# PROMOTION OF MASS SPORTS AMONG PENSIONERS AS A FACTOR OF HEALTH MAINTENANCE

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## ABSTRACT

One of the key challenges for all countries is ensuring longevity and good health among the elderly. A promising solution lies in organizing physical activity programs. Mass sports offer an effective way to engage seniors in physical exercise in a format that suits their needs. The study was conducted from March to September 2024 among 80 residents of Astana, Kazakhstan, aged 61 to 74, with an equal gender distribution. Participants were divided into two groups: 40 in the control group and 40 in the experimental group. The experimental group trained with a coach three times a week on outdoor sports grounds. Before and after the intervention, individual interviews were held to assess health status and attitudes toward sports. Muscle tone, flexibility, and endurance were measured. Statistical analysis methods were used to verify the reliability of the results. "The effectiveness of health-oriented physical activity in the form of mass sports was confirmed by the following results: 88% of participants in the experimental group reported improved well-being after five months of training. In contrast, 67% of respondents in the control group noted a decline in their general health during the same period. Physical performance improved significantly in 90% of women and 95% of men who took part in the health-focused exercise program. Muscle strength increased in 65% of women and 76% of men. Endurance improved in more than half of the experimental group – 55% of women and 65% of men. Among men, 65% became noticeably more physically resilient. The range of quadriceps muscle tone increased in 66% of the experimental group, and biceps tone improved in 60%, with men showing greater gains. In contrast, testing of the control group revealed a negative trend in both muscle tone and functional capacity. The experiment clearly demonstrated that health-oriented physical activity in the form of mass sports has a positive impact on the overall physical condition of elderly individuals.

***Keywords:*** *mass sports, physical activity, retirees, old age, physical performance.*

## 1. INTRODUCTION

Regular physical activity is the key to good health and maximizing the active life span of the elderly. Ferreira et al. (2020) argue that people over 60 years of age are the group to which the pedagogy of the third age is applied.

Physical education experts (Navarrete-Villanueva et al., 2021; Shen et al., 2024; Parra-Rizo et al., 2022) provide a detailed analysis of the characteristics of older adults who are no longer working. It has been found that it is critical for those who have stopped working to engage in physical activity in order to maintain health and an active lifestyle.

It should be noted that in the context of physical education of citizens such sciences as pedagogy, psychology and physiology have a close relationship. When establishing a theoretical basis for the systematization of health-improving physical education for the elderly, the regularity in mental development and functioning of vital organ systems was revealed. Albrecht et al (2023) detailed in their work the mechanisms that help older adults adapt to regular physical activity. Taking into account such indicators as age and corresponding mental development, morphofunctional features, allows to minimize the risks of developing ineffective and even dangerous health training programs.

Physical culture is interpreted as a specific process on the one hand and the result of human activity on the other hand, through which people develop physical abilities and volitional qualities of personality. In the works of many authors (Albrecht et al., 2023; Bai et al., 2022; Mobaraki et al., 2022) it is possible to find various theoretical concepts containing forms, methods and means applied in recreational physical culture.

Physical education is characterized by a complex structure, as it contains many components from physical education and training to motor rehabilitation. At the same time, physical education is defined as a pedagogical process during which a person develops certain knowledge that can influence physical abilities (Mobaraki et al., 2022).

Physical education is characterized by a special organization of the educational process, which is characterized by the presence of such components as unity, compliance with strict regulations for the implementation of the pedagogical process, solving the approved tasks and achieving the goals. An integral part of physical education is the

educational process, which allows to achieve a versatile physical development, to form a positive image of physical culture in human consciousness. Through physical education, a person develops values, useful habits and positive social qualities based on the principles of continuous improvement of health, physical fitness, which, in turn, will allow and maximize the effectiveness of social functions.

In the modern interpretation, physical health consists of a certain set of biosocial properties of a person by means of which an individual can actively function in society (Legrand et al., 2021; Dogra et al., 2022; Townsend et al., 2021). In this context, the primary goal of physical health stands out. It consists not only in achieving high performance of all organs and body systems, but also in the development of high adaptation of these systems.

