

The influence of complex motor activities on the morphofunctional and psychoemotional state of elderly people from different countries of Europe and Asia

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Abstract

Background and Study Aim. The World Health Organization has recognized that insufficient physical activity is a serious public health problem. A large number of studies are devoted to improving livelihoods and increasing life expectancy of the population through the formation of guidelines for a healthy lifestyle. Regular physical activity is one of the most important components of maintaining health and healthy aging. Many European countries already have well-developed social programs to support physical activity among older people. This includes the organization of sporting events, financial support for clubs for seniors, as well as infrastructure that promotes an active lifestyle (active parks, walking and cycling paths, a sufficient number of swimming pools, etc.). Therefore, the purpose of the study was to identify the effectiveness of complex motor training on the morphofunctional and psycho-emotional state of elderly people from different countries of Europe and Asia.

Material and Methods. The study involved 240 (30 men and 30 women each from Poland, Kazakhstan, Kyrgyzstan and Ukraine) elderly people (the average age of the study participants was 68.24±3.01 years). The groups were homogeneous in age, gender, social status, interests, level of physical fitness, functionality and motivation.

The study participants followed a developed physical activity program for older people. Classes lasted a year, 3 times a week, lasting 60 minutes each. The program included theoretical and practical parts. Theoretical material concerned the benefits of physical activity, motor mode and dosage of exercise for older people. The practical part included the most common types of physical education and health activities among older people (swimming, Nordic walking, health tourism).

The study involved assessing the morphofunctional state of older people by determining body mass indexes, functional changes and Robinsomal, as well as the Skibinsky and Rufier tests, and the assessment of well-being, activity and mood (WAM) was carried out using a questionnaire

Results. During the study, we measured morphofunctional indicators and determined the psycho-emotional state of elderly people from Poland, Kazakhstan, Kyrgyzstan and Ukraine, who were engaged in a developed program using various types of physical activity, namely: swimming, Nordic walking, health tourism

Conclusions. The results obtained indicate the effectiveness of using a comprehensive physical activity program among older women and men from different countries of Europe and Asia. All participants showed positive changes in all indicators. Minor changes over the course of a year of training according to the developed program in the indicators of the morphofunctional and psycho-emotional state of elderly people from Poland indicate that a healthy lifestyle is being popularized in the European Union country and conditions are being created for regular physical activity of the population, including older people.

Keywords: physical activity, elderly people, morphofunctional state, well-being, activity, mood

Олександр Скалій, Тетяна Скалій, Турсинзада Куангалієва, Жаксат Кенжин, Асаналієва Меєргул, Славомір Леткевич. Вплив занять комплексної рухової спрямованості на морфофункціональні показники та самопочуття, активність і настрої людей похилого віку різних країн Європи та Азії.

Передумови та мета дослідження. Всесвітньою організацією охорони здоров'я визнано, що недостатня фізична активність є серйозною проблемою здоров'я населення. Велика кількість досліджень присвячена покращенню життєдіяльності та підвищенню тривалості життя населення за рахунок формування орієнтирів на здоровий спосіб життя. Регулярна фізична активність є одним із найважливіших компонентів збереження здоров'я та здорового старіння. Багато європейських країн вже мають добре розвинені соціальні програми, що підтримують фізичну активність людей похилого віку. Це включає організацію спортивних заходів, фінансову підтримку клубів для літніх людей, а також інфраструктуру, яка сприяє активному способу життя (активні парки, пішохідні та велосипедні доріжки, достатня кількість басейнів тощо). Тому метою дослідження було виявити ефективність занять комплексної рухової спрямованості на морфофункціональний та психоемоційний стан людей похилого віку різних країн Європи та Азії.

Матеріал і методи. У дослідженні взяли участь 240 (по 30 чоловіків і жінок з Польщі, Казахстану, Киргизстану та України) осіб похилого віку (середній вік учасників дослідження склав 68,24±3,01 років). Групи були однорідними за віком, статтю, соціальним положенням, інтересами, рівнем фізичної підготовленості, функціональними можливостями та

мотивацію.

