ISSN 2522-1906 (Print) ISSN 2522-1914 (Online)

Physical rehabilitation and recreational health technologies

Original article

Vol. 8 No 1

Barre-fitness as a modern means of improving the health of women in the first period of adulthood

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DOI: https://doi.org/10.15391/prrht.2023-8(1).04

Received: 19.01.2023
Accepted: 12.02.2023
Published: 31.03.2023

Citation:

Krasova, I., Semyzorova, A., Deineko, A., Beihul, I., & Shyshkina, O. (2023). Barre-fitness as a modern means of improving the health of women in the first period of adulthood. *Physical rehabilitation and recreational health technologies*, 8(1), 29-38. https://doi.org/10.15391/prrht.2023-8(1).04

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Abstract

Purpose: to determine the effect of Barre-fitness classes on the morphofunctional state and physical fitness of women in the first period of adulthood.

Material & Methods: the results of a study of 35 women of the first period of adulthood (21–35 years old) with fitness experience from 6 to 12 months are presented. The female participants, taking into account the age and results of the initial study, were divided into 2 groups: the main group (MG), (n=18) and the control group (CG), (n=17). The women of the control group were engaged in dance fitness, and the women of the main group were engaged in specially designed Barre-fitness exercises. To achieve the set goals, physical development was assessed using anthropometric indicators: body length and weight; waist circumference, hip circumference. To assess the functional capabilities of women, the indicators of the cardiovascular and respiratory systems were studied.

Results: during the study, a statistically significant ($p<0.05$–0.01) improvement was observed in most of the studied morpho-functional parameters of women in the MG, with the exception of hip circumference, systolic blood pressure and diastolic blood pressure ($p>0,05$). The indicators of women in the CG also had a positive trend, but did not reach statistically significant differences ($p>0,05$). As a result of the use of Barre-fitness means, there was a significant statistically significant ($p<0,05$-$0,001$) improvement in the results of the physical fitness of women in the MG, with the exception of the "Shuttle run 4×9 m" indicator ($p>0,05$). The indicators of women in the CG also had a positive trend, but did not reach statistically significant differences ($p>0,05$).

Conclusions: the conducted study testifies to the positive impact of Barre-fitness classes on the morphofunctional state, the level of physical fitness and the health of women in the first period of adulthood. The obtained results make it possible to recommend Barre-fitness means for training women in fitness clubs and studios, as well as in the educational process of future specialists in physical culture and sports in higher education institutions.

Key words: Barre-fitness, health of women, women in the first period of adulthood, morphofunctional state, physical fitness, health-improving classes.

Анотація

Barre-фітнес, як сучасний засіб оздоровлення жінок першого періоду зрілого віку. Мета: визначити вплив занять Barre-фітнесом на морфофункціональний стан та фізичну підготовленість жінок першого періоду зрілого віку. **Матеріали і методи:** представлено результати дослідження 35 жінок першого періоду зрілого віку (21–35 років) зі стажем занять фітнесом від 6 до 12 місяців. Учасниці з урахуванням віку і результатів початкового дослідження були поділені на 2 групи: основну (ОГ), (n=18) і контрольну (КГ), (n=17). Жінки контрольної групи займалися танцювальним фітнесом, а основної групи – спеціально розробленими вправами Barre-фітнесу. Для вирішення поставленої мети проводилося оцінювання фізичного розвитку за допомогою антропометричних показників: довжина і маса тіла; обхват талії, обвід стегон. Для оцінки функціональних можливостей жінок досліджувалися показники серцево-судинної та дихальної систем. **Результати:** у ході дослідження спостерігалося статистично достовірне ($p<0,05–0,01$) покращення більшості досліджуваних морфо-функціональних показників жінок ОГ, за виключенням показників обводу стегон, АТ систолічного та АТ діастолічного ($p>0,05$). Показники жінок КГ також мали позитивну динаміку, але не досягли статистично достовірних відмінностей ($p>0,05$). У результаті застосування засобів Barre-фітнесу відбулося значне статистично достовірне ($p<0,05–0,001$) покращення результатів фізичної підготовленості жінок ОГ, за винятком показника «Човниковий біг 4×9 м» ($p>0,05$). Показники жінок КГ також мали позитивну динаміку, але не досягли статистично достовірних відмінностей ($p>0,05$). **Висновки:** проведене дослідження свідчить про позитивний вплив занять Barre-фітнесом на морфофункціональний стан, рівень фізичної підготовленості та здоров'я жінок першого періоду зрілого віку. Отримані результати дають підстави рекомендувати засоби Barre-фітнесу для занять із жінками у фітнес-клубах та студіях, а також у навчальному процесі майбутніх фахівців з фізичної культури та спорту в закладах вищої освіти.

