

The impact of fitness classes on the health of women aged 30-40 years with somatoform vegetative dysfunction

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ABSTRACT

Objective

is to improve the functional state of women between 30-40 years of age who suffer from somatoform vegetative dysfunction.

Methods

The pedagogical experiment was conducted at a fitness club for 8 months. It involved 36 women between 30-40 years of age who suffer from somatoform vegetative dysfunction and have an average level of functional state. They were engaged in an experimental method of conducting classes using physical exercises with the use of fitness loads of moderate intensity. To assess the functions of the cardiovascular system, blood pressure and pulse were measured using a tonometer. To analyze the state of the cardiovascular system, the endurance coefficient was calculated using the Kvass formula. The tolerance to hypoxia was determined using the Gench and Stange test. The Quetelet index was calculated based on height and weight indicators.

Results

During the study period, in the experimental group the pulse rate decreased by 6.75 bpm ($p < 0.05$). An increase in systolic pressure was 4.5%, and in diastolic pressure – 2.5% ($p > 0.05$). The endurance coefficient decreased by 2.78 ($p > 0.05$). The improvement of the Gench test was 27.7% ($p < 0.05$), and that of the Stange test – 8.2% ($p < 0.05$). The Quetelet index decreased by 0.08 ($p > 0.05$).

Conclusion

The level of the functional state of the body of women, who suffer from various somatoform vegetative dysfunction, improves significantly if physical exercises with moderate intensity fitness loads are used in fitness classes according to the developed physical rehabilitation technique.

Keywords

Physiotherapy exercises; Blood pressure; Pulse, Hypertension; Functional state.

INTRODUCTION

Over the last ten years, the relevance of studying the functional pathology of the cardiovascular system, namely somatoform vegetative dysfunction, increased significantly. This is due to the fact that this disease is not only widespread and difficult to diagnose, but also requires timely treatment and rehabilitation of patients suffering from these disorders. A number of works on the problem of somatoform vegetative dysfunction appeared.^{1,2} They made a great contribution to the development of the theory of this pathology and stimulated interest in further research.

Somatoform vegetative dysfunction (vegetative-vascular disorders) are disorders in the functioning of the vascular system of the body, leading to insufficient supply of tissues and organs with oxygen. Otherwise, these diseases are called somatoform vegetative dysfunction, neurocirculatory dystonia, or cardiac neurosis.^{3,4}

Somatoform vegetative dysfunction is quite common both in children (12-25%) and in adults (up to 70%).^{3,5} Expressed manifestations are formed by the age of 20-40. Women suffer from somatoform vegetative dysfunction three times more often. This is a consequence of the fact that the increasing pace of modern life requires full dedication of internal resources and strength in the process of study and work. One third of cases of the disease require treatment of somatoform vegetative dysfunction.^{4,6}

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Somatoform vegetative dysfunction are characterized by a disorder of the autonomic regulation of internal organs, blood vessels, metabolic processes due to primarily or secondarily occurring deviations in the structure and function of the central parts of the autonomic nervous system and usually accompanied by psychoemotional disorders.^{3,4} Etiological, provoking factors of somatoform vegetative dysfunction are hereditary-constitutional burden, unfavorable course of pregnancy and childbirth of the mother, acute and chronic infectious and somatic diseases, sites of infection, organic diseases of the brain, endocrine restructuring of the body, pathology of the endocrine glands, allergic conditions, neuroses. In the mechanism of occurrence of somatoform vegetative dysfunction, the leading role is played by congenital or acquired structural and functional insufficiency of the central parts of the autonomic nervous system.^{5,7}

In adults, somatoform vegetative dysfunction can manifest and worsen under the influence of chronic diseases, stress, depression, neuroses, digestive system diseases, endocrine diseases, hormonal changes (pregnancy, menopause), and also be a consequence of past brain and spinal injuries.^{3,4}

The presence of excess weight in a person has a great influence on the occurrence and development of somatoform vegetative dysfunction at any age. Excessive weight gain leads to the development of hypertension, which in turn is an additional burden on the cardiovascular system.^{8,9}

Symptoms of somatoform vegetative dysfunction are varied. This fact is due to the widespread influence of the autonomic nervous system on the body, which controls the main systems of the body (respiratory, cardiovascular, digestive, endocrine and others). Symptoms can be constant or appear in the form of attacks, crises, panic attacks and end in fainting. Patients are concerned about weakness, fatigue, sleep disorders, irritability.^{10,11}

In addition, with somatoform vegetative dysfunction, tachycardia is observed with minor physical exertion, a tendency to increase or decrease blood pressure, cold hands, feet.^{6,7}

The hypertensive type of somatoform vegetative dysfunction is characterized by an increase in blood pressure to 170/95 mm Hg, and the hypotonic type of somatoform vegetative dysfunction is characterized by

a decrease in blood pressure to 90/45 mm Hg.

