Original Article

Impact of physical activity of correctional orientation in the form of combined fitness and swimming on the psychophysiological state of 40-45-year-old women

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Abstract:

The goal is to study the impact of physical activity of correctional type in the form of combined fitness and swimming on the psychophysiological state of women aged 40-45. The training process was held at the Fakel Sports School in Chelyabinsk (n = 30) and included weekly strength training and aqua fitness (45 minutes each). Stress resistance for females (situational anxiety by the methods of Ch. D. Spielberg, Yu.L. Khanin) was studied before the exercises (background level) and at the end of the 1st, 3rd and 6th months of training. The study was performed using the appropriate NEUROCOM software — UPDK-MK v. 5.3.1221. The techniques applied were the following: emotional stability, level of subjective control (E. F. Bazhin, E. A. Golyunkina and A.M. Etkind, based on the scale of J. Rotter). The level of control in the studied female population showed average values of internality after certain correction based upon the general internality scale, and it indicated the effectiveness of cognitive system of studied subjects to cope effectively with their stresses. The level of internality in the experimental group (EG) was higher by 11%, and it allowed to conclude that the corrective technique applied was quite effective.

Keywords: - women aged 40-45, correctional technique, fitness, swimming, locus of control, situational anxiety.

Introduction

The first fitness programs appeared in the first half of the 20th century and were associated with Dr. K Cooper who developed certain exercises tested on military personnel. Further, there were developed a whole variety of fitness programs to model types of motor movements (Bolach, 2014, [1]; Romanowska-Tolloczko, 2009 [7]; Petrovych, 2013 [8]; Shishkina, 2014 [11]; Kadykova, 2016 [12]; Cotlo, 2016 [13]; Maslova, 2007 [14]; Shakira, 2016 [16]; Sologubova, 2011 [15]; Solodkov, 2003 [16]; Shakhlina, 2001 [18]). Modelling of fitness trainings was carried out by means of organization of group and individual exercises with health-conditioning and motor orientation.

Comprehensive fitness trainings with health-improving orientation are based on one or several types of motor activity. There are developed integrative, generalized fitness trainings targeted at different groups of people: children, mature and elderly, or people in special periods of life (associated with childbirth, injuries, etc.).

Polymorphism of fitness programs is dictated by the need to satisfy interests in improvement of individual physique of different groups of people. The multifactoriness of fitness training components determines their active participation in modelling of the career component, principles of hygienic care, improvement of physique, balanced nutrition, prevention of various diseases, strengthening of social position, etc. We should emphasize the role of fitness in regulation of optimal vitality and in the mechanisms of antistress protection.

At present there is a great interest to introduce power fitness programs in combination with (aqua fitness) taking into account the following circumstances (Dolgoval et al., 2016 [2, 3, 4]; Shemanova, 2008, 2012 [19, 20]; Dudina, 2016 [5, 6]):

1. Availability and targeting of programs aimed at specific groups with certain level of physical and psychological preparedness, and specificity of professional activity.

2. The aim of fitness complex, which facilitates reception of positive emotions and increase in motivation taking into account individual needs and interests of engaged persons, should be clearly indicated.

4. A number of psychological, pedagogical and medical procedures should be provided through the dynamics of fitness.

5. Creating safe environment and comfortable conditions while doing the exercises with the proper medical support is a required component of any fitness.

The goal of this study is to explore the impact of physical activity of correctional orientation in the form of combined fitness and swimming on the psychophysiological state of women aged 40-45.

Materials and methods

Stress-resistance of organism for women aged 40-45 was studied at the Fakel Sports School in Chelyabinsk. We examined 30 women divided into two groups of 15 subjects each. Women of the control group (CG) were offered a traditional method of fitness training. We selected special power exercises with a component of aqua fitness for the main experimental group (EG), taking into account types of figure and having a corrective-improving orientation. The process included training in strength (2 times a week) and aqua fitness (4 times a week) for 45 minutes. Stress resistance for females (situational anxiety by the methods of Ch.D. Spielberg, Yu.L. Khanin) was studied in the above groups before the exercises (background level) and at the end of the 1st, 3rd and 6th months of fitness. The study was performed using the appropriate NEUROCOM software — UDK-MK v. 5.3.1221 (a set of verified techniques for determining psychophysiological qualities). The techniques applied were the following: emotional stability, level of subjective control (E. F. Bazhin, E. A. Golyunkina and A.M. Etkind based on the scale of J. Rotter).