Ключові слова: Barre-фітнес, здоров'я жінки, жінки першого періоду зрілого віку, морфо-функціональний стан, фізична підготовленість, оздоровчі заняття.

Introduction

The term "Barre" means "ballet barre". Barre exercises are one of the fairly new, non-traditional, affordable and effective systems of health-improving fitness classes (Bruno & Farrell, 2021).

Barre was created by the German ballerina Lotte Berk, who was forced to leave the stage after a serious injury and invented fitness, which helped her keep fit, keep her chiseled body without daily ballet training and enjoy aesthetic and effective exercises. Subsequently, the method included elements of Pilates and yoga, it became more versatile and accessible (Pirkko Markula, 2021).

So, modern Barre-fitness, which is gaining more and more popularity in the world, is a system of physical exercises based on a combination of ballet exercises, functional strength training, Pilates and yoga. It is these loads, which include a combination of different amplitudes of movement and long-term retention of a certain posture, that contribute to the development of endurance, relief and muscle strength and have no less intense effect on the body than classical aerobic training. Also, Barre exercises give a personal experience of touching the perfection of the classical heritage (Adams, 2018; De Vito, & Halfpapp, 2015). A ballet barre (a chair or other support) is used as a support when working on the muscles of the legs, buttocks, and the press. Dumbbells 1-2 kg, fitness balls, elastic bands and other items can be used in the lesson. A large number of specially designed and varied exercises are combined in such a way that allows you to make each workout different from the others and motivate women to continue exercising, while seeing their training achievements in real time, feeling better, having a good mood, good posture and developed muscles (Lim & Park, 2019; Barranco-Ruiz et al., 2020).

In modern conditions, the preservation and restoration of women's health is one of the urgent problems in the world, which is not only of scientific and practical interest, but also contributes to the solution of economic, social and demographic problems of society (Belyak et al., 2018; Pogrebniak, 2018).

Health-related quality of life includes physical, psychological, social and economic aspects along with the absence of disease. One proven means of improving health is exercise, which has been shown to improve both physical and mental well-being and improve quality of life (Küçük & Livanelioglu, 2015; Romanchuk & Dolgier, 2016; Romanchuk & Dolgier, 2017).

Studies in the field of improving the health of women of the first mature age (Sinytsia, 2018; Ulyinska, 2022) point to the need to increase their physical activity through the introduction of a variety of health-improving fitness tools, among which Barre-fitness has a special place.

Therefore, the development of programs for physical education and recreation for this contingent, taking into account their motivational priorities, indicators of mental, physical and functional states is always a topical issue.

At present, in connection with the latest events in Ukraine, the problem of preserving the mental and physical health of young women is becoming more urgent than ever because of the harmonization of their emotional state, which really happens in Barre fitness classes, thanks to the combination of physical exercises with the art of classical dance and music and the health-improving effect of which is due to the activation of the functional systems of the body, an increase in the level of physical fitness and an improvement in the emotional state (Stevens & Mc Kechnie, 2005; Heiner, 2016; Whiteside & Kelly, 2016; Zeller, 2017).

But, the impact of Barre-fitness classes on the physical condition of women in the first period of adulthood is not sufficiently covered by scientists, which led to the relevance of the research topic.

The purpose of the study: to determine the influence of Barre-fitness on the morphofunctional state and physical training of women of the first period of mature age.

Material and methods of research

Participants

The study was attended by 35 women of the first period of mature age (21-35 years). Of these, 24 participants aged 21-25; 8-26-30 years and 3-31-35 years. All women had a fitness experience from 6 to 12 months. The participants in the study were divided in accounting at the age of 2 of the groups: the main (OG) (n=18) and control (kg) (n=17). No contraindications for women were found. All women are familiar with the nature of the study and gave informed consent to participation and process the data obtained.

Methods

An assessment of physical development was carried out using anthropometric indicators: body length and weight; waist circumference, hip circumference. To assess the functional capabilities of women, the indicators of the cardiovascular and respiratory systems were studied.

To assess the body weight of women, the method of calculating the body mass index (Quetelet) was used according to the formula: $BMI=m/L^2$, where BMI is the body mass index, kg/m^2; m – body weight, kg; L – body length, m. BMI standards recommended by WHO were used as an assessment.

The following anthropometric characteristics of physical development were measured: body length and weight; coverage of the waist (the tape runs along the narrowest part of the body under the ribs) and hips (the tape runs along the convex points of the buttocks). Measurement of the circumferential dimensions of body parts was carried out according to the method of Bunak, V.V.