Symptoms on the part of the digestive system are nausea, vomiting, belching, diarrhea, constipation, pain and cramps in the abdomen. On the part of the urinogenital system, symptoms are frequent and painful urination in the absence of pathology in the urinogenital system.^{3,5}

Cardiac somatoform vegetative dysfunction is the most common form. It is the cause of hyperdiagnosis of organic heart disease, which in turn has serious consequences: exclusion from physical exercise and sports, warnings about pregnancy and childbirth, frivolous tonsillectomy, unnecessary prescription of anti-inflammatory drugs. Cardialgic syndrome occurs in almost 90% of patients. Cardialgia is associated with increased susceptibility of the central nervous system to irritants. When it first appears, cardialgia is fixed by means of self-hypnosis or a conditioned reflex. Pain can be of various natures: constant aching or pinching in the region of the apex of the heart, intense prolonged burning in the region of the heart, paroxysmal prolonged cardialgia, paroxysmal short-term pain or pain arising in connection with physical exertion, but not interfering with the continuation of the load.^{3,6}

The analysis of literary sources showed that somatoform vegetative dysfunction are disorders in the functioning of the body vascular system, leading to insufficient oxygen supply to tissues and organs. The causes of this disease are perinatal affections of the central nervous system, constitutional heredity, emotional imbalance, neurotic and psychotonic disorders, inadequate reactions to stressful situations, psychotraumatic effects, endocrine diseases, allergic reactions, unfavorable environmental conditions, vitamin imbalance disorders, heavy physical exertion, nutritional disorders and many other factors.

Physical rehabilitation is of primary importance in the recovery process. The main means of physical rehabilitation are physical exercises. To eliminate and prevent the occurrence of somatoform vegetative dysfunction, special therapy is necessary, the integral components of which are: therapeutic physical culture, adaptive physical culture and health-improving physical culture. They are able not only to eliminate somatoform vegetative dysfunction, but also to have a beneficial effect on the general condition of the human body.^{12,13}

Somatoform vegetative dysfunction are one of the most common pathologies of human health in the world. For the normal condition and functioning of the human

body, a healthy lifestyle with all its components is of great importance (a balanced daily routine, sufficient physical activity, timely rest, proper nutrition, water procedures, reasonable hardening procedures).^{7,14}

If the correction of vegetative disorders is timely, 80-90% of people experience normal sleep and appetite, many complaints disappear or are significantly reduced, and the body adaptive capabilities are restored.^{5,15}

One of the most important methods of non-medicine treatment of various diseases is physical exercise. As part of the prevention and rehabilitation of somatoform vegetative dysfunction, one of the sections of adaptive physical culture is used - adaptive physical rehabilitation. It is aimed at using various physical exercises that help strengthen the patient's body, increase its resistance, and restore working capacity.^{16,17} Sports games contribute to psycho-emotional stabilization, have a general strengthening effect on the body. Among the exercise machines, it is best to use a treadmill, exercise bike, stepper, elliptical.^{18,19}

In case of somatoform vegetative dysfunction, such means of physical culture as exercises where the head is below the chest level and exercises performed upside down are contraindicated for the patient due to the fact that there is a risk of fainting and deterioration of health. During the exercises, a person should not experience unpleasant sensations, excessive fatigue, irritability.^{20,21} In recent decades, fitness has become one of the most popular types of physical exercises.^{22,23}

Fitness is a system of health-improving physical culture that includes such means of physical rehabilitation as exercise plus a healthy lifestyle. Fitness has become very popular, especially among women in the fight for a slim figure and excellent health.^{19,21}