Учасники дослідження займалися за розробленою програмою занять руховою активністю для людей похилого віку. Заняття тривали рік, 3 рази на тиждень тривалістю 60 хвилин кожне. Програма включала теоретичну і практичну частини. Теоретичний матеріал стосувався користі рухової активності, рухового режиму та дозування навантаження оздоровчого заняття для людей похилого віку. Практична частина включала найпоширеніші види фізкультурно-оздоровчої діяльності серед літніх людей (плавання, скандинавська ходьба, оздоровчий туризм).

Дослідження передбачало оцінку морфофункціонального стану літніх людей, за рахунок визначення індексів маси тіла, функціональних змін та Робінсонала, а також проб Скібінського та Руф'є та оцінку самопочуття, активності і настрою (САН) проводилася за допомогою опитувальника.

Результати. В ході дослідження було проведено вимірювання морфофункціональних показників та визначення психоемоційного стану осіб похилого віку з Польщі, Казахстану, Киргизстану та України, що займалися за розробленою програмою з використанням різних видів рухової активності, а саме: плавання, скандинавська ходьба, оздоровчий туризм.

Висновки. Отримані результати свідчать про ефективність використання комплексної програми рухової активності серед жінок та чоловіків похилого віку різних країн Європи та Азії. У всіх учасників виявлено позитивні зміни за всіма показниками. Незначні зміни за рік занять за розробленою програмою в показниках морфофункціонального та психоемоційного стану літніх людей з Польщі свідчать про те, що в країні Європейського союзу популяризується здоровий образ життя та створюються умови для регулярних занять руховою активністю населення, у тому числі й людей похилого віку.

Ключові слова: рухова активність, люди похилого віку, морфофункціональний стан, самопочуття, активність, настрої.

Introduction

A large number of studies [1; 7; 25] are devoted to improving life activity and increasing life expectancy of the population through the formation of guidelines for a healthy lifestyle. Scientists have proven [11; 25] that regular physical activity maintains health and reduces morbidity rates in different groups of the population, including older people. Many European countries have well-developed social programs to support physical activity among older people. This includes the organization of sporting events, financial support for clubs for seniors, as well as infrastructure that promotes an active lifestyle (active parks, walking and cycling paths, a sufficient number of swimming pools, etc.). Also, educational programs that increase older people's awareness of the benefits of physical activity and provide information on safe ways to exercise are an important component [3; 6; 26; 27].

Studies [12; 19; 23] have established that in post-Soviet countries (Ukraine, Kazakhstan, Kyrgyzstan, Azerbaijan, Georgia, etc.) conditions are insufficiently organized and infrastructure is developed to ensure physical activity of the population, especially older people. Elderly people in the above-mentioned countries do not have the habit of a physically active lifestyle and regular exercise, have lower self-esteem compared to the younger (working-age) generation, and are more likely to experience depression and have health problems.

Data on the health of older people and the problems of aging populations in post-Soviet countries are confirmed by statistics from the World Health Organization (WHO). Thus, as of 2023, in Ukraine more than 20% are elderly people (over 65 years old), in Kazakhstan this figure is close to 13%, and in Kyrgyzstan – 9%. According to official data, the majority of older people suffer from diseases of the cardiovascular system and respiratory system, which in most cases lead to death. According to WHO, a sedentary lifestyle is one of the leading causes of morbidity and mortality. For older people, it is important not only to extend life expectancy, but also to maintain its quality. It is physical activity that plays an important role in achieving this goal. In this regard, it is important in post-Soviet countries to develop the direction of physical activity of older people. It would be beneficial to make recreational activities more common in everyday life and make them a normal part of everyone's life. Therefore, such active forms of recreation as morning exercises, conditioning training, family weekend vacations, hiking, skiing, mountain hiking, swimming in the pool and others should become the norm.

It is known that the effectiveness of using physical education and sports directly depends on the motivation to

engage in physical activity. Thus, it has been established that the main aspects of motivation of older people for physical activity in different countries are: improvement of health, their psychological state and well-being, social interaction and support for functional insolvency. At the same time, availability of infrastructure, social support, education and awareness are the main factors influencing motivation [8; 21; 26].

Foreign scientists have proven that physical activity and exercise significantly correlate with a reduced risk of mortality [28]. Physical activity reduces many major risk factors for mortality, including hypertension, type 2 diabetes mellitus, dyslipidemia, coronary heart disease, stroke and cancer. Mortality from all causes is reduced in physically active individuals compared to inactive individuals [20].

