless of their age and are exposed to cardiovascular risk factors in non rational lifestyle.*
5. *Investigation of somatic and functional indices provide information about the role of respiratory gymnastics.*

The research was conducted on a total of 27 subjects, patients of the Center for Medical Rehabilitation Spine Health Bucharest diagnosed with essential hypertension . The experimental subjects were grouped according to age and their participation in the study. The subjects were included three aged 21-22 years and 24 subjects aged 40-60 years . Of the 24 , four subjects withdrew during the first three weeks of personal reasons , and 8 subjects did not wish to be actively involved in achieving this research , establishing the composition of the two groups , one experimental and one control , both of by 12 subjects.

The 27 subjects of research were divided into 3 groups:

1. The experimental group of 3 subjects belonging to the 21-22 years old segment
2. Experimental Group B, consisting of 12 subjects belonging to the 40-60 years old age group ,

3. Control Group C consists of 12 subjects aged 40-60 years . The selection criteria were the same as those used in preliminary research.

Note that in accordance with the Declaration of Helsinki, Amsterdam Protocol and Directive 86/609/EEC, has obtained the approval of the Ethics Committee of the Department of Physical Education and Sport of the National University of Physical Education and Sports to conduct experimental research. We note obtaining written consent regarding their participation in research subjects.

Research used resources targeted three dimensions: evaluation subjects, survey questionnaire and respiratory gymnastics program applied subjects.

Evaluation of subjects, recipients of three programs - respiratory gymnastics model proposed targeted somatic and functional parameters measured initial (Baseline), after 6 weeks of application exercises (Intermediate) and finally, after 12 weeks of starting training (Final).

To record specific evaluations initial, intermediate, and final, developed a model to test individual form presented in the thesis. Subsequently, the data obtained were summarized in tables.

All 27 subjects diagnosed with essential hypertension answered before the actual experiment, a questionnaire consisting of 17 questions to find out what subjects the attitude towards physical activity in general, but also about breathing exercises, how as you know these and they have practiced. The questionnaire developed is own design and is a simple means of assessing what guides us on the lifestyle of the subjects and the presence in their lives to cardiovascular risk factors. Questionnaire with 17 questions has standardized character and is presented in Appendix volume of the thesis. Their application in people with essential hypertension requiring three progressive stages to give the subjects a degree of safety, and has been adapted to the particularities of their individ.

Their application in individual people with essential hypertension requiring three progressive stages to give the subjects a degree of safety, and has been adapted to their individual peculiarities.

Respiratory gymnastics lesson was conducted under strict supervision and were periodically measured cardio-respiratory parameters . To avoid possible complications subjects worked individually. Physical training was held in the heart of low and moderate intensity exercise, using the value of 60-75% of heart rate reserve.

Progression of respiratory intensity gym session was done gradually, individualized for each subject. During exercise, the maximum level of tolerance, the subjects expressed their general condition through a Borg scale values. This value was parameter assessing of exercise intensity perceived themselves at each meeting. Performed with a frequency of three times a week

aerobic exercise program included extensive and slow movements represented by the upper limb and lower torso to increase the force of contraction of the myocardium, and exercises that were based on coordination, balancing, twisting torso to rebalance the nervous system.

Depending on the specific respiratory rate times for each subject during the first program was 20-30 minutes , the second of 40-90 minutes , and the third had a duration of 60-75 minutes . The exercises were carried out in the mirror to observe the movement and thus the mind and body work together, will be important in their practice . The programs are carried out over a period of 12 weeks. All subjects experiment group met three lessons weekly schedule .

To characterize the statistically experimental groups B and C of control were used statistical indicators of central tendency (arithmetic mean , median, quartile 1 (Q1) , quartile 3 (Q3)), indicators as standard deviation, value determines the minimum and maximum playing, coefficient of variation, weights , etc. . Listed indicators were applied:

- Parameters anthropometrical ,
- Cardiovascular functional parameters ,
- Respiratory functional parameters ,
- Parameters of quality of life.