The main means of fitness is health aerobics - one of the areas of mass physical culture with adjustable load. Various groups of specialists are actively working on the development and popularization of various programs that synthesize elements of physical exercises, dance and music for a wide range of people. A characteristic feature of health aerobics is the presence of an aerobic part of the lesson, during which the work of the cardiovascular, respiratory and muscular systems is maintained at a certain level.²⁴⁻²⁶

The types of aerobics include classical aerobics, step aerobics, aqua aerobics, dance aerobics, martial arts, recovery and relaxation training.^{27,28}

In case of various health disorders people turn to fitness loads in order to get in good physical shape and reduce pathological manifestations in the body. In particular, using adequate physical activity, it is possible to correct the hormonal status of patients who suffer endocrinological and cardiovascular disorders.²⁹⁻³¹ The authors consider the features of the influence of fitness loads of aerobic nature of moderate intensity on endocrine and vegetative-vascular disorders in women, where the main means are fitness loads of moderate intensity of aerobic nature, which are carried out taking into account the course of the disease, age and physical condition of the patient. The purpose of such exercises is to adapt the cardiovascular system to physical loads of moderate intensity, thereby ensuring more economical functioning of these systems at rest.^{31,32} After moderate-intensity exercises according to the "ComboLow" program with a predominance of the aerobic component, a decrease in blood pressure to normal values and normalization of the heart rate were noted.^{29,30} However, the authors did not specify the characteristics of the equipment used, the speed and presence of ascents and descents on the treadmill, the presence of aerobic and strength exercises. The form and conditions of the classes were not specified.

The effectiveness of using a set of strength exercises to improve the physical and functional state of students with somatoform vegetative dysfunction is proven. A set of strength exercises in combination with breathing exercises and voluntary muscle relaxation is used. Strength exercises of moderate intensity help improve hemodynamics and physical fitness of students with somatoform vegetative dysfunction of the hypertensive type.^{29,30}

Thus, many issues related to the problem of somatoform vegetative dysfunction currently require more thorough and in-depth study and relate to insufficiently developed sections of cardiology.

The scientific novelty of the study is that for the first time the method of using physical exercises which are characterized by fitness loads of moderate intensity was developed in order to improve the level of physical condition of people between 30-40 years of age who suffer from somatoform vegetative dysfunction.

The theoretical significance of the study is to expand knowledge in the field of adaptive physical rehabilitation on the use of physical exercises which are characterized by fitness loads of moderate intensity in order to

improve the level of physiological condition of people between 30-40 years of age suffering from somatoform vegetative dysfunction.

The practical significance of the study is to develop a methodology for using physical exercises which are characterized by moderate intensity fitness loads for people between 30-40 years of age suffering from somatoform vegetative dysfunction, which can be used by specialists in specialized institutions, fitness clubs, rehabilitation centers in order to improve the level of functional state.

The aim of the study is to improve the level of functional state of people between 30-40 years of age suffering from somatoform vegetative dysfunction.

Tasks:

1. To study the causes of somatoform vegetative dysfunction, their classification and impact on the functional systems of the body
2. To identify effective means and methods for classes using moderate-intensity fitness loads in order to improve the level of physical fitness of people suffering from vegetative-vascular disorders
3. To develop an experimental method for using physical exercises and moderate-intensity fitness loads in classes for people suffering from somatoform vegetative dysfunction and to test its effectiveness.

MATERIAL AND METHODS

It is advisable to conduct classes at a fitness club, since it has a special material and technical base that meets sanitary and hygienic standards. Therefore, the pedagogical experiment was conducted at the Kirov fitness club from May 11 to December 26, 2024, to

improve the functional state of people between 30-40 years of who suffer from somatoform vegetative dysfunction. It involved 36 women between 30-40 years of who suffer from somatoform vegetative dysfunction and have an average level of functional state; they were engaged in the experimental method of conducting classes using physical exercises characterized by fitness loads of moderate intensity. Classes were held 3 times a week for 60 minutes (group class).

It is important to consider the influence of music on the body of those involved, since it affects rhythmic and emotional characteristics, therefore, at each training session, background music was used as a factor affecting the emotional coloring of the class.³³⁻³⁶

A set of physical exercises in step-aerobics was used at a moderate pace when the heart rate is 120-130 bpm (Basic Step) on special equipment – step platforms.