To assess the functional capabilities of women, indicators of the cardiovascular and respiratory systems were studied.

Heart rate (HR, bpm) was determined by palpation on the carotid or radial artery after 3 minutes of rest for 10 or 15 s according to the Dushanin method at the beginning and end of training. Blood pressure was measured using the Korotkov method using an electronic tonometer in a calm state in a sitting position, legs parallel to each other on the arm where the pressure can be greater. The arm on the table was positioned so that when the cuff was put on the shoulder, it was at the level of the heart. The measurement was carried out 2 times with an interval of 1 min.

The vital capacity of the lungs (VC) was determined using a portable electronic spirometer.

For operational control of heart rate at each lesson, an individual fitness bracelet was used, which was fixed on the wrist of each woman. Thanks to the synchronization of the fitness bracelet with the application in the smartphone and the set program (1 measurement every 5 minutes), heart rate indicators were recorded and memorized 12 times during the entire workout. The specified program provided for a sound signal when the heart rate increased to 161 bpm. In the case of such a case, the woman stopped the training, rested until the heart rate resumed to 120 beats/min and continued training with a normal feeling.

To assess the level of physical fitness, the following tests were used: lifting the torso into a sitting position for 1 min (times) was carried out to determine the strength endurance of the abdominal muscles; push-ups (times) was used to determine the level of strength development; tilt forward from a sitting position (cm) – to determine the level of flexibility; standing long jump (cm) was used to determine speed-strength abilities; shuttle run 4×9m (s) was carried out in order to determine the level of dexterity; Romberg's test made it possible to determine the static balance of the body. All tests were carried out according to the generally accepted methodology (Romanchuk, 2010) in accordance with the tests and standards of the annual assessment of the physical fitness of the population of Ukraine (Ministry of Youth and Sports of Ukraine, 2018). Normative characteristics of physical fitness of women in the first period of adulthood are presented in Table 1.

Procedure

The study was conducted for 6 months (August 2021 – January 2022) on the basis of fitness clubs in the city of Kamenskoe, Dnepropetrovsk region.

At the beginning of the study, testing of morpho-

Table 1. State tests and normative assessments of physical fitness of persons of mature age – up to 39 years (Sergienko, 2001)

Test types	Gender	Standards, points				
		5	4	3	2	1
		excellent	good	satisfactorily	badly	unsatisfactory
1. Raising the body in a sitting position for 1 minute, times	w	46	41	36	32	27
2. Push-ups, times	w	23	18	14	10	6
3. Tilt forward from a sitting position, cm	w	19	16	13	9	6
4. Standing long jump, cm	w	205	191	179	167	155
5. Shuttle run 4×9 m, s	w	10,3	10,7	11,2	11,6	12,1

functional indicators and physical fitness of women in the first period of adulthood in the control and main groups was carried out. According to the results of the proposed tests (Table 1), no significant differences were found (>0,05), which allows us to state the homogeneity of both groups.

According to the results of the initial testing of the physical condition and taking into account the age, the women were divided into the main (n=18) and control (n=17) groups. There were no significant differences in the performance of the proposed tests in both groups.

Women in the control group (n=17) were engaged in dance fitness based on aerobics, salsa, jazz-funk, zumba, bachata and other areas of modern dance. Separate dance trainings were held, and dance styles were combined in one lesson, solving different problems in a complex way. The training of the main group (n=18) consisted of specially designed Barre-fitness exercises. Classes in both groups were held three times a week for 60 minutes.

At the end of the study, repeated testing of morphological and functional indicators and physical fitness of women in the first period of adulthood was carried out.

The study was carried out in accordance with the initiative topic of the scientific plan of the department of gymnastics, dance sports and choreography of the KhSAPC: "Theoretical and methodological foundations for the development of backbone components of physical culture (sport, fitness and recreation) for 2020-2025.

The studies were carried out in accordance with the ethical standards of the Declaration of Helsinki.

Statistical analysis

At the beginning of the study, the sample was analyzed and its compliance with the normal distribution (p>0,05) was proved, so we used parametric methods for processing the results (Student's t-test).

Statistical analysis of the obtained results was carried out using licensed Excel spreadsheet packages and a set of built-in functions. Descriptive statistics indicators were determined: arithmetic mean (X) and standard deviation (SD). Evaluation of the statistical reliability of the results of a comparative analysis of the indicators of the main and control groups, carried out using the statistical software package Statistika 5.11, Excel.

