

Original Article

Practical implementation of differentiated approach to developing water aerobics classes for early adulthood women with different types of body build

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Abstract:

Practical implementation of differentiated approach to developing water aerobics classes for early adulthood women with different types of body build. **The purpose of the article** is to establish effectiveness of influence of Water Aerobics classes for early adulthood women with different types of body build on their physical development indices. **Results.** The approach to building-up health fitness classes which is based on differentiation of exercise workload in accordance with the type of body build of early adulthood women (asthenic, normosthenic, hypersthenic) was developed. The dynamics of physical development indices in early adulthood women under the influence of Water Aerobics classes in accordance with their body build type was studied. The research involved 46 women of the above-mentioned category, with 73,9 % of normosthenic type, 15,2 % of asthenic one and 10,9 % of hypersthenic one. It was proved that women who took the developed exercise program experienced normalization of body length-weight ratio, the number of women with average level of body type balance increased, optimization of fat and muscle components of their bodies took place. Women of asthenic body type experienced optimization of their weight, the ones of normosthenic type had redistribution of body fat and muscle components with increase of muscle component by means of fat component decrease, women of hypersthenic type demonstrated improvement of all physical development indices under research. The conducted research contributed to corpus of data regarding the increase of effectiveness of Water Aerobics classes for early adulthood women with different types of body build.

Key words: women, Water Aerobics, development, distribution, influence, effectiveness.

Introduction.

Nowadays the scientists record deterioration in physical conditions of early adulthood women, determined by sedentary life-style, improper nutrition, unfavorable social, economical, environmental conditions, which exacerbates the problem of human capital reproduction (Andrieieva et al, 2019; Belyak, 2014; Butenko et al, 2017(a); Tomilina, 2016; Maksymova, 2017).

The leading role in overcoming this negative tendency is taken, according to the modern scientists, by the means of health fitness, which classes contribute to raising the level of physical health, physical conditions, functional state of the body, mental and physical fitness for work and provide positive impact on psychoemotional state of women of reproductive age (Afanasiev et al, 2019; Butenko et al, 2017(b); Masliak, 2015; Kashuba, 2016). Contemporary scientists pay more and more attention to innovative means of motor activity, among which special attention should be paid to physical exercises in water environment, which popularity is determined by considerable energy usage, decrease of joints and spine load, health improving impact of hydrostatic water pressure (Zadorozhnaya, 2012; Shutova, 2015; Zinchenko, 2016).

However, effectiveness of the influence of Water Aerobics classes for early adulthood women, which is methodologically based on taking into consideration their types of body build while developing the correlation of impact means, is not yet proved.

The aim of the research is to assess the influence of Water Aerobics classes on physical development indices of early adulthood women, which is based on differentiated approach.

Material and methods.

Used methods include the analysis and analysis of scientific and methodical literature, Internet data, anthropometry; body build type is distinguished by Pignet Index, body length-weight ratio is defined with Body Mass Index, the level of body type balance is analyzed with the help of Rohrer's Index, body composition is

established based on the method of bioelectric impedance; mathematical statistics methods are as well used by applying non-parametric tests: Fischer's Exact Test and ϕ^* Criterion, which allow correlating samples by characteristic distribution (Byshevets, 2019). The research was conducted in "Yunist" Fitness Club in the city of Kyiv. The research involved 46 early adulthood women, which were divided by the type of body build; before conducting the research the written consent for participation in the research was obtained from the women. 15,2 % of experiment participants were of asthenic body build type, 73,9 % – of normosthenic type, and 10,9 % – of hypersthenic one.

Results.

The analysis of scientific resources, as well as personal experience in developing and conducting water exercises for early adulthood women became the basis for developing the means of differentiated influence with taking into consideration the peculiarities of women's body build (Kashuba, 2016; Kashuba et al, 2017).