Therefore, the purpose of the study was to identify the effectiveness of complex motor training on the morphofunctional and psycho-emotional state of elderly people from different countries of Europe and Asia.

Material and Methods of the research

Participants.

The study involved 240 (30 men and 30 women from Poland, Kazakhstan, Kyrgyzstan and Ukraine) elderly people (the average age of the study participants was 68.24±3.01 years). The groups were homogeneous in age, gender, social status, interests, level of physical fitness, functionality and motivation.

The study participants followed a developed physical activity program for older people. Classes lasted a year, 3 times a week, lasting 60 minutes each. The program included theoretical and practical parts. Theoretical material concerned the benefits of physical activity, motor mode and dosage of exercise for older people. The practical part included the most common types of physical education and health activities among older people (swimming, Nordic walking, health tourism). On Mondays there was Nordic walking, on Wednesdays there was health tourism, and on Saturdays there was swimming. Participation in competitions, hiking trips and other public sports events took place outside the training hours.

Ethics Statements and Participants.

This study was approved by the Bioethics Committee for Clinical Research and conducted according to the Declaration of Helsinki. All participants gave their written consent to research and were informed about the purpose and test procedures and about the possibility of withdrawal of consent at any time for any reason.

Study design.

The study included an assessment of the morphofunctional state of older people by determining body mass indices,

functional changes and Robinsol, as well as the Skibinsky and Ruffier tests, and the assessment of well-being, activity and mood (WAM) was carried out using a questionnaire.

Body mass index (BMI) is a value that allows you to assess the degree of correspondence between a person's body weight and his height, thereby indirectly assessing whether the weight is excessive (obese), normal or insufficient. Body mass index is measured in kg/m² and is calculated using the formula:

$$I=BW/BL,$$

where BW is body weight in kg; BL – body length in meters.

The Index of Functional Changes (IFC) was developed in 1979 by R. M. Baevsky to assess the level of functional capabilities and determine the adaptive potential of the cardiovascular system. IFC is determined in conventional units. To calculate the IFC (KZ), it is necessary to have data on the heart rate (HR), on the size of blood pressure (BP_{syst} - systolic, BP_{diast} - diastolic), as well as on the height (H), body weight of the person under study (BW) and his age (A). Calculations are made as follows:

$$IFC = 0,011HR + 0,014 BP_{syst} + 0,008 BP_{diast} + 0,014B + 0,009BW - 0,009BL - 0,27,$$

where HR – heart rate, beats per minute⁻¹; BP_{syst} – arterial systolic pressure, mm Hg; BP_{diast} – arterial diastolic pressure, mm Hg; A – age in years; BW – body weight in kilograms; BL – body length in meters.

Robinson index (IP) is an indicator characterizing myocardial oxygen consumption. This indicator reflects the functional state of the cardiovascular system and is calculated using the formula:

$$IP = \frac{HR \times BP_{syst}}{100},$$

where HR – heart rate, beats per minute⁻¹; BP_{syst} – arterial systolic pressure, mmHg.

Skibinsky index reflects lung and circulatory reserves, calculated using the formula:

$$\text{Skibinsky index} = \frac{VC \text{ (ml)}}{100} \times \frac{\text{breath holding time (s)}}{HR \text{ (beats per minute}^{-1}\text{)}}$$

where VC is the vital capacity of the lungs in ml; HR – heart rate, beats per minute⁻¹

The Ruffier Index (RI) is used to assess the functional reserve capabilities of the body during physical activity (30 squats in 45 seconds).

$$RI = \frac{4 \times (HR_1 + HR_2 + HR_3) - 200}{10},$$

where HR₁ is heart rate for 15 seconds at rest; HR₂ – heart rate for 15 seconds in the first minute of recovery; HR₃ – heart rate for 15 seconds in the second minute of recovery.

The essence of the WAM assessment is that study participants are asked to compare their condition with a number of signs on a multi-stage scale. The scale consists of indices (3210123) and is located between thirty pairs of words of opposite meaning, reflecting mobility, speed and pace of ongoing functions (activity), strength, health, fatigue (well-being), as well as characteristics of the emotional state (mood). The subject must choose the number that most accurately reflects his condition at the time of the examination. During processing, the numbers are recoded as follows: index 3, corresponding to poor health, low activity and bad mood, is taken as 1 point; the next index 2 – for 2 points; index 1 – for 3 points and so on to index 3 on the opposite side of the scale, respectively taken as 7 points. Based on the given scores, the arithmetic mean is calculated both overall and separately for activity, well-being and mood.

