

EFFICACY OF RECREATIONAL PHYSICAL ACTIVITY FOR PERIMENOPAUSAL WOMEN WITH HYPERTENSION ONSET

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ABSTRACT

The aim: To examine the effect of the developed wellness program on hemodynamic indices and psychological state of perimenopausal women.

Materials and methods: The study involved 27 women aged 39 to 47 years. Inclusion criteria: recorded perimenopause, climacteric syndrome, history of episodic increase in blood pressure up to 140/85 or 150/90 mmHg. Exclusion criteria: primary hypertension, diabetes mellitus, chronic contagious, systemic, oncology diseases, and mental illnesses. Research procedure comprised tracing of the heart rate, blood pressure registration, and pulse pressure calculation. Robinson index, the coefficient of endurance according to A. Kvas formula were calculated. The assessment of psychological state was made using the Spielberger-Khanin Inventory.

Results: Multidisciplinary professionals gave classes upon wellness program at "Women's Health" school. The program included educational conversations, healthy walking, massage, psycho-corrective exercises. The dynamics of the studied parameters was analyzed after 12 weeks. Based on the anthropometric measures findings the tested women showed improvement of 6,76% weight loss; and their body mass index decreased by 6,77%. Initial numbers of Robinson index and the coefficient of endurance were above normal values. After working under the program statistically significant dynamics was observed ($p < 0,05$), although there were still signs of cardiovascular disorders. There were statistically significant positive changes Spielberger-Khanin Inventory on State Anxiety (-9,09%) and Personal Anxiety Scales (-6,96%) ($p < 0,05$).

Conclusions: Early detection of risk factors and physical activity will help to bring a vast improvement to prognosis and quality of life of perimenopausal women with hypertension onset.

KEY WORDS: recreational physical activity, psychological state, Robinson index, coefficient of endurance

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INTRODUCTION

The first signs of perimenopause in women, that is irregular period, develop after 40, however the latest scientific data show earlier onset of this period. Perimenopause in each woman involves specific physiological changes of different organs and systems associated with ovarian failure and loss of function [1-3]. Failure to produce estrogen provokes endothelial dysfunction and increased body mass index which accounts for development of hypertension. Arterial hypertension (AHT) is rated as one of the determinants of cardiovascular death. As reported by WHO cardiovascular diseases (CVD) are the leading cause of mortality in European and American countries. In the previous decades more serious epidemiological situation was more prominent among men resulting in underestimation of the significance of precursory symptoms of AHT in women. Over the last years there has been heightened interest in women's health during menopause when persistent elevation in blood pressure starts [4-7].

Prominent autonomic balance, sympathetic nervous system activation, clinical manifestations of autonomic dysfunction progress during perimenopause [8,9]. The effect of risk factors on nosogenesis and prognosis of CVD takes attention of many scientists. Psycho-emotional

stress, environmental pollutants, bad health habits, physical inactivity are associated with development of various vasculomotor, neuropsychic, endocrinous and metabolic as well as cardiovascular disorders significantly worsening not only the quality of life but also prognosis for the future [7,10,11].

From the psychosocial aspect women often associate this transition period in their life with senility. Many women may experience heavy mental workload, lack of control over their life, anxiety, confusion and emotional void. Some women seek to confront these age-related difficulties by using alcohol or drugs which aggravates the problem even more [4,10,12].

More pronounced meteosensitivity is present in women during menopause. Typically causes of such state resulting in failure of immune system, are as follows: ill-balanced and unhealthy diet; lack of fresh air; chronic fatigue and frequent stress situations; bad health habits; unfavorable ecological setting; lack of physical activity [8,9].

The development of wellness programs comprising kinesitherapy, mindset training, massage, and partnership expansion programs play the essential role in improving the quality of life of such patients. Thus, North American Menopause Society (NAMS) experts suggest that women

having mild presentation of vasculomotor symptoms initially change their lifestyle and use drug-free aids as treatment [9]. The study by Kronenberg F., Fugh-Berman A. proved the effect of breathing techniques on sympathetic nervous system and hot flash frequency reduction by 35% and more compared to muscular relaxation [cit. 13]. Nelson H.D., Haney E., Humphrey L. et al. (2005) in their study used methods of traditional Chinese medicine such as yoga, acupuncture, herbal therapy to treat hot flash, however, the efficacy of this program was not proved [11,12].

Despite the proven effects of kinesitherapy and psychocorrection methods on the state of the body system of perimenopausal women, the studies of the efficacy of the comprehensive approach to preventing AHT by drug-free modalities were not conducted. In scientific literature there are works related to the development of wellness programs for the age category of population, aimed at improving quality of life [14-17]. Considering that worldwide working age population die from CVD, and now it is not only a healthcare problem but also an economic one, AHT prevention in perimenopausal women is subject to importance of wellness programs development [18,19].