Results of the study

The structure of the lesson in both groups included preparatory, main and final parts (Table 2). Women in the control group (CG) were engaged in dance fitness in the zone of medium and above average intensity. The heart rate (HR) in the main part ranged from 100 to 160 bpm. At the peak of the load for 10–12 minutes, the heart rate was 140–160 bpm. In dance fitness, the technique of performing exercises changed due to the amplitude and position of the body, the intensity changed as a result of an increase in the pace of performance, the complexes of dance exercises and their variability were constantly becoming more complicated. Physical activity during the lesson had a predominantly aerobic orientation, but a short-term anaerobic block (10-12 minutes with a heart rate of 140-160 bpm) was necessarily used at each training session, and also power and corrective blocks were traditionally used (Pilates exercises) , at the end of the lesson, breathing exercises and stretching exercises were performed.

The training sessions of the women of the main group (n=18) consisted of Barre-fitness exercises, the training program of which provided for the regulation of individual physical activity through the use of dumbbells, balls, rubber bands; changes in the duration, intensity, amplitude and coordination complexity of movements; tempo of musical accompaniment; strict regulation of exercises in the development of physical and functional qualities.

Each Barre-fitness session was conducted in the zone of low, medium and above average intensity. The heart rate ranged from 90 to 160 bpm. In the preparatory part of the lesson, adapted exercises of the classical dance simulator at the support were used, light dumbbells and balls were used. At the support, simple exercises of classical choreography were performed: plié, demi plié (squats); varieties of battement (withdrawal and adduction of the leg on the floor, throw at 45^{o}, accurate strike at the supporting leg, uniform retraction and leg swing at 45^{o}, 90^{o} and above); varieties of rond (circle of the foot on the floor and in the air). Also, the above exercises, small jumps and rotations from the arsenal of classical dance were included in combinations, which then turned into a dance and were performed in the middle of the hall in the main part of the training. At each lesson, a set of exercises of choreographic training was necessarily used, which made it possible to use the main muscle groups of women. The choreography was quite adapted, light jumps, so at a high pace of training, the load on the joints was minimal and excluded their injury.

Dance combinations were formed in accordance with the principle "from simple to complex". As the dance combinations became more complicated, the training loads increased significantly. A feature of the technique was a technique that involved the exclusion from the combination of the "old", well-studied ligament for 4-8 accounts, and the inclusion instead of the new. Women were given the opportunity to compose dance sequences themselves, include them in combinations and perform them with musical accompaniment, competing individually or in a team for the best performance. This methodological technique was used to improve coordination abilities, interest in activities, self-affirmation, acquiring teamwork skills and improving the mood of women.

At the end of the main part, Pilates exercises of a power orientation and exercises for the development of flexibility (stretching) were always used.

In the final part of the session, elements of stretching and yoga were used to calm and speed up recovery processes after a training load, as well as to develop flexibility.

Thus, the Barre training consisted of a warm-up, exercise at the barre, choreographic training in the middle, Pilates strength exercises, yoga and stretching and had its own characteristics and differences from dance fitness (Table 2):

• the use of a barre, where all exercises were performed with a straight back, a tucked up stomach, stretched socks, which made it possible to involve the muscles working in these unusual positions. The exercises were performed to a slight trembling and burning of the muscles, which was a normal reaction to an unusual load and was observed in all those who performed the exercises technically correctly. Therefore, there was a constant control over the technique of performing exercises;

• when using Barre exercises, all muscle groups were guaranteed to be worked out qualitatively in one session due to a clearly regulated training structure and the use of specific exercises and types of loads that were safe and provided a holistic effect of exercises on the musculoskeletal system. Also, classes had a cumulative effect: even once a week, there was a positive effect of exercise on the body;

• the training effect was achieved due to the static-dynamic mode of muscle contraction with a minimum amplitude when performing unusual movements, thereby allowing to master all muscle groups. A set of isometric exercises was used, which provided for a long-term retention of a certain posture and contributed to the inclusion of stabilizing muscles in the work, encouraging new muscle groups to work in various modes, which made it possible to achieve the maximum training result in strengthening the muscles of the body, forming correct posture, developing balance, increasing flexibility and mobility of the joints;

• when performing Barre exercises, serious and constant attention was paid to posture: the back was not only safely fixed due to the straight position, but also trained, the muscle corset was strengthened, and the correct posture was formed. Due to the stretching of the spine, an individual insignificant increase in growth was observed;

• the Barre-fitness methodology did not require a strict set of movements in combinations, as in Zumba, Salsa and other dance styles, but on the contrary, ballet, strength, cardio and flexibility exercises were combined in a free order. Attention was regularly switched to changing activities by combining dynamic, static and static-dynamic exercises;