When analyzing the test results and identifying the effectiveness of the implemented program, statistical indicators

were used, such as: arithmetic mean (\bar{X}), root mean square and error of the mean (m), the reliability of the differences was assessed using the t-test (Student's test), the differences were considered significant when (p<0.05) the normality of the distribution of differences was determined using the Shapiro-Wilk test.

Results of the research

During the study, we measured the morphofunctional indicators of elderly people who were engaged in a developed program using various types of physical activity, namely: swimming, Nordic walking, and health tourism. Thus, it was found that body mass index decreased in both women and men from all countries in which the study was conducted (Table 1). At the beginning of the study, all women and men from Kazakhstan, Kyrgyzstan and Ukraine were overweight, but at the end of the study, all had body mass index values within the normal range. The greatest changes were found in women from Kyrgyzstan (t=2,98; p<0,01) and men from Ukraine (t=2,92; p<0,01). Women and men from Poland, both at the beginning and at the end of the study, had a body mass index within the normal range, but thanks to regular exercise, this indicator improved further, in women by 3.9 kg/m² (p>0,05), and for men by 4,6 kg/m² (p<0,05).

According to the index of functional changes, it was found that under the influence of classes according to a comprehensive program using various types of physical activity, elderly women had a significant (p<0,05-0,1) improvement, in contrast to men (p>0,05). At the same time, at the end of the study, almost all participants in the study had a satisfactory level of adaptation, which indicates the positive impact of regular physical activity.

At the beginning of the study, all participants had Robinson index values within the range of 90.8-105.8 conventional units, which indicates a low level of functioning of the cardiovascular system of elderly people in Poland, Kazakhstan, Kyrgyzstan and Ukraine. Thanks to regular physical activity, positive changes in the functioning of the cardiovascular system have been noted. Thus, among elderly women from Poland, the Robinson index improved by 5,9 conventional units (t=1,91; p>0,05), from Kazakhstan – by 12 conventional units (t=2,65; p<0,05), from Kyrgyzstan – by 15,1 conventional units (t=2,70; p<0,05), from Ukraine – by 14,6 conventional units (t=2,59; p<0,05). Indicators of the Robinson index in elderly men at the end of the study had significantly (p<0,05-0,01) positive changes.

At the beginning of the study, a satisfactory level of Skibinsky test indicators was established among study participants from Kazakhstan, Kyrgyzstan and Ukraine. During the study, the condition of the cardiorespiratory system improved, which was confirmed by the results of the Skibinsky test (p<0,05-0,01). Thus, among women from Poland it improved by 20.6 conventional units, from Kazakhstan – by 8,4 conventional units, from Kyrgyzstan – by 9,7 conventional units, from Ukraine – by 11,4 conventional units; for men by 17,7 conventional units, 11,2 conventional units 12,2 conventional units and 13,1 conventional units respectively.

The majority of participants at the beginning of the study scored below the average level on the Ruffier test. In older people, thanks to regular physical activity, the level of physical activity improved to average. Thus, among women from Poland it improved by 3.3 conventional units. (t=2,16; p<0,05), from Kazakhstan – by 5,9 conventional units (t=2,30; p<0,05), from Kyrgyzstan – by 4,5 conventional units. (t=2,21; p<0,05), from Ukraine – by 5,9 conventional units (t=2,42; p<0,05); in men by 2.6 conventional units (t=1,18; p>0,05), 3.9 conventional units

Table 1. The influence of classes according to a comprehensive program using various types of physical activity on the morphofunctional state of women and elderly men in Europe and Asia