The content of the exercise program was determined in accordance with the focus of differentiated impact on water fitness means. For women of asthenic body build type the exercises directed to develop muscle power and strength endurance (Aqua Building), flexibility and muscle tonus regulation (Aqua Stretching, Hydro Relaxing), coordination abilities (Aqua Dynamics) were used. The priority in the classes for early adulthood women of normosthenic type was given to water fitness means aimed to keep muscle tonus (Aqua Tonic), improve strength endurance, movement coordination and speed (Aqua Gym, Aqua Karate); aerobic endurance was stimulated by using the means of Aqua Step. The means of Aqua Stretching, Hydro Relaxing were used to recover after exercises. While defining the content of impact program of classes for early adulthood women with hypersthenic type of body build special attention was paid to the means of developing aerobic and strength endurance, flexibility and movement coordination (Aqua Jogging, Aqua Dance, Aqua Gym etc.). The means of Aqua Stretching, Hydro Relaxing were used to recover after exercises. During implementation of exercise program the basic principles of building up the classes in health fitness using general pedagogical and specific methods, techniques of teaching motor actions, developing motor skills were followed.

The indices of physical development of early adulthood women, namely body composition and correlation of specific indices of physical development, were considered as leading criterion for differentiated classes' effectiveness. These criteria were defined based on factor analysis (Tkacheva et al, 2017).

Offered means were implemented practically in the activity of "Yunist" Fitness Club in the city of Kyiv.

As part of the study we learnt the dynamics of changes in specific indices of physical development and fat deposits in early adulthood women under the influence of water fitness means with considering the type of their body build. It was established that during the experiment body mass index (BMI) of women of asthenic type changed from (18,25; 0,94) to (18,32; 0,96) $\text{kg}\cdot\text{m}^{-2}$, where the data is presented as ($\bar{x};s$), of the ones of normosthenic type – from (20,22; 1,48) to (20,22; 1,41) $\text{kg}\cdot\text{m}^{-2}$, of the ones of hypersthenic type – from (24,45; 1,86) to (23,57; 1,54) $\text{kg}\cdot\text{m}^{-2}$. At the stage of ascertaining experiment it was found out that in contrast to women of asthenic and hypersthenic body build type, the vast majority of women of normosthenic type (88,24%) were characterized by normal body length-weight ratio. After the experiment was completed, the number of women of asthenic type with weight deficit went down by 14,29 %, but of women of normosthenic type – by 5,88 %. At the same time, among women of hypersthenic type, the number with excess weight reduced by 20 %. However, statistic significance of distribution changes was not proved ($p>0,05$) (Table 1).

Table 1
Dynamics of physical development indices in early adulthood women under the influence of water aerobics means in accordance with their type of body build, %, (n=46)

Index	Assessment	Body build type, experiment stage								
		asthenic, n=7			normosthenic, n=34			hypersthenic, n=5		
		before	after	Δ	before	after	Δ	before	after	Δ
Body length-weight ratio (Body Mass Index)	Weight deficit	71,43	57,14	-14,29	11,76	5,88	-5,88	-	-	-
	Normal ratio	28,57	42,86	14,29	88,24	94,12	5,88	60	80	20
	Excess weight	-	-	-	-	-	-	40	20	-20
Level of body type balance	Below average	14,29	14,29	-	2,94	2,94	-	-	-	-
	Average	85,71	85,71	-	94,12	97,06	2,94	20	40	20
	High	-	-	-	2,94	-	-2,94	80	60	-20
Fat component	Above the norm	14,29	-	-14,29	14,71	5,88	-8,82	40	20	-20
	Norm	14,29	28,57	14,29	20,59	50	29,4*	20	60	40
	Below the norm	71,43	71,43	-	64,71	44,12	20,59*	40	20	-20
Muscle component	Above the norm	14,29	14,29	-	32,35	23,53	-8,82*	60	40	-20
	Norm	28,57	28,57	-	29,41	52,94	23,53*	-	60	60
	Below the norm	57,14	57,14	-	38,24	23,53	-14,71*	40	-	-40

Note: * - $p<0,05$ while comparing women divided by corresponding characteristics, before and after the experiment

It was found out that before the experiment the Rohrer's Index of the participants varied from 9,74 to 17,09 kg·m⁻³, with average rate of (12,07; 1,36) kg·m⁻³. At the same time, the biggest number of early adulthood women with balanced body build were recorded among the participants of normosthenic type, which at the end of the experiment reached 97,06 %. Besides, the number of women with balanced body build raised by 20 % among the participants of hypersthenic type.