Physical training is a set of certain forms of muscular activity, the regular performance of which can improve physical development, performance and health (Rodrigues et al., 2022). Recreational training is characterized by certain features that distinguish such systems from sports training. The main goal of the latter is to obtain the maximum result in a particular sport, while health training is aimed at improving the current indicators of the physical state of the body, the functioning of its vital organs and systems. In sports training, in order to achieve the required result, extreme loads are used, while in health training such loads are selected taking into account the current physical condition and functional capabilities of a person (Stojanović et al., 2021; Khalafi et al., 2022; Smart et al., 2022).

It has been found that during physical education, older adults develop lasting healthy lifestyle habits and an understanding that regular exercise promotes health and longevity and improves quality of life (Huang et al., 2021; Fiorito et al., 2021).

Conscious attitudes towards physical activity play a huge role in the development of positive attitudes towards a healthy lifestyle. Some authors (Stehr et al., 2021; Meredith et al., 2022; Jenkin et al., 2021) have categorized motivation to engage in physical activity into groups in their works:

1. A high degree of satisfaction with the activities. Motivating tools can be the opportunity to diversify everyday life, meet new people, make friends.
2. Realizing the results of regular exercise (gaining new knowledge and skills, improving physical abilities).
3. Understanding perspectives (desire to participate in various sports activities, building willpower and character).

The main purpose of physical activity for older adults is to improve the quality of life, the ability to actively interact with society, health promotion and prevention of various diseases. To achieve high results in physical education, many scientists (Izquierdo et al., 2021; Zhai et al., 2021; Pedersen et al., 2022) have developed a whole system consisting of a large number of forms of mass exercise.

The works of some authors (Xiao et al., 2022; Mollinedo-Cardalda et al., 2021) indicate that the training plan should be prepared in advance and contain a set of necessary exercises of reduced intensity, aimed at a gradual increase in loads. A maximal test is the greatest number of motor manipulations that a person can perform when performing a particular exercise. Indicators in maximal tests are the minimum and maximum weight of the weight, speed in performing the exercise and time spent. These values are the basis for calculating the load for each individual and the average values for the age group.

Exercise can include a wide variety of exercises ranging from general developmental to specialty exercises. Recreational training does not usually contain technically demanding exercises (Galle et al., 2023). The level of load is determined based on the exercise methods used, and a systematic increase in load is accomplished by increasing the number of repetitions of the exercise. Individualized load calculation is necessary not only to maximize health benefits, but also to motivate and maintain interest in exercise.

An integrated approach to physical activity is fundamental to improving quality of life, facilitating the incorporation of regular exercise into the life activities of older adults.

## 2. MATERIALS AND METHODS

*Study participants*

The study was conducted seasonally during 5 months of 2024: from March to September. Residents of Zhastar microdistrict (Astana, Kazakhstan) acted as respondents. The experiment included three stages: establishing, forming and control stages. In the framework of the establishing and control stages of the experiment, the subjects determined the tone of different muscle groups, as well as assessed flexibility and endurance. The formative stage included the implementation of a program of recreational physical training within the experimental group.

To implement the developed program, 80 pensioners aged 61 to 74 who provided consent to participate in the experiment were selected. Recruitment, campaigning and informing were carried out with the help of local self-government bodies.

40 people were identified in the experimental group (19 men, 20 women) and 40 in the control group (18 men, 22 women). The experimental group was divided into subgroups of 12 people (3 groups) who practiced three times a week: Monday, Wednesday and Friday (with a possible change according to the weather). Class time was regulated depending on air temperature and weather. Classes were conducted by a coach on courtyard outdoor playgrounds (vorkout, basketball and soccer).

The density of motor activity during the lessons was 55% with a total lesson density of 97%. The full course of the recreational physical training program consisted of 62 lessons adapted to the capabilities of the elderly.