Indicators	Countries	Beginning of the study	End of study	Assessment of reliability	
		$\bar{X}_1 \pm m_1$	$\bar{X}_2 \pm m_2$	t	p
Women					
Body mass index, kg/m ²	Poland (n1=n2=30)	22,1±1,42	18,2±1,36	1,98	>0,05
	Kazakhstan (n1=n2=30)	26,3±1,74	20,0±1,61	2,66	<0,05
	Kyrgyzstan (n1=n2=30)	27,0±1,86	19,4±1,75	2,98	<0,01
	Ukraine (n1=n2=30)	26,9±1,92	19,7±1,84	2,71	<0,05
Index of functional changes, c.u.	Poland (n1=n2=30)	2,92±0,14	2,45±0,13	2,46	<0,05
	Kazakhstan (n1=n2=30)	3,24±0,16	2,62±0,15	2,83	<0,01
	Kyrgyzstan (n1=n2=30)	3,18±0,16	2,58±0,16	2,65	<0,05
	Ukraine (n1=n2=30)	3,07±0,17	2,52±0,15	2,43	<0,05
Robinson's index, c.u.	Poland (n1=n2=30)	91,4±2,23	85,5±2,13	1,91	>0,05
	Kazakhstan (n1=n2=30)	101,5±3,41	89,5±2,97	2,65	<0,05
	Kyrgyzstan (n1=n2=30)	105,9±4,37	90,8±3,49	2,70	<0,05
	Ukraine (n1=n2=30)	104,7±4,05	90,1±3,91	2,59	<0,05
Skibinsky index, c.u.	Poland (n1=n2=30)	35,7±6,32	56,3±7,69	2,07	<0,05
	Kazakhstan (n1=n2=30)	26,1±2,64	34,5±3,02	2,09	<0,05
	Kyrgyzstan (n1=n2=30)	27,4±2,82	37,1±3,74	2,07	<0,05
	Ukraine (n1=n2=30)	25,3±2,49	36,7±3,14	2,85	<0,01
Rufier index, c.u.	Poland (n1=n2=30)	9,2±1,14	5,9±1,02	2,16	<0,05
	Kazakhstan (n1=n2=30)	13,4±2,09	7,5±1,48	2,30	<0,05
	Kyrgyzstan (n1=n2=30)	12,7±1,69	8,2±1,13	2,21	<0,05
	Ukraine (n1=n2=30)	13,1±2,03	7,2±1,36	2,42	<0,05
Men					
Body mass index, kg/m ²	Poland (n1=n2=30)	23,5±1,54	18,9±1,31	2,28	<0,05
	Kazakhstan (n1=n2=30)	25,8±1,67	19,7±1,59	2,65	<0,05
	Kyrgyzstan (n1=n2=30)	28,2±1,91	20,7±2,04	2,68	<0,05
	Ukraine (n1=n2=30)	26,1±1,68	19,3±1,61	2,92	<0,01
Index of functional changes, c.u.	Poland (n1=n2=30)	2,85±0,13	2,52±0,12	1,87	>0,05
	Kazakhstan (n1=n2=30)	3,01±0,15	2,58±0,16	1,96	>0,05
	Kyrgyzstan (n1=n2=30)	3,12±0,25	2,54±0,16	1,95	>0,05
	Ukraine (n1=n2=30)	2,93±0,16	2,49±0,15	2,01	>0,05
Robinson's index, c.u.	Poland (n1=n2=30)	90,8±3,07	81,2±2,34	2,49	<0,05
	Kazakhstan (n1=n2=30)	98,2±4,12	85,3±2,76	2,60	<0,05
	Kyrgyzstan (n1=n2=30)	102,1±3,82	91,2±3,08	2,22	<0,05
	Ukraine (n1=n2=30)	97,8±3,46	84,1±2,92	3,03	<0,01
Skibinsky index, c.u.	Poland (n1=n2=30)	37,2±5,86	54,9±6,47	2,03	>0,05
	Kazakhstan (n1=n2=30)	28,6±3,02	39,8±3,16	2,56	<0,05
	Kyrgyzstan (n1=n2=30)	29,3±3,11	41,5±3,43	2,64	<0,05
	Ukraine (n1=n2=30)	27,8±3,24	40,9±3,57	2,72	<0,05
Rufier index, c.u.	Poland (n1=n2=30)	8,4±1,08	5,8±0,95	1,81	>0,05
	Kazakhstan (n1=n2=30)	10,9±1,23	7,0±1,38	2,11	<0,05
	Kyrgyzstan (n1=n2=30)	11,2±1,41	7,5±1,19	2,01	>0,05
	Ukraine (n1=n2=30)	10,7±1,38	6,30±1,06	2,53	<0,05

($t=2,11$; $p<0,05$), 3,7 conventional units ($t=2,01$; $p>0,05$) and 4,4 conventional units ($t=2,53$; $p<0,05$) respectively.