The special program for the EG included aqua fitness performed in a swimming pool as a natural simulator with many functions.

Results

The indicator of emotional stability (see Table II) had a positive value of 0.61 ± 2.6 in the EG and 0.64 ± 2.8 in the CG, and it did not significantly exceed the normative values ($T_4 < T_3$), which allowed to assume a small probability of "disruption" of activity in conditions of emotional stress. The coefficient of variation indicated a relative homogeneity of the population.

Table I. Indicator of the Emotional Stability of the Group of Women Aged 40-45 under Research

Methodology	Indicator, Unit of measure	Gender	Indicator (control group)		Indicator (experimental group)	
			M $\pm$ m	CV	M $\pm$ m	CV
Emotional stability	m, mc	female	0.64 ± 2.8	23.4	0.61 ± 2.6	24.6

The indicators of situational anxiety of women through the dynamics of fitness are shown in Table II.

The number of women with a high level of situational anxiety was 6, average – 6, and low - 3 in the CG before the beginning of training. The number of women with a high level of situational anxiety was 7, average – 5, and low - 3 in the EG within such period. There were no significant differences between the levels of situational anxiety in the study groups before the beginning of the fitness program. Some unreliable increase in the average scores, characterizing levels of situational anxiety, was observed after a month of training. In our opinion, doing fitness exercises, especially those of power orientation, was associated with emotional stress, which increased within the initial period. The category of women in the EG who first visited the fitness club and were not prepared for power loads had the highest level of situational anxiety.

Table II. Indicators of Situational Anxiety of Women in the Dynamics of Doing Fitness

Groups/anxiety level (points)	High	Medium	Low
Background level			
CG	67.1 ± 6.1	45.4 ± 3.6	35.8 ± 4.6
EG	68.4 ± 5.6	46.2 ± 3.7	34.9 ± 2.8
In a month of training			
CG	68.3 ± 5.8	46.2 ± 3.6	36.3 ± 3.5
EG	69.3 ± 5.7	47.4 ± 3.9	35.6 ± 3.1
In three months of training			
CG	62.4 ± 5.3	42.5 ± 3.7	32.6 ± 2.7
EG	64.1 ± 5.8	40.6 ± 3.6	31.9 ± 2.8
In six months of training			
CG	-	39.5 ± 2.8	25.3 ± 1.7
EG	-	37.4 ± 2.9	19.5 ± 0.9

Note. Reliability of the differences in the parameters of the EG in comparison to the CG (calculated by the Mann-Whitney test) was: * — $p < 0.05$; ** — $p < 0.01$; *** — $p < 0.001$.

There was a steady tendency to decrease the average scores characterizing levels of situational anxiety after three months of fitness in both study groups. Compared to the background level in the CG with a high level of situational anxiety, the average indicators decreased by 7.0% ($p < 0.05$), and by 6.3% in the EG.

No category of women with a high level of situational anxiety was identified in both study groups after six months of fitness.

Discussion

The persistent health-improving effect of aqua fitness was due to the increased activity of functional systems (cardiovascular, endocrine, respiratory, etc.) and the phenomenon of gravitational unloading of the musculoskeletal system.

Strength training has an anabolic effect, helping to reduce the volume of adipocytes and improve the aesthetic effect. Power exercises strengthen all types of muscle tissue, including the heart muscle, thus creating a muscle corset that tightly holds all visceral organs. The effect of strength training is extrapolated to the ligament-joint apparatus and mineral metabolism in bone tissue.

One of the ultimate goals of specific strength training in women is to correct the figure and construct an aesthetically desirable body. Before the start of the strength training it was necessary to consult with doctors and remember that there were a lot of contraindications (high blood pressure, arrhythmia, bronchial asthma, myocardial infarction, etc.) and limitations (problems with the spine, pathologies of the thyroid gland of chronic genesis and others).

There were a number of power exercises to be selected taking into account the individual parameters of each person.

Depending on the purpose of the training, certain exercises were selected and the number of approaches varied. It was taken into account that an inefficient number of repetitions of exercises with weights contributed to violation of blood flow in the body and increased fatigue. When working with weights, there is a large load on the spine, muscles become strong, but less flexible, which increases the risk of injury. Each movement is to be performed in a certain rhythm under the control of breathing.