THE AIM

To examine the effect of the developed wellness program on hemodynamic indices and psychological state of perimenopausal women.

MATERIALS AND METHODS

“Women’s Health” school was created at the premises of Kharkiv State Academy of Physical Culture. The study involved 27 women aged 39 to 47 years. Inclusion criteria: recorded perimenopause, climacteric syndrome, history of episodic increase in blood pressure up to 140/85 or 150/90 mmHg. Exclusion criteria: primary hypertension, diabetes mellitus, chronic contagious, systemic, oncology diseases, and mental illnesses. The research related to human use has been complied with all the relevant national regulations and institutional policies, principles of the Helsinki Declaration, adopted by the General Assembly of the World Medical Association (1964-2000), the Council of Europe Convention on Human Rights and Biomedicine (1997).

Detailed analysis of life record data showed that body weight gain, decrease in physical activity, eating disorders, lability of nervous system, response to weather condition changes in the form of headaches and elevation in blood pressure were present in all women over the last 3 to 5 years. Research procedure comprised tracing of the heart rate (HR), systolic blood pressure (SBP) and diastolic blood pressure (DBP) registration, and pulse pressure (PP) calculation. Robinson index and the coefficient of endurance were calculated. The assessment of psychological state was made using the Spielberger-Khanin Inventory.

Robinson index (RI) is used to assess the level of metabolic and energy processes in the body. It is representative of the level of hemodynamic load on the cardiovascular system

(CVS). RI shall be calculated using the following formula: $RI = HR_r \times SBP / 100$, where HR_r – is resting heart rate, bpm; SBP – systolic blood pressure, mmHg. Average value of the RI is 81 to 90 c.u., more than 111 c.u. – is impaired regulation of CVS.

Coefficient of endurance (CoE) is a descriptor of CVS condition level while performing physical activity. It is determined from A. Kvas formula: $CoE = (HR_r \times SBP \times 10) / PP$, where HR_r – is resting heart rate, bpm; SBP – systolic blood pressure, mmHg; PP – pulse pressure, mmHg. Normative value is equal to 16 c.u., an increase in CoE indicates CVS deconditioning.

Spielberger-Khanin inventory enables differentially assessing anxiety according to two subscales both as trait and state associated with the current situation. State anxiety scale (S-anxiety) is a descriptor of individually experienced emotions at that moment. Trait anxiety scale (T-anxiety) is a constitutional trait accounting for proneness to perceive threat over a wide range of situations. The results of survey were recorded in points, and their interpretation were as follows: less than 30 points – mild anxiety, 31-45 point – moderate anxiety, 46 and more points – severe anxiety.

Statistical processing was carried out using STATISTICA 13.0 (StatSoft) statistics package.

RESULTS

The operation of “Women’s Health” school was aimed at teaching recreational physical activity to women for the purpose of improving their quality of life [20,21]. A multidisciplinary team was created to work upon the program. The team included a physical therapist, teacher, rehabilitation coach, psychologist, massage therapist.

While making the program by physical therapist, the principles of physical therapy and pedagogical cooperation, specifically affordability, integrity and multidisciplinary, were followed [22]. The program provided conversations on health promotion, healthy walking, peer massage of neck and collar area, psychocorrective exercises.

Educational part of the program included conversations with women to form their strong beliefs about the need for lifestyle changes, eating behavior correction and fulfilling recreational physical activity requirements; information on menopause, structure and functions of body systems, pathogenesis and medical and social consequences of CVD, meteosensitivity prevention.

At the beginning of the program 3 to 5 women wearing light clothing supervised by the rehabilitation coach walked every other day in the park area during 45 minutes, first at a slow pace 60 to 70 steps per minute at a distance of 500 to 700 m. Starting from day 10, the route of 800 to 1500 m was set, walking pace was gradually increased up to 80 - 90 steps per minute and lasted for 45 to 60 minutes. It was recommended to control breathing. Inhale when making the 2 steps, exhale during the next 3-4 steps. Sessions should be regular, since cumulative positive effect subsides after their cancellation [7,10].