• the use of yoga poses helped the body get used to the correct posture in the mode of constantly tense muscles to maintain ballet poses, and also contributed to the improvement of the psycho-emotional state, calming down and accelerating the recovery processes;

• Barre's technique included many stretching exercises, both static postures and active movements, which allowed for a gentle stretch of the muscles and improved flexibility;

• the methodology did not provide for significant cardio and strength loads in Barre fitness classes: many exercises were performed with their own weight or with the addition of a weight of 1-2 kg; all the main exercises were performed at a slow pace, aerobic exercise predominated (heart rate 90-120 bpm), but at each lesson a short-term anaerobic block up to 10 minutes was used. where the heart rate reached 140-160 bpm;

• a competitive method was used for the best performance and compilation of dance-choreographic combinations.

The structure of classes, features and differences between Barre classes and dance fitness are presented in Table 2.

During the study, a statistically significant ($p<0,05$–$0,01$) improvement was observed in all the studied results of women in the main group, with the exception of waist circumference, systolic blood pressure and diastolic blood pressure ($p>0,05$). The indicators of women in the control group also had a positive trend, but did not reach statistically significant differences ($p>0,05$).

It was found that women engaged in Barre fitness significantly improved the Body Mass Index from 24,22±0,34 to 22,98±0,46 ($p<0,05$), which, according to WHO recommendations, is normal; waist and hip measurements decreased from 74,01±2,97 to 69,17±3,82 and from 95,92±6,53 to 92,28±6,8 ($p<0,05$) and ($p>0,05$) respectively; there was a statistically significant ($p<0,01$) improvement in the indicator "HR at rest, bpm^{-1}" from the level of "satisfactory" 73,39±3,24 to the level of "good" 69,17±4,48; blood pressure decreased from 116,11±11,95 to 114,44±11,23 and from 77,94±9,26 to 75,0±9,7, which corresponds to the "normal" gradation (Table 1).

Table 4 shows the dynamics of physical fitness indicators of women in the control and main groups.

As a result of the use of Barre-fitness tools in training sessions, there was a statistically significant ($p<0,05$–$0,001$) improvement in the results of testing the physical fitness of women in the main group, with the exception of the "Shuttle run 4×9 m" indicator ($p>0,05$) . The indicators of women in the control group had a positive trend, but did not reach statistically significant differences ($p>0,05$).

Therefore, it has been established that the average indicator in the test "Raising the body in a sitting position for 1 min. from the supine position" in women of the main group changed from "bad" –

ISSN 2522-1906 (Print) ISSN 2522-1914 (Online)

Table 2. Structure, content and differences between Barre-fitness and dance fitness classes