At the beginning of the experiment the deficit of fat component was recorded in women of both asthenic and normosthenic types. However, the women of asthenic type under investigation had the highest rate of 71,43% (Kashuba et al, 2019). Normalization of fat mass took place in early adulthood women regardless of the type of their body build, but among the women of normosthenic type the increase of number with normal quantity of fat component and decrease of number with fat mass deficit became statistically significant ($p < 0,05$).

It should be mentioned that the amount of muscle component in women of normosthenic type under research was the most closely resembling the norm compared to the women of other types of body build. Thus, the number of women of normosthenic type with the rate of muscle component within the norm was 12,61% higher than the number of women of asthenic type and 41,2% higher compared to women of hypersthenic type. But after the experiment the maximum number of women with normal level of muscle component – 60% – was recorded in women of hypersthenic type of body build. However, statistically significant ($p < 0,05$) increase of number of women with normal level of muscle component was again recorded in women of normosthenic type of body build. It is obvious that water fitness classes with consideration of the type of body build contribute to improving the indices of physical development of early adulthood women.

Discussion.

Scientists share the opinion that, unfortunately, women in early adulthood already suffer from worsening of health conditions, pain in cervical, thoracic and lumbar sections of the spine, the indices of their physical development and fitness drop down (Samoshkin et al, 2014; Tomilina, 2016).

Nowadays specialists make significant efforts in order to overcome negative tendency of decreasing the level of physical conditions of women in reproductive age (Ivanchykova et al, 2018; Osipov, 2012; Tkacheva, 2018). At a time when innovative kinds of motor activity are being widely spread, a stepping stone to improving physical conditions of women of the mentioned category is assessment of the influence of health fitness, in particular on those who take classes (Kashuba et al, 2018a, 2019). It is a well known fact that classes of health fitness are built up based on the peculiarities of the physical conditions of trainees (Andrieieva et al, 2019; Imas et al, 2018; Kashuba et al, 2018b; Sologubova, 2015). Besides, evaluation of body build and presence of fat component is necessary for choosing adequate means of pedagogical influence. That is why we consider systematizing knowledge of specific features of body build of early adulthood women appropriate and demanding further research. Studying the influence of fitness classes using TRX equipment on physical conditions of early adulthood women O. Demidova (2017) noticed that such classes have positive impact on body weight management. Moreover, compared with classes of dance kind of aerobics “Latina”, the methodology, developed on the basis of “TRX FORCE Tactical Conditioning Program” contributes to more significant correction of body weight and circumference values of those who take such classes. According to the presented data, during the experiment, BMI of women taking Latina classes dropped down by 10,1 %, but of women taking TRX classes – by 9,9 %, but circumference values of the second group reduced a lot more than of the first group. Thus, upper arm circumference reduced by 13,2 against 1,9 % in the women of the first group, waist circumference – by 13,4 against 10,4 %, hip circumference – 13,1 against 11,2 %. In our research BMI of women under research decreased only in women of hypersthenic type of body build and this decrease reached only 2,8 %, rather than BMI of women of asthenic type increased by 0,4 %, and of normosthenic type – by 0,03 %. Such difference can be explained by the fact, that in the scientists' research (Demidova, 2017) average BMI value is over 26 kg·sm⁻¹, which indicates excess body weight.