Physical activity during a year of exercise improved indicators of well-being, activity and mood improved to varying degrees ($p<0,05-0,001$) in older people (Table 2). Thus, indicators of well-being showed more significant changes in women from Ukraine and Kyrgyzstan, by 2,7 points ($t=3,94$; $p<0,001$) and 2,2 points ($t=2,87$; $p<0,01$), respectively. Well-being improved to a greater extent in men from Ukraine and Kazakhstan, by 2,8 points ($t=4,01$; $p<0,001$) and 1,9 points ($t=2,94$; $p<0,05$), respectively. Women and men from Poland also showed sig-

nificant differences ($p<0,05$), but to a lesser extent, which indicates that Poles are involved in physical activity throughout their lives.

In terms of activity, the highest data at the end of the study were obtained from elderly women from Ukraine ($t=4,88$; $p<0,001$), Kazakhstan ($t=2,97$; $p<0,01$) and Kyrgyzstan ($t=2,65$; $p<0,05$). During the study, older men also showed significantly better indicators than at the beginning of the study. Thus, among men from Ukraine, activity increased by 2,5 points ($t=3,76$; $p<0,001$), from Kazakhstan – by 2,2 points ($t=3,28$;

Table 2. The influence of classes according to a comprehensive program using various types of physical activity on indicators of well-being, activity and mood of elderly women and men from Europe and Asia (according to the WAM method), points

Indicators	Countries	Beginning of the study	End of study	Assessment of reliability	
		$\bar{X}_1 \pm m_1$	$\bar{X}_2 \pm m_2$	t	p
Women					
Well-being	Poland (n1=n2=30)	4,9±0,48	6,2±0,34	2,21	<0,05
	Kazakhstan (n1=n2=30)	4,3±0,65	6,1±0,41	2,34	<0,05
	Kyrgyzstan (n1=n2=30)	3,8±0,71	6,0±0,29	2,87	<0,01
	Ukraine (n1=n2=30)	3,4±0,63	6,1±0,27	3,94	<0,001
Activity	Poland (n1=n2=30)	4,2±0,75	6,3±0,46	2,39	<0,05
	Kazakhstan (n1=n2=30)	3,6±0,69	6,1±0,48	2,97	<0,01
	Kyrgyzstan (n1=n2=30)	3,9±0,72	6,3±0,55	2,65	<0,05
	Ukraine (n1=n2=30)	2,8±0,59	6,2±0,37	4,88	<0,001
Mood	Poland (n1=n2=30)	4,5±0,56	6,1±0,41	2,31	<0,05
	Kazakhstan (n1=n2=30)	4,1±0,61	5,8±0,37	2,38	<0,05
	Kyrgyzstan (n1=n2=30)	3,9±0,58	5,7±0,24	2,87	<0,01
	Ukraine (n1=n2=30)	3,4±0,62	5,9±0,36	3,49	<0,01
Men					
Well-being	Poland (n1=n2=30)	4,1±0,62	5,9±0,37	2,49	<0,05
	Kazakhstan (n1=n2=30)	3,4±0,53	5,3±0,37	2,94	<0,01
	Kyrgyzstan (n1=n2=30)	3,8±0,61	5,6±0,38	2,51	<0,05
	Ukraine (n1=n2=30)	2,9±0,58	5,7±0,39	4,01	<0,001
Activity	Poland (n1=n2=30)	4,1±0,64	6,2±0,37	2,84	<0,01
	Kazakhstan (n1=n2=30)	3,6±0,59	5,8±0,32	3,28	<0,01
	Kyrgyzstan (n1=n2=30)	3,4±0,73	5,4±0,36	2,46	<0,05
	Ukraine (n1=n2=30)	3,0±0,62	5,5±0,24	3,76	<0,001
Mood	Poland (n1=n2=30)	4,8±0,61	6,2±0,24	2,12	<0,05
	Kazakhstan (n1=n2=30)	4,1±0,59	5,9±0,31	2,70	<0,05
	Kyrgyzstan (n1=n2=30)	3,9±0,62	6,0±0,29	3,07	<0,01
	Ukraine (n1=n2=30)	3,4±0,53	6,1±0,36	4,21	<0,001

$p < 0,01$), from Poland – by 2,1 points ($t = 2,84$; $p < 0,01$) and from Kyrgyzstan – by 2 points ($t = 2,46$; $p < 0,05$).