<table>
<tr><td>Part of class</td><td colspan="3">Barre - fitness</td><td colspan="3">Dance fitness</td></tr>
<tr><td rowspan="6">Preparatory 20 min:
1 block - 5 min
2 block – 10 min
3 block – 5 min</td><td>Blocks of classes, orientation</td><td>Means</td><td>HR, bpm</td><td>Blocks of classes, orientation</td><td>Means</td><td>HR, bpm</td></tr>
<tr><td>1. Special exercises for working out all muscle groups from top to bottom in ballet positions of legs and arms. Work on posture and development of balance.</td><td>Aerobic exercise, low-intensity exercises: sipping, lifting on toes, squats, tilts, turns, lunges, swings (plie, passe, tandu batman), a combination of these rights at a slow and medium pace with a medium and small amplitude of movements. Using dumbbells 1-2 kg. Applying yoga poses to get used to the correct posture.</td><td>90-100</td><td>1. Exercises of general action.</td><td>Aerobic exercise, low-intensity exercise: general developmental exercises for the head, trunk, arms and legs, tilts, turns, circular movements, squats, semi-squats, lunges, swings.</td><td>90-110</td></tr>
<tr><td colspan="3">Difference: the use of ballet positions, exercises with medium and small amplitude of movements with and without dumbbells. The use of yoga poses to get used to the correct posture and exercises to develop balance.</td><td colspan="3">Difference: performing exercises with a maximum and average range of motion at an average and fast pace.</td></tr>
<tr><td>2. Exercises at the barre: for the muscles of the thighs and buttocks, tilts and turns for the muscles of the press and back. Posture work.</td><td>Squats (plié) and leg raises holding legs with various movements of small amplitude. Use of balls.</td><td>100-110</td><td>2. Dance exercises of low and medium intensity are aimed at the functions of the cardiovascular and respiratory systems.</td><td>Basic aerobics steps, simple dance movements in place and with movement combined with hand movements.</td><td>110-120</td></tr>
<tr><td colspan="3">Difference: the use of the barre: performing a set of isometric exercises in ballet positions of the arms and legs with and without balls with prolonged retention of a certain posture and the inclusion of stabilizer muscles in the work, performing movements with a small amplitude, unusual movements to engage new muscle groups with the ability to connect different modes of muscle work.</td><td colspan="3">Difference: standard warm-up – exercises of low and medium intensity</td></tr>
<tr><td>3. Stretching exercises: stretching the muscles of the neck, upper shoulder girdle, torso and lower limbs</td><td colspan="4">Turns, tilts of the neck, holding the head in tilts, turns with the help of hands; retraction, adduction, flexion and extension and holding of the hands in different starting positions and with the help of the other hand; different inclinations and inclinations with a turn from a standing position, sitting, lying, with a girth; kneeling; backbends lying on the stomach, various rolls in the group from the supine position, lunges, swings, abduction and adduction of the straight and curved legs. The pace is slow.</td><td>90-100</td></tr>
<tr><td rowspan="4">Main - 30 min:
1 block – 20 min;
2 block - 10 min</td><td>1. Anaerobic exercises to improve physical condition and form the correct posture</td><td>Light running and light low jumps on the spot, ballet holding poses, dance-choreographic combinations at medium and high pace. Exercises are performed with large and small amplitude.</td><td>140-160</td><td>1. Dance compositions of complex orientation and high intensity.</td><td>Repeating a series of dance combinations based on aerobics, salsa, jazz-funk, zumba, bachata and other elements of modern dance, a combination of dance styles</td><td>120-160</td></tr>
<tr><td colspan="3">Difference: free order combination of ballet, strength, cardio and flexibility exercises. Performing dance-choreographic sequences in the current way without rest due to a combination of ballet holds of poses and performing exercises with a small amplitude. Application of the competitive method.</td><td colspan="3">Difference: repetition of a series of dance combinations with a maximum amplitude of movements 3 times with a rest duration of 60-90 s. between series The third block of exercises is performed with a decrease in tempo and range of motion.</td></tr>
<tr><td>2 Pilates exercises for strength and flexibility development</td><td>“Hundred”, stops, raising and lowering the body, circles with one and both legs, rolls on the back, swings and holding the legs in the supine position, stomach, side, twisting and tilting the body, tilting and turning the head in emphasis while lying on the stomach . The use of expanders, dumbbells, balls, etc.</td><td>100-110</td><td>2 Pilates exercises for strength and flexibility development</td><td>“Hundred”, lifting and low-ering the torso, circles with one and both legs, rolls on the back, swings and hold-ing the legs in the supine position, on the stomach, on the side, twisting and tilting the torso, tilting and turning the head in em-phasis while lying on the stomach.</td><td>100-110</td></tr>
<tr><td colspan="3">Difference: when applying exercises with expanders of varying degrees of elasticity, dumbbells 1-2 kg, balls, everyone chooses an object himself, and everyone performs the same movements in the coordination struc-ture, but at the same time they receive a different, individual load. The pace is slow.</td><td colspan="3">Difference: weighting agents, expanders, balls and other items were not used.</td></tr>
<tr><td>Final - 10 min</td><td>Stretching, yoga and breathing exercises: a combination of static postures and active movements aimed at gently stretching the muscles and improving flexibility.</td><td>Complex stretching of the muscles of the whole body using tilts, turns, twists, swings while maintaining the position in the maximum amplitude position.</td><td>90-100</td><td>Stretching exercises: stretching the muscles of the trunk and legs. Breathing exercises</td><td>Stretching the muscles of the anterior, posterior and inner thighs, lower legs, muscles of the chest, back, arms and shoulder girdle.</td><td>90-100</td></tr>
<tr><td colspan="7">The difference between Barre-fitness and dance fitness: the use of yoga exercises to calm and speed up recovery processes after a training load, as well as to develop flexibility.</td></tr>
</table>

33,33±3,34 to “good” – 42,94±5,24 (p<0,001); in the exercise “Push-ups” the results increased from “satisfactory” –14,94±2,73 to “good” – 20,33±3,79 (p<0,001); in the exercise “Bending forward from a sitting position” there was an improvement from the “bad” score – 12,39±4,42 to the “good” score – 17,00±1,21 (p<0,001); in the test “Standing long jump” the indicators increased from the score “bad” – 168,61±3,65 to the score “satisfactory” – 175,03±5,56, (p<0,001); in the balance test “Romberg’s test” the results improved significantly from the score “satisfactory” – 7,89±3.1 to the score “excellent” – 17,50±4,05 (p<0,001); the indicator of the exercise “Shuttle run 4×9m” had a slight improvement from 11,56±0,93 to 11,18±0,86 and no significant differences were