The aim of the experimental method of using physical exercises with fitness loads of moderate intensity in classes with people between 30-40 years of suffering from somatoform vegetative dysfunction is to improve the level of their functional state. Therefore, to achieve the goal, the following tasks were set:

- 1) to improve the functioning of the cardiovascular system of the body (blood pressure, pulse, endurance);
- 2) to improve the functioning of the tolerance to hypoxia of the body (the Gench test, the Stange test);
- 3) to optimize body weight in accordance with existing standards recommended by the World Health Organization (determination of the body mass index – Quetelet index).

To solve the set tasks, the experimental method of using physical exercises and applying fitness loads of

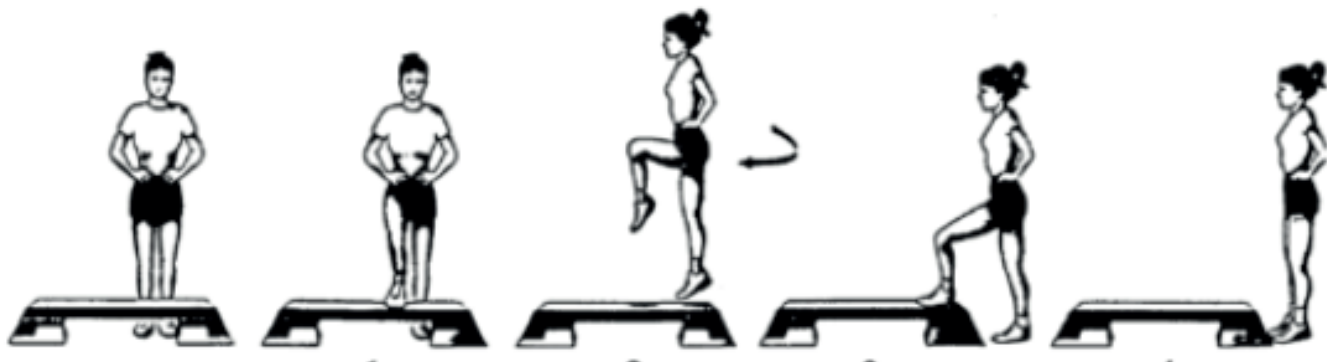


Figure 1. Exercising on the step

moderate intensity in classes with people between 30-40 years of age suffering from somatoform vegetative dysfunction was developed.

Before the start of all classes, the technique of performing exercises and safety precautions were explained in detail. For example, when performing movements, complete blocking of the knee joint is not allowed, deflection in the lumbar spine is excluded. Steps are performed in the basic position - the feet are parallel and do not touch each other. Beginners are advised to look more often at their feet and at the platform, or at their reflection in the mirror. It is necessary to place the foot on the central part of the platform so that the foot is completely on the platform. When descending from the platform, the foot must be placed from the toe to the heel at a distance of one foot from the step platform. The arms are included in the work only after the technique of working with the legs is mastered (Figure 1).

The time for performing repetitions of basic steps with one leg should not exceed 1 min., so as not to cause overstrain of the musculoskeletal system. The maximum number of repetitions of one element with leg lift is performed no more than 8 times. The tempo of the background music should be no more than 120-130 bpm.

Approximate plan of the training session (60 minutes):

1. Organizational issues - 2 min.
2. Limber Up - 4 min. (the pulse rate 90-100 bpm).

Aim: to prepare the body for the main load and reduce the risk of injury, raise body temperature and pulse rate. The main means of limbering up are simple combinations and movements of classical aerobics (side steps) without turns and jumps with the addition of arm movements to chest level. The intensity and amplitude of movements should increase gradually. It is necessary to ensure symmetry and muscle balance in order to evenly warm up the entire body.

An example of limber-up:

- 1) inhale-exhale with arms raised above the head on the inhale and lowering the arms along the body on the exhale – 4 times.
- 2) circular movements in the shoulder joint forward and backward – 8 times.
- 3) round the back, pull in the stomach and stretch the arms in front of you, then bend in the lumbar spine, pushing the chest forward and moving the arms

back (palms facing forward) – 4 times.

- 4) step touch – 8 times.
- 5) open step with arm movement – 32 times.
3. Preliminary stretching (Prestretch) – 3 min.