Classes in various types of physical activity also had a positive effect on the mood of both women and men ($p < 0,05-0,001$). The greatest changes in mood indicators were obtained among elderly people from Ukraine, so in women the mood level improved by 2.5 points ($t = 3,49$; $p < 0,01$), and in men – by 2,7 points ($t = 4,21$; $p < 0,001$).

Discussion

The World Health Organization recognizes that insufficient physical activity is a serious health problem for the population, including older people. The study [5] stated that healthy aging is the ability to maintain independence, purpose, vitality and quality of life in old age, despite diseases, accidents and unhelpful social determinants of health. Exercise or physical activity is an important component of healthy aging, helping to prevent or mitigate the effects of aging. Most older people, unfortunately, do not comply with recommendations for regular physical activity, which results in health problems, which is reflected in the works [2; 4; 16; 22].

Regular physical activity is one of the most important components of healthy aging. It prevents or helps manage pain, limited mobility, general weakness, cognitive impairment and many others [5; 20; 25].

In addition to research on preserving and strengthening the health of older people, increasing the adaptive capabilities

of their body, and reducing chronic diseases, attention is paid to studying the influence of physical exercise and physical activity on the morphofunctional and psycho-emotional state of older people.

The choice of tests to determine the impact of physical activity on the morphofunctional and psychoemotional state of older people is determined by their availability, integrity and validity. These tests are widely used in the science of public health [7; 10; 13; 15; 17].

During the annual training, the greatest changes ($p < 0,05-0,01$) were obtained in women from Kyrgyzstan in body mass index and Robinson index; from Kazakhstan – in terms of the index of functional changes, and from Ukraine – in the Skibinsky and Ruffier tests. In Ukrainian men, the most significant ($p < 0,05-0,01$) increase in results in the Robinson indices and body weight and Skibinsky test was determined. In indicators of well-being and mood, the largest changes ($p < 0,01-0,001$) were obtained in women from Ukraine and Kyrgyzstan; in activity indicators of women from Ukraine and Kazakhstan. Also, significant changes ($p < 0,01-0,001$) were found in indicators of well-being in men from Ukraine and Kazakhstan; in terms of activity – from Ukraine, Kazakhstan and Poland; in mood indicators – from Ukraine and Kyrgyzstan.

At the beginning of the study, low indicators of well-being, activity and mood of women and men from Ukraine were obtained, which may be due to the long-term martial law in the country, and significant improvements at the end of the study

indicate the positive impact of regular physical activity on the psycho-emotional state and social adaptation of older people.

A number of authors have already studied the influence of physical activity on the mental state of different population groups. Exercise has also been shown to reduce symptoms of depression and anxiety in children and adolescents [15]. Pooled studies worldwide have shown that exercise is more effective than controls and is an effective treatment for depression [7]. Physical exercise also helps with various psycho-emotional disorders associated with various life troubles. Improvements in the psycho-emotional state under the influence of physical activity in older people are highlighted in other studies [17].

It can be argued that the study results confirm existing literature on improving symptoms of depression and general mood in people of all ages through regular physical activity. Similar results were obtained in studies [9; 18].

Conclusions

The conducted studies indicate that classes according to a comprehensive program using various means of physical activity (Nordic walking, health tourism, swimming) have a positive effect on the morphofunctional indicators of elderly women and men from different countries of Europe and Asia (Poland,

Ukraine, Kazakhstan and Kyrgyzstan). Regular physical activity also improved the level of well-being, activity, and mood of the study participants.

The results obtained indicate the effectiveness of using a comprehensive physical activity program among older women and men from different countries of Europe and Asia. The formation of the program and the use of various means of physical activity depended on various factors (material and technical base, motivation of older people to engage in physical activities, etc.). Minor changes over the course of a year of training according to the developed program in the indicators of the morphofunctional and psycho-emotional state of elderly people from Poland indicate that a healthy lifestyle is being popularized in the European Union country and conditions are being created for regular physical activity of the population, including older people.

Conflicts of Interest

The authors declare no conflict of interest.

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