The massage therapist ran classes with women on practical mastery of peer massage session [23]. Peer massage technique includes the following maneuvers:

Table I. Dynamics of anthropometric measures of perimenopausal women

parameter	women (n=27)		p
	initial data	data after the program	
	X ± m	X ± m	
height, cm	165,00±2,37	165,00±2,37	>0,05
weight, kg	74,00±2,18	69,00±1,43	>0,05
BMI, kg/m2	27,18±0,94	25,34±0,67	>0,05

Table II. Positive changes of hemodynamic indices of perimenopausal women with AHT onset

parameter	women (n=27)		p
	initial data	data after the program	
	X ± m	X ± m	
HR, bpm	87,08±1,31	78,55±1,56	<0,05*
SBP, mm Hg	138,13±1,59	127,78±1,39	<0,05*
DBP, mm Hg	87,22±0,74	74,73±0,63	<0,05*
PP, mm Hg	50,91±0,85	53,05±0,76	<0,05*

Note: * statistically significant differences in the dynamics of values

Table III. Dynamics of systolic heart function values of the perimenopausal women with AHT onset

parameter	women (n=27)		p
	initial data	data after the program	
	X ± m	X ± m	
Robinson index, c.u.	120,28	100,37	<0,05*
Coefficient of endurance, c.u.	17,1	14,8	<0,05*

Note: * statistically significant differences in the dynamics of values

1. Palmar surface of both hands laid on the neck and shoulder girdle; and a light spiral rubbing of the neck and shoulder girdles was performed with light force. After that palms moved to scapular and interscapular region. This rubbing was performed for 30 to 40 sec.

2. Two palms laid on shoulder girdle muscles, then one of them smoothly stretch while the other goes opposite way.

The distance between palms shall be 5 to 6 cm. Quantity – 2 to 3 times each side.

3. Shoulder girdles were kneaded starting from neck and to the shoulder joints using heel of the hand; 2 to 3 passed each side; interscapular region from inferior angle of scapula up to neck-shoulder point, 2 to 3 passes; from medial border of scapula towards shoulder joints, 2 to 3 passes each side.

4. At the end 4 to 5 active moves on maximum retraction and protraction of scapula were performed. The whole session took 4 to 5 minutes [23].

The psychocorrective unit involved running 9 sessions lasting 90 minutes and doing exercises without assistance. Common activity; work in subgroups (3 to 4 women); and individual work were used. Psychocorrective unit sessions started with motivational fun games aimed at forming the atmosphere of trust within the group [24,25]. Art therapy and body-oriented therapy methods were used during psychocorrective sessions. Art therapy and body-oriented therapy methods incited women to speak through their unconscious emotions.

Respiration management was used to decrease anxiety level of the women. All respiration exercises were divided into sets: 8 repetitions per one set. Stimulating respiration exercises were performed seated or in the upright position; relaxation ones were done in a supine position. The number of repetitions increased gradually, and the quality of respiratory load also changed. To promote their mental state, the women were offered to do respiration exercises stimulating sympathetic division of nervous system: focus on inhalation (loudly, deeply), exhalation (quietly). To relax their current state women were taught diaphragmic respiration. Also, hypnosis and neurolinguistic techniques were used during psychocorrective sessions to form attitudes to preserve and strengthen mental health.

After 12 weeks the physical therapist analyzed the dynamics of the studied parameters. The following changes took places within the group of persons at “Women’s Health” school. Thus, according to the results of anthropo-

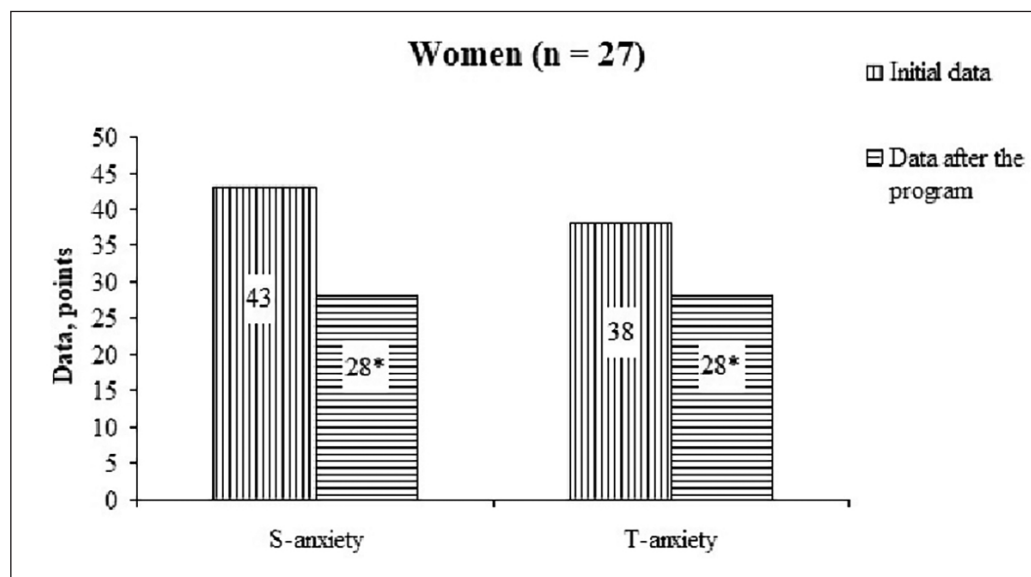


Fig. 1. Dynamics of medians of indicators of the psychological state of perimenopausal women
Note: * statistically significant differences in the dynamics of values

metric measures the tested women showed improvement of 6,76% weight loss; and their body mass index decreased by 6,77% (table I).