Aim: stretching warmed up muscles (increase joint mobility, flexibility, elasticity of muscles, increase blood flow to muscles) and maintaining pulse rate within 100 bpm.

The main means of Prestretch are dynamic exercises which have impact on the main muscle groups, i.e. from the position of static stretching, additional dynamic movement is gradually carried out. This transition from static to dynamic should be comfortable and smooth.

An example of preliminary stretching (Prestretch):

- 1) lunges on the right-left leg from side to side in the lateral direction – 8 times.
- 2) lunge only on the right leg with a springy movement, then turning the body and the foot of the right and left leg in a straight direction to the right – 4 times each.
- 3) bend forward, straightening knees, arms bent at the elbows, palms under the elbows – 8 times.
- 4) repeat exercise 1 in the opposite side.
- 5) repeat exercise 2 to the left side.
- 6) repeat exercise 3.
- 7) remain in the tilt without springy movements for 2 counts and, pulling in the stomach, “twist” vertebra by vertebra into a standing position on two legs, arms down along the body.

4. Exercise complex (Basic Step) – 26 min;

The aim is to strengthen the cardiovascular and tolerance to hypoxia of the body, develop coordination skills. Background music, the pulse rate is within 120-130 bpm. The means of the classical step-aerobics complex at a moderate tempo are basic steps formed into a simple choreographic combination of movements; they are done to background music when pulse is no higher than 130 bpm, maintaining symmetry (change of the leading leg) and muscle balance.

An example of Basic Step:

- 1) basic step (step onto the step platform with both feet alternately. Performed in four counts).
- 2) V-steps (step onto the step with both feet alternately, onto opposite corners of the step).

- 3) step with shin overhang (step with your right foot onto the corner of the step platform, and swing your left foot back. Your heel should touch your left buttock, and then do the other side).
- 4) step with knee lift (step with your right foot onto the corner of the step platform, and bend your left foot at the knee and pull it to your stomach. Then do the other side).
- 5) step with leg lift (step with your right foot onto the corner of the step platform, and throw your left foot forward. Then do the other side).
- 6) touch the floor (standing in the middle of the step platform, touch the floor with your feet one by one).
- 7) leg extension back (step with your right foot onto the corner of the step platform, and extend your left foot back as far as possible without bending it at the knee. Raise your arms synchronously with the leg extension. Then do the other side).
- 8) leg abduction (step with your right leg onto the step platform and move your left leg to the side without bending it at the knee. Move your arms to the side synchronously with the leg raising. Then do the same on the other side).

Jogging in place at a moderate pace or intense walking in place can be added for variety. While walking, it is recommended to inhale while raising arms out to the sides, then to exhale while lowering arms along your body. After all participants' master Basic Step (2 weeks after the start of classes, starting with the 7th class), the load was slightly increased, thus a set of step exercises was used – aerobics of medium physical activity with the pulse rate 135-140 bpm (Step Intermediate). Simple jumping elements were gradually added, amplitude movements of the body were included and the choreography was complicated, a combination of simple and complex arm movements, a change in the trajectory of movements.

5. Aerobic cool-down – 5 min.

Cool-down is important for the cardiovascular system. When the aerobic part of the workout ends abruptly, the blood remains in the muscles (especially the lower extremities), and the heart muscle increases the pulse in order to redistribute the blood to other organs. Thus, the heart is overloaded, which is dangerous and harmful to the body. Therefore, it is necessary to cool down the aerobic part in order to tone the blood vessels, reduce

the pulse, smoothly transition the work of the heart muscle to the normal mode and relax the muscles.

The aim of the cool-down: a gradual decrease in heart rate to the lower limit of the training load zone, elimination of muscle discomfort in the lower extremities and preparation of the body for the upcoming strength work. The main means of cooling down are various combinations of movements used during the limber-up, performed at a slow pace, with the use of dynamic stretching exercises in the final part - lunges, movements of the torso in combination with arm movements, stretching of the muscles of the calf, the front and back of the thigh, and the lumbar spine.