Dates of each subject were introduced in the database and statistical analysis on statistical indicators and statistical hypotheses were performed with SPSS 17.0 product specific information for statistical analysis of data from the social sciences (Statistical Package for the Social Sciences). Â

Comparing of initial and final testing in the control group or initial, intermediate and final testing if the experiment group had rights to highlight significant or insignificant differences between testings for to determine if there are progress in the preparatory process, reflected by the results of the tests proposed in this experiment. Finally, the two groups were compared, experiment and control, based on the values recorded at the final testings to highlight differences between the two groups progress at the end of the period.

To achieve our aims we used nonparametric Wilcoxon Signed ranks test for two paired sample in the control group and the nonparametric Friedman test for multiple samples (initial , intermediate and final) and Wilcoxon Signed ranks as post hoc test with Bonferroni correction for test Friedman. Bonferroni correction is generally thought materiality equal to 0.05 distributed over the number of comparisons to be performed . (in our case 3: initial -intermediate - final initial , intermediate , final). In this case $\alpha = 0.017$. Post hoc tests were necessary because the comparison of three or more rows of values Friedman nonparametric test signal as significant differences , if exists, between those strings environments if there was at least a couple of the significant mean difference so, without providing information about differences of each value pairs.

Comparing the final testings from experiment group with those from the control group was performed by nonparametric Mann -Whitney test for two independent samples.

Statistical processing of the results obtained for each parameter evaluated by nonparametric Friedman test, Wilcoxon post hoc with Bonferroni correction and Mann-Whitney is shown in the tables in Appendix H, p 132.

From the analysis of experimental research we can conclude that all assumptions have been validated by the results of the three evaluations of each subject participating in research.

The general conclusions of the thesis were:

1. Analysis and synthesis of the speciality literature highlights the lack of standardized respiratory gymnastics programs for persons with essential hypertension and lead to the understanding of its need to optimize physical fitness and heart condition, able to generate a better quality of life.

2. The frequency of essential hypertension in the adult population in developed countries and its evolutionary trend , could reach " a world with 1.56 trillion in 2025 hypertensive " as stated in the annual conference of the Society for Hypertension in 2012 and implications of the disease on health lead to the need to identify a therapy based on movement, inexpensive and effective with minimal adverse reactions , the possibility of applying to as many subjects to act in order to reduce cardiovascular risk factors present in their lives and lower values heart rate and blood pressure in hypertensive so as to receive lower doses of antihypertensive drugs and long-term activity.

Respiratory gymnastics , by confirming the hypothesis of our research is a means of physical education and sport field whose effects on cardiovascular risk factors is reflected in the increasing body exercise capacity and proper functioning of all organs and systems , the predominance of the cardiovascular and respiratory system.

3. Breathing exercises and deep relaxation leading to overall decreasing muscle tone on exhale due activation of the parasympathetic nervous system and favors increasing the stroke volume on inhale, the consequences are represented by labor decreased heart by stimulating blood circulation, decreased peripheral vascular resistance and better extraction oxygen in muscle.

4. Respiratory gymnastics through exercises used helps to increase strength and endurance of the respiratory muscles, increase body resistance under hypoxia minimum benefit on pulmonary ventilation energy costs. Decreased labor fan associated with better flexibility paravertebral muscles through correct posture of the spine and extend expiration obtained from practicing designed and proposed new programs.

5. Including diaphragmatic breathing as respiratory gymnastics programs and daily activities that help to control heart rate and respiratory allow suppleness ensure alternation trunk muscle contraction-relaxation and optimizes the level of stress.

6. Individualized application, controlled and systematized programs proposed improvements cardiorespiratory function of people with essential hypertension, the benefit resulted in decreased cardiac and respiratory frequency parameters, blood pressure and increase exercise capacity.

Confirming of assumptions made in this paper leads to the general conclusion:

Using individualized respiratory gymnastics, confirmed by the results of experimental research and statistical processing performed recommends that physical activity as an important and valuable therapeutic tool for improving the quality of life of individuals with essential hypertension.