Although no statistically significant dynamics was observed ($p > 0,05$), after wellness program perimenopausal women had a pronounced tendency to decrease body weight and BMI.

After working upon the program an improvement in all hemodynamic indices was observed. Thus, HR values significantly decreased by 9,80%, SBP by 7,49%, DBP by 14,32% ($< 0,05$). PP value statistically significantly increased by 4,20% ($< 0,05$) (table II).

Based on the findings of hemodynamic indices for quantitative assessment of systolic heart function, the Robinson index was calculated and coefficient of endurance (CoE) according to Kvas formula was estimated. At initial examination mean value of the Robinson index in the group of women was 120 c.u., which is 1,28 times higher than the normal value and is declarative of impaired regulation of cardiovascular system. CoE according to the Kvas formula during the initial calculation showed weakening of cardiovascular system: while the normal value is 16 c.u., among the tested women this parameter got the value equal to 17,1 c.u. (table III).

Analysis of the dynamics showed positive changes: Robinson index and CoE decreased by 16,55 and 13,45% respectively. After working upon the program statistically significant dynamics was observed ($p < 0,05$), although there were still signs of cardiovascular disorders.

Considering the fact that psychological disorders are among compromising factors of AHT progress and adversely affect cardiovascular performance, the Spielberger-Khanin inventory on trait (T-anxiety) and state (S-anxiety) anxiety scales was conducted among perimenopausal women. When assessing psychological state of the tested persons, statistically significant increase in state and trait anxiety level according to Spielberger-Khanin inventory was determined compared to normal values ($p < 0,05$). After completing the wellness program, there was a statistically significant dynamics of Spielberger-Khanin Inventory on State Anxiety Scale (-9,09%) and (-6,97%) on Trait Anxiety Scale ($p < 0,05$) (fig.1).

Thus, there were positive changes in hemodynamic indices and psychological state of perimenopausal women with AHT onset affected by the developed wellness program.

DISCUSSION

Perimenopausal women experience persistent increase in arterial blood pressure. The issues of the quality of life of perimenopausal women are poorly covered in the literature, inadequate attention is given to the development of wellness programs, occasionally wellness programs for the elderly can be found. Development of recreational physical activity program should be aimed at meeting the needs and components to improve the quality of life of the women during this period. Health and wellness program should include physical activity, correction of eating behavior,

psychocorrective exercises, behavioral components such as meteosensitivity conditioning which is shown in our study [6,8-10,19].

Perimenopausal women's data obtained during the study showed the disposition towards increase in weight and BMI emphasizing the importance of this risk factor for AHT progression. An increase in impaired regulation of CVS was indicated, which is subject to the predominance of increased BP values. An increase in anxiety level according to Spielberger-Khanin Inventory was indicated. All of the above data point to a decrease in the quality of life of perimenopausal women.

To prevent AHT it is necessary to do moderate aerobic physical activity. Prospective study shows that CVD risk is 30% higher for physically non-active middle-aged people. The study confirmed that regular moderate physical activity promotes the development of adjustment reactions, immunity to environmental exposure, increased metabolism in tissues, coping with hypoxia, heart function economy [13-17].

Nelson H.D. et al., Agmon, M. et al. [11], studied the effect of healthy walking and fitness on clinical condition of the women having symptoms associated with menopause. The analysis of the positive changes in hemodynamic indices and parameters of psychological state of the women from "Health school" confirmed the results of the similar study.

Thus, currently there is no framework defining the development of wellness programs which could detect preterm hemodynamic and psychological changes in this category of women. Early detection of risk factors and targeted influence on physical activity and psychological state will help to significantly improve the prognosis and quality of life of perimenopausal women.

CONCLUSIONS

Based on the study, the changes in hemodynamic indices and psychological state were detected in the perimenopausal women with AHT onset, which confirms the risk of CVD progression. The dynamics of the above parameters was statistically significantly positive: the general state of health improved, psychological state recovered, and the tolerance to physical and psychological stress has increased.

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Conflict of interest:

The Authors declare no conflict of interest.

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