6. A set of strength exercises using a moderate-intensity fitness load – 12 min.

Aim: increasing muscle strength endurance, changing the qualitative composition of the body. The pulse rate is within 100-110 bpm. All exercises are performed with own weight. The set of strength exercises includes:

- 1) physical exercises for the abdominal muscles (rectus, internal and external oblique, transverse) – bending the torso from a supine position.
- 2) physical exercises for the back muscles (the muscle that straightens the spine) - hyperesthesia from a prone position.
- 3) physical exercises for the chest and shoulder muscles (pectoralis major, anterior deltoid muscles, triceps brachii) – push-ups with wide hand placement from a kneeling position.

7. Slow recovery exercise set – 8 minutes.

Aim: preventing muscle pain (removing lactic acid), improving flexibility, increasing muscle metabolism, restoring heart rate, blood pressure and relaxation. The slow recovery exercise set is performed at the pulse rate 80-90 bpm.

An approximate recovery exercise set:

- 1) Breathing exercises according to the Bodyflex system. Breathing should be calm and even, ensuring a smooth transition from one exercise to another. Performing a deep inhalation by the chest through the nose and a long exhalation with a drawn-in stomach through the mouth while lying on back. Stretching the entire body with arms extended above the head, palms up and toes pulled towards you. Pulling and holding bent knees to the stomach. Spreading and holding straightened

legs in a wide position while lying on your back. Rolling along the spine. Bend towards straight legs while sitting. While standing on your feet, round your back, draw in your abdominal muscles, clasp your hands together, stretch forward with your palms turned outward from you behind your hands. While standing on straight legs, inhale and exhale while raising and lowering your arms along the sides. Make a large circle with your arms from the shoulder back in full amplitude. Pull your shoulders up towards your ears and hold this position.

- 2) static stretching. Stretching the entire body with arms extended above the head, palms up, and toes pointed toward. Pulling and holding bent knees to the stomach. Spreading and holding straight legs in a wide position while lying on the back. Rolling along the spine.
- 3) relaxation: taking a deep breath in by the chest through the nose and a long exhalation with the stomach pulled in through the mouth while lying on the back. Hold each position for at least 8 seconds.

Control tests:

Before testing, each participant was trained to correctly perform all tests.^{37,38}

1. Assessment of cardiovascular system functions, namely: control of heart rate (pulse) and blood pressure. “Upper” – systolic pressure (SP) characterizes the functional state of the heart muscle. “Lower” – diastolic pressure (DP) reflects the tone of the vascular bed. Both indicators were determined using a standard Omron tonometer.
2. Calculation of the endurance coefficient according to the Kvas formula (EC). It is determined to analyze the state of the cardiovascular system. EC is an integral value that combines pulse and pressure and is calculated using the formula: $EC=10*\text{Pulse}/(\text{SD}-\text{DD})$
3. Assessment of tolerance to hypoxia were assessed using a functional test for holding the breath on inhalation. It's the Gench test. It is carried out in a sitting position.

Test execution: first perform deep: inhale, exhale, inhale and then calmly exhale and hold the breath, while it is necessary to pinch the nose with your fingers.

4. Five minutes after the Gench test, the Stange test

was performed - holding the breath on inhalation. It is necessary to take three inhalations and exhalations in a calm mode and then hold breath on a full inhalation, while pinching the nose with fingers.

5. The Quetelet or body mass index (BMI) is calculated by the ratio between the person's height and weight according to the formula: $BMI=\text{Weight (kg)} / \text{Height (m}^2)$

Methods of mathematical statistics

After completion of the study, all numerical indicators were processed in the Biostatistica 2021 program and in an Excel table. The arithmetic mean and standard deviation were determined. Comparative analysis is carried out using the Student's T-test.

RESULTS

Table 1 presents the results of the indicators of the functional state of the cardiovascular system and the external tolerance to hypoxia of the body in women between 30-40 years of age from the beginning to the end of the pedagogical experiment.

Table 1. Changes in indicators over the study period

Indicators	Before	After	t	p
Resting pulse (bpm)	70,75±1,85	64,00±0,26	3,61	<0,05
Resting blood pressure: SP (mmHg)	110,00±4,64	115,00±1,32	1,04	>0,05
DP (mmHg)	68,75±2,65	70,5±0,66	0,66	>0,05
Endurance coefficient according to the Kvas formula (EC)	17,78±1,54	15,0±0,32	1,11	>0,05
the Gench test (seconds)	23,13±2,25	28,15±0,56	2,16	<0,05
the Stange test (seconds)	42,75±0,66	46,25±0,53	4,12	<0,05
the Quetelet index (BMI) (kg/m ²)	20,6±1,02	20,52±1,00	0,05	>0,05

Table 1 shows that there were changes in all indicators, but not all of them were reliable. To make the results of the study more visual, the diagram that reflects the percentage of growth in indicators from the beginning to the end of the study for all tests was constructed (Figure 2).