*Study Organization*

To assess the degree of physical development based on such indicators as strength, endurance, speed and flexibility, special tests were applied. The control complex includes certain exercises:

1. Squats. The result is the number of squats performed by the subject during 1 minute.

2. Arm flexion/extension exercise. In a state of inclination, the subject bends and extends the arms for one minute. The benchmark is the number of performed repetitions per minute.

3. Forward bends. Having assumed the required starting position, the subject performs forward bends. The exercise is considered "excellent" if the person can touch the feet with the toes when bending. A good result - the examinee can touch the lower part of the shin with the hands. With a satisfactory assessment, the person reaches with hands only to the upper part of the shin.

4. The PWC-150 test, which involves the use of a cycle ergometer. The test subject must perform two 5-minute approaches with a mandatory 3-minute rest between them. At the end of each approach, the heart rate is determined for 30 seconds. The most important rule of the exercise is to increase power during the second approach. Muscle tone and muscle tone amplitude were determined using a myotonometer. The difference between the data on muscle tone at tension and relaxation is the amplitude of muscle tone.

At all stages of the experiment, participants in both groups had their blood pressure measured using a tonometer and heart rate measured using a heart rate monitor.

*Statistical Analyses*

To analyze the results obtained in the course of the study, methods of statistical data processing were used with the help of software "Statistica 12". As a result of the work done, the mean value, mean square deviation, and the indicator of reliability of differences determined on the basis of Student's criteria were calculated.

# 3. RESULTS

The preliminary stage of the pedagogical experiment was a series of individual interviews with each participant in the study. In particular, a questionnaire survey was conducted, the results of which, together with individual interviews, led to a sample of participants who were suitable for measurement and separately those who were fully prepared to start regular physical activity.

The majority of pensioners in both groups have a generally positive attitude towards health-improving physical culture (72% of women and 84% of men). Among the rest, some were not sufficiently aware of what exactly health-improving physical culture is, and also in the process of conversation spoke negatively about regular physical exercise. The share of people with a sports background was 15% among women and 29% among men.

The complexes developed by us used general developmental exercises. According to the approved regulations, these exercises were introduced into the training sessions gradually: the load increase and complication of the exercises were carried out according to the plan - after 4 weeks, as recommended in scientific studies (Merchant et al., 2021; Collado-Mateo et al., 2021; Yang & D'Arcy, 2022). But the subjects began to complain of more frequent headaches, increased or decreased blood pressure, feelings of fatigue, heart and joint pain. It became obvious that there was not enough time for the preparation period for the retirees, so a shift of the phase of increasing the load and increasing the difficulty of the exercises to week 8 was implemented. This had a positive result.

After completing the main phase, we conducted a control survey of all participants in the experiment, consisting of both experimental and control groups.

The results of the control survey made it possible to conclude that regular recreational physical training had a positive impact on the health and physical development of the subjects. For example, the analysis of subjective data showed that 88% of the participants of the formative experiment after its completion began to feel much better than before the beginning of classes. Many subjects noted that their sleep normalized, appetite improved, meteorological dependence decreased, the desire to continue health-improving physical training increased, and a feeling of vigor appeared.

As for the objective evidence, their indicators also show a significant improvement in the health of the subjects. The majority of participants of the formative experiment (80%) have slowed down their heart rate and stabilized their blood pressure (75%).

The analysis of changes in the functional capabilities of the participants of the forming experiment allowed us to conclude that during its implementation there were significant changes in the results of control tests. The obtained results are reflected in Tables 1 and 2.

**Table 1.** Test scores of women in the experimental and control groups

| Test | Stating | | Control | | Alteration | | P | | t | |
|---|---|---|---|---|---|---|---|---|---|---|
| | EG | CG | EG | CG | EG | CG | EG | CG | EG | CG |
| Arm curls/extensions (number) | 27,4 | 15,2 | 27,9 | 14,6 | 0,5 | -0,6 | <0,05 | <0,05 | 0,8 | 0,6 |
| Squats (number) | 27,9 | 17,1 | 27,6 | 16,1 | -0,3 | -