Table 3. Morphofunctional parameters of women in the control and main groups before and after the experiment (CG, n=17, MG, n=18)

Investigated parameters	Group	Before the experiment, $\overline{X}$ ±SD	After the experiment, $\overline{X}$ ±SD	P
Quetelet body mass index, kg/m²	CG	24,88±0,45	24,57±0,42	>0,05
	MG	24,22±0,34	22,98±0,46	<0,05
	P	>0,05	<0,05	–
Waist circumference, cm	CG	73,74±2,84	71,50±3,52	>0,05
	MG	74,01±2,97	69,17±3,82	<0,05
	P	>0,05	<0,05	–
Hip circumference, cm	CG	96,35±5,16	94,65±5,27	>0,05
	MG	95,92±6,53	92,28±6,80	>0,05
	P	>0,05	>0,05	–
HR at rest, bpm⁻¹	CG	74,59±3,32	73,47±3,89	>0,05
	MG	73,39±3,24	69,17±4,48	<0,01
	P	>0,05	<0,01	–
BP syst, mm Hg	CG	115,47±11,89	115,18±11,83	>0,05
	MG	116,11±11,95	114,44±11,23	>0,05
	P	>0,05	>0,05	–
BP diast, mm Hg	CG	76,65±8,62	76,18±9,28	>0,05
	MG	77,94±9,26	75,00±9,7	>0,05
	P	>0,05	>0,05	–
VC, ml	CG	2769,41±269,9	2964,7±287,1	<0,05
	MG	2698,33±220,81	3155,56±323,9	<0,01
	P	>0,05	<0,01	–

Table 4. Indicators of physical fitness of women in the control and main groups before and after the experiment (CG n=17, MG n=18)

Investigated parameters	Group CG=17 MG=18	Before the experiment, $\overline{X}$ ±SD	After the experiment, $\overline{X}$ ±SD	P
Lifting the body in a sitting position for 1 min. from a supine position, number of times	CG	32,47±5.03	33,88±3,06	>0,05
	MG	33,33±3,34	42,94±5,24	<0,001
	P	>0,05	<0,001	–
Push-ups, number of times	CG	14,41±2,81	16,18±3,70	>0,05
	MG	14,94±2,73	20,33±3,79	<0,001
	P	>0,05	<0,001	–
Tilt forward from a sitting position, cm	CG	12,06±3,58	14,47±3,28	>0,05
	MG	12,39±4,42	17,00±1,21	<0,001
	P	>0,05	<0,001	–
Standing long jump, cm	CG	165,59±5,56	168,06±5,53	>0,05
	MG	168,50±4,04	175,03±5,56	<0,001
	P	>0,05	<0,001	–
Shuttle run 4×9 m, s	CG	11,32±0,81	11,01±0,77	>0,05
	MG	11,56±0,93	11,18±0,86	>0,05
	P	>0,05	>0,05	–
Balance (Romberg's test), s	CG	7,65±2,55	9,18±1,98	>0,05
	MG	7,89±3,1	17,50±4,05	<0,001
	P	>0,05	<0,001	–

ISSN 2522-1906 (Print) ISSN 2522-1914 (Online)
Fizicna Reabilitacia ta Rekreacijno-Ozdorovci Tehnologii
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found (p>0,05).

Thus, a comparative analysis of the dynamics of morphological and functional indicators and physical fitness allows us to assert the effectiveness of the use of Barre-fitness tools in training sessions with women in the first period of adulthood.

Discussion

Analysis of scientific and methodological literature confirmed the research data of many scientists (Koch, et al., 2019; Küçük & Livanelioglu, 2015; Duggal et al., 2018) regarding the assertion that the modern system of the fitness industry is one of the promising and at the same time safe forms of health-improving and recreational physical activity aimed at increasing the adaptive capabilities of the body of people of all ages, gender, physical development and health. Research data (Beliak, 2014; WHO, 2006) testify that in recent years, a negative trend in the decline in the health indicators of young women has been recorded throughout the world, associated with an increase in deviations in the work of the most important body systems, a decrease in its resistance, and an increase in the number of chronic diseases. Domestic scientists (Shyshkina, 2021; Pogrebnyak, 2018) indicate that among the factors that negatively affect the state of health, the awareness of "insufficient physical activity" among a significant part of the population of Ukraine occupies one of the last places and physical culture is practically not considered as a fundamental means of improving the health of the population, organizing leisure, socializing young people and other public groups. As scientists say (Küçük & Livanelioglu, 2015; Savina, 2020). Today, the science and practice of many countries of the world is focused on the prevention of diseases not by medication, but by health-improving forms of motor activity. At the same time, significant reserves remain unrealized in Ukraine to increase motivation for physical activity, determine strategic directions and justify innovative technologies to create an environment that encourages women to physical activity. According to the latest research (Duggal et al., 2018; Siqueira Rodrigues et al., 2010; Küçük & Livanelioglu, 2015; Adams, 2018) there is no doubt that physical exercises have a positive effect on the quality of life, physical and mental health, the activity of the cardiovascular, respiratory and other systems, the level of development of human physical qualities. At present, the authors (Lim & Park, 2019; Hrishko & Sinytsia, 2021) it has been proven that it is possible to ensure the physical perfection and health of women in the first period of adulthood through the creative use of the arsenal of fitness industry tools that best suit the characteristics and individual needs of each woman.