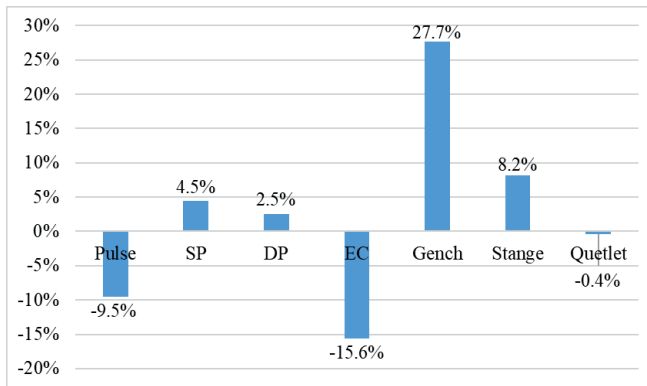


Figure 2. Increase in the studied parameters in women between 30-40 years of age who suffer from vegetative-vascular dystonia

Having assessed the changes in the indicators of the functional state of the cardiovascular system and the external tolerance to hypoxia in Figure 2, we state the fact that the level of the functional state of the body of women between 30 to 40 years of age suffering from various somatoform vegetative dysfunction has improved.

DISCUSSION

The analysis of literary sources showed that somatoform vegetative dysfunction are disorders in the functioning of the body vascular system, leading to insufficient oxygen supply to tissues and organs. The causes of this disease are perinatal affections of the central nervous system, constitutional heredity, emotional imbalance, neurotic, inadequate reactions to stressful situations, endocrine diseases, allergic reactions, unfavorable environmental conditions, vitamin imbalance disorders, heavy physical exertion, nutritional disorders and other factors.^{4,7,14}

It is established that this disease is characterized by a number of symptoms that are varied. This is due to the widespread influence of the autonomic nervous system on the body, which controls the main systems of the body (cardiovascular, respiratory, digestive, endocrine).^{3,5,6}

To date, various authors have developed and scientifically substantiated a number of successful methods for using moderate-intensity fitness loads in classes with people suffering from somatoform vegetative dysfunction.^{1,2} However, there is an obvious insufficiency in the development of methodological foundations for conducting corrective physical exercise classes using moderate-intensity fitness loads for

people between 30-40 years of age suffering from somatoform vegetative dysfunction. In addition, the developed methods do not include a comprehensive use of physical exercises using moderate-intensity fitness loads performed on special equipment (step platform) with recovery exercises, which must take into account the individual characteristics of the morphofunctional state of a human.^{3,4} It is advisable to conduct these classes at a fitness club that has such special equipment and technical base that meets sanitary and hygienic standards.

It is found that background music is of great importance in fitness classes as a factor influencing the emotional coloring of classes. It is necessary to take into account the influence of music on the body of those involved, since it affects rhythmic and emotional characteristics.³³⁻³⁶

The experimental method of adaptive physical rehabilitation and the method of using physical exercises with the use of fitness loads of moderate intensity in classes with people between 30-40 years of suffering from somatoform vegetative dysfunction are developed in order to improve the level of their functional state on the basis of the Kirov fitness club.

The obtained testing data from the beginning to the end of the pedagogical experiment should be compared with the normative values of the corresponding age group of women.^{39,40}

The pulse of an adult untrained person at rest is on average from 60 to 89 bpm.^{39,40} During the study period in the experimental group, it decreased by 6.75 bpm and is 64 bpm ($p < 0.05$).

Measuring blood pressure is the most common method for assessing the functional state of the human cardiovascular system. In a person between 21-40 years of age, SP is 120-130 mmHg, and DP is 70-80 mmHg. If SP is 15 mmHg and DP is 10 mmHg higher, it indicates a hypertensive state. If SP is 20 mmHg and DP is 15 mmHg lower, this indicates a hypotensive state.^{39,40} Before the study, the average SP and DP in the experimental group were below normal. After the study, SP increased slightly and amounted to 115 mmHg, which is almost normal; and DP was 70.5 mmHg, which is normal ($p > 0.05$).