The scientific resources contain the data regarding using water fitness means for overcoming negative tendency of obesity among early adulthood women. In N.M. Zinchenko's research (2016) there are proves of positive impact of water fitness classes on health conditions of women with excess body weight. According to the data of this research BMI of the trainees reduced by 12,3 % during the experiment. However, it should be emphasized that in our research the women were characterized by normal body length-weight ratio, so the aim of the research was to optimize their body weight, but not to reduce it.

Besides, according to other scientific sources (Samoshkin, 2014), the means of Fit-Ball Aerobics and Fit-Ball Gymnastics combined with sensible nutrition contribute to faster reduction of body fat content in early adulthood women, compared to the means of Step Aerobics together with performing additional exercises for “problem zone” and for developing back muscle strength along with correction of nutrition regime. The scientist proves that body fat content reduced by 2,7 % in women who took Step Aerobics, when this index dropped down by 11,5 % in women who used to take Fit-Ball Aerobics and Fit-Ball Gymnastics classes.

In our research it was found out that water aerobics classes had impact on subcutaneous fat content in women depending on their body build type as follows: asthenic type – increased by 5,1 %, normosthenic type – by 3,3 %, hypersthenic type – decreased by 5,9 %. It again proves that experiment participants demonstrated

optimization of fat mass percentage. As we can see, water fitness means do not have such visible effect as other types of health fitness mentioned. But it should be mentioned that water fitness has some advantages as compared with other kinds of fitness. For instance, by contrast with strength building kinds of health fitness, functional fitness, etc. water fitness has almost no contra-indications. Positive effect of water environment on human body should be mentioned as well. But the question why there is such difference between the data in scientific resources and results of our research is still to be answered.

First of all, Yu. I. Belyak (2014) proved that early adulthood women by BMI and fat mass content can be roughly divided into three clusters. Moreover, indices of BMI and fat component content in women of the same age have statistically significant difference. Along with this, Masliak (2015) proves the necessity to distribute early adulthood women into age subgroups and study physical development of women of 21-30 and 31-35 separately due to significant differences between their weight-height indices. It should be mentioned that the results of our research are compliant with the author's data, according to which BMI of women of 21-30 with normal body length-weight ratio reduced by 4,3 % under the influence of Step Aerobics classes.

As a result it should be mentioned that the outcome of our research does not contradict the data from other scientific resources (Ivanchykova et al, 2018; Kashuba et al, 2019), but flags up possibility to solve the problem of optimizing body length-weight ratio and fat mass in women by means of Water Aerobics with consideration of the type of women's body build.

Conclusions and perspectives of further research.

Nowadays the problem of decrease of indices of physical conditions of women in reproductive age that escalates the threat of demographic crisis, which evidences can be found in European countries is brought to the forefront. Such situation led to activation of scientific community in order to find the ways of overcoming current negative tendency of decline in birth rate and population decrease.

Health promotion of early adulthood women correlates, according to scientists, with popularity of the idea of healthy life style in society and, first of all, with optimization of women's motor activity, which caused explosive development of health fitness. Scientific community actively discusses the issues connected to implementation of innovative kinds of health fitness into the system of health promotion of early adulthood women that requires researches aiming to assess effectiveness of offered health promotion programs.

Among different kinds of health fitness special place is taken by classes in water environment. It is generally known fact that exercising in water has positive impact on a human body. Water Aerobics classes are popular among early adulthood women and have practically no contra-indications. The assessment of the effectiveness of the program, based on the means of Water Aerobics with consideration of the type of body build of early adulthood women proved that women experienced normalization of body length-weight ratio, the number of women with average level of body type balance increased, optimization of fat and muscle percentage was recorded. Thus, BMI of women of asthenic type of body build increased, women of normosthenic type had redistribution of body fat and muscle components with increase of muscle component by means of fat component decrease, women of hypersthenic type demonstrated improvement of all physical development indices under research. It can be claimed that water fitness means have positive influence on the level of physical development of early adulthood women with different types of body build.

Further research may be focused on assessing the influence of the developed program on locomotion and spring systems of early adulthood women.

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