The data obtained during the study are consistent with the data (Lim & Park, 2019; Vancini et al., 2017; Sinytsia, 2018; Ulyinska, 2022), regarding the statement that with women of the first period of mature age, physical culture and health-improving classes of strength and aerobic orientation should be used. The use of the former to a greater extent involves the process of body shaping and physical improvement, the latter - strengthening health and relieving psychological stress.

The information of the authors has been further developed; that it is recommended to build programs of physical culture and recreation for women in the first period of adulthood based on motivational advantages, the level of physical preparedness and individual characteristics of the morphofunctional state of persons. But the results of research show that such conclusions apply to almost all areas of health fitness (Küçük & Livanelioglu, 2015; Duggal & Pollock, 2018; Siqueira Rodrigues et al., 2010). Recent studies have shown that the quality of life can be improved through dance, Pilates or yoga (Lim & Park, 2019; Küçük & Livanelioglu, 2015; Whiteside & Kelly, 2016; KauricKlein, 2019; Barranco-Ruiz et al., 2020; Rahimimoghadam et al., 2019; Vancini et al., 2017). Scientists (Koch et al., 2019; Burkhardt & Brennan, 2012; Coaten & Newman-Bluestein, 2013; Pratt, 2004; Barranco-Ruiz et al., 2020) argue that dance has long been considered a therapeutic and attractive exercise, especially for women, and serves many purposes: a form of physical activity and cultural expression, improves health and quality of life, reduces depression and anxiety, improves interpersonal, psychomotor and cognitive skills. These opinions are confirmed by such scientists as Stevens & Mc Kechnie (2005), Heiner (2016), Whiteside & Kelly (2016), Zeller (2017), Bruno & Farrell (2020) and offer to implement these goals a modern direction of health fitness – Barre-fitness, which in an unconventional way combines choreography, dance, Pilates and yoga.

The obtained results of the study made it possible to expand and supplement information on the planning of health fitness programs in order to correct the indicators of the physical condition of women. Taking into account the data obtained, it has been established that Barre-fitness classes have a positive effect on the indicators of the morphofunctional state, physical fitness and contribute to the improvement of the psycho-emotional state, the formation of a stable motivation for physical culture and health-improving activities, which is consistent with the data of many scientists (De Vito et al., 2015; Hrishko & Sinytsia, 2021; Sinytsia, 2021).

Conclusion

The conducted study testifies to the positive impact of Barre-fitness classes on the morphofunctional state, the level of physical fitness and the health of women in the first period of adulthood. During the experiment, a statistically significant (p<0,05–0,01) improvement was observed in all the studied results of women in the main group, with the exception of waist circumference, systolic blood pressure and diastolic blood pressure (p>0,05). The indicators of women in the control group also had a positive trend, but did not reach statistically significant differences (p>0,05). The obtained results make it possible to recommend Barre-fitness means for health-improving sessions with women in fitness clubs and studios, as well as to apply them in the educational process in the training of future specialists in physical culture and sports in higher education institutions.

Prospects for further research are to study the effect of Barre-fitness classes on the psycho-emotional state of women in the first period of adulthood.

Author's contribution

Conceptualization, A.S., O.S. and I.B.; methodology, I.K., A.S. and O.S.; software, A.S., I.K. and I.B.; check, I.K. and A.S.; formal analysis, I.K. and A.S.; investigation, A.S., I.B. and O.S.; data curation, I.K. and A.S.; writing – rough preparation, I.K., A.S., I.B. and O.S.; writing – review and editing, I.K. and A.S.; visualization, I.K.; supervision, I.K. and A.S.; project administration, I.K., O.G. and A.S. All authors have read and agreed with the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

Funding

This article didn't receive financial support from the state, public or commercial organizations.

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