Normally, the endurance coefficient according to the Kvass formula (EC) is 16. An increase of this value indicates a weakening of the cardiovascular system, while a decrease indicates its strengthening.^{39,40} EC in

the experimental group decreased by 2.78 and is equal to 15.00 on average, which indicates that the cardiovascular system of the participants has strengthened ($p>0.05$).

The Gench test for untrained people is normally 25-30 seconds. If the breath holding time on exhalation is less than 25 s, then the functional capabilities of the tolerance to hypoxia are low. Accordingly, the longer the breath holding time, the higher the functional capabilities of the tolerance to hypoxia and the more trained the human body.^{39,40} The results of the Gench test increased by 5.02 seconds, which indicates that the functional capabilities of the tolerance to hypoxia of the participants in the experimental group have increased significantly ($p<0.05$).

The Stange test for untrained people is normally 45-55 seconds. If the breath holding time on inhalation is less than 45 seconds, then the functional capabilities of the tolerance to hypoxia are low. Accordingly, the longer the breath holding time, the higher the functional capabilities of the tolerance to hypoxia and the more trained the human body.^{39,40} The results of the Stange test increased by 3.5 seconds, which indicates that the functional capabilities of the tolerance to hypoxia of the participants in the experimental group have increased significantly ($p<0.05$).

Using the Body Mass Index (Quetelet Index), the presence of excess body weight or body weight deficit can be determined, and it is possible to assess the risk of developing diseases associated with somatoform vegetative dysfunction of the human body, which develop most often as a consequence of excess body weight. According to the recommendations of the World Health Organization, the indicator should be in the range of 18.5-25.4.^{39,40} In the experimental group, this indicator decreased slightly by 0.08 and amounted to 20.52, which corresponds to the norm ($p>0.05$).

After assessing the changes in the results of the Indicators of the functional state of the cardiovascular system and the external respiration apparatus from the beginning to the end of the pedagogical experiment, it can be stated that the level of the functional state of the body of women between 30 to 40 years of suffering from various somatoform vegetative dysfunction has significantly improved. This fact indicates the effectiveness of physical exercise classes using moderate-intensity fitness loads according to the developed experimental method of physical rehabilitation.

However, before starting physical exercise classes using moderate-intensity fitness loads for people between 30-40 years of suffering from somatoform vegetative dysfunction, using a set of step aerobic exercises, it is necessary to teach participants to choose correct sportswear to perform correct movements and to safely use sports equipment.

Thus, this article demonstrates a high-quality scientific study and offers a comprehensive methodology for fitness training with middle-aged women. Of course, the study could be improved by adding additional tests or expanding the sample size. This may be a prospect for further study of this issue.

CONCLUSION

The functional state of women between 30-40 years of age suffering from various somatoform vegetative dysfunction improves significantly if fitness classes include physical exercises where fitness loads are moderate and classes are held according to the developed physical rehabilitation technique.

Methodological features of the experimental technique implementation:

- 1) rational class planning in order to achieve a health-giving effect;
- 2) planning of fitness loads based on the gradual principle;
- 2) using step aerobics at a moderate pace at the pulse rate 120-130 bpm;
- 3) performing recovery exercises at a slow pace when the pulse rate is 90-100 bpm;
- 4) using background music;
- 5) daily independent walking in the fresh air for 40 minutes when the pulse rate is 100-110 bpm.
- 6) adhering to the basic principles and rules of a healthy lifestyle:
 - give up bad habits completely (smoking, alcohol, drugs);
 - adhere to healthy work-life balance (sleep at least 8 hours);
 - choose a rational diet in compliance with the basic rules;
 - do physical exercises.

Conflict of interest: The author declares that he no conflict of interest.

AUTHOR'S CONTRIBUTION

Data gathering and idea owner of this study: Polevoy G.G.

Study design: Polevoy G.G.

Data gathering: Polevoy G.G.

Writing and submitting manuscript: Polevoy G.G.

Editing and approval of final draft: Polevoy G.G.

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