First results were noticeable after two months with regular and persistent training regimens in the second half of the day. Long pauses in training (1–2 weeks and more) could lead to de-adaptation of the female organism.

It was necessary to pay attention to a balanced diet when practising power fitness. Contraindications to any diet were due to possible depletion of muscle tissue, appearance of stretch marks, and decrease in skin elastic properties against the weak effect on adipose tissue. It was necessary to exclude fats of animal origin during training: butter, any fatty, high-seasoned, salty, meat dishes, but it was allowed to eat some meat. Priority food products were: cereals, dried fruits, apples, lean meat, fish, curds and cheese.

The psychological state is closely related to the neuro-dynamic characteristics of the nervous system, which are stable enough and allow assessing the level of functioning of the central nervous system that ensures the realization of higher mental functions and cognitive activity.

We consider emotional stability as a psychophysiological characteristic, and the technique applied is the assessment of variants of simple visual-motor reaction. During the period of stress conditions, subjects with high level of emotional stability show no changes in the latent time of sensomotor reaction, which indicates a high level of stress tolerance and good regulatory abilities. After finishing the fitness training compared to the baseline level, a considerable decrease in average scores that characterize the levels of situational anxiety in both study groups also proves the positive effect of fitness on the psychoemotional state of the female organism. In addition, as a result of physical training programs, a lot of subjects achieved the desired results concerning the correction of their figures, and it reliably resulted in a decrease in the situational anxiety indicators. The situation of weight loss, correction of muscle mass caused a decrease in emotional stress, a sense of anxiety caused by excess kilograms.

When predicting the occurrence and increase in anxiety in various disadaptive situations, it is more appropriate to apply situational-specific criteria of anxiety than the criteria for general personal anxiety. The level of situational anxiety (as shown above for women) is more accurate for anticipating the deterioration of activity in a situation of emotional stress associated with a body weight exceeding the norm than the value of general personal anxiety. The contextuality of personified differences in the inclination to anxiety states should also be noted, i.e. they may manifest themselves in one type of situation but not in others. Among the study groups, there were five women who had a high level of situational anxiety with a much lower personal anxiety. Women indicated that they experienced an increased level of anxiety before coming to the fitness centre because of their own imperatives, promises to their relatives who repeatedly pointed out to the need for body shape and weight correction. Three women noted that they had dreamed of an ideal figure since their youth and tried to achieve the goal with no result. Perhaps, this was a factor in the threat of negative self-esteem, and the anxiety caused by these circumstances should be regarded as temporarily transient. Notably, anxiety in such circumstances can be considered as a multicomponent process involving components of a stressful character with elements of threat, as well as someone's personal quality.

Both the perception of different types of emotional stress and susceptibility to anxiety is quite different in humans. Therefore, theoretical studies of anxiety should consider aspects of treating anxiety as a personality trait. Individual differences in personal anxiety are largely due to the frequency and intensity of the manifestation of anxiety in time. It is logical to assume that a person with a high level of anxiety has a greater susceptibility to experience anxiety in situations of interpersonal relations that carry a threat to his/her own self-esteem

Conclusions

This study has shown that individual psychological characteristics affect the behaviour in the process of stress reaction. One of the psychological characteristics that affect the regulation of stressful processes is the locus of control. The locus of control may vary depending on the psychological state of the individual. The applied technique makes it possible to evaluate individual perception of events in the continuum of external and internal loci of control.

The locus of control values was determined for the study groups with some differences: 2.31 ± 0.62 in the CG, and 2.67 ± 1.24 in the EG. The background level on the general internality scale was 2-3 stens (below the average).

The level of control in the study female population amounted to 4-6 stens after certain correction based upon the general internality scale, namely, 4.75 ± 1.63 in the EG, and 4.23 ± 1.71 in the CG; i.e. the level of internality was average and it indicated the effectiveness of cognitive system of study subjects to cope effectively with stresses. Considerably high values of the coefficient of variation (37.7 and 37.95, respectively) characterized the heterogeneity of the study population (women aged 40-45). The level of internality in the EG was higher by 11%, and this allowed to conclude that the corrective technique applied was quite effective.

Women are more sensitive in the matters of figure correction because they have higher indices of the internal locus of control and are more inclined to feel responsible for failures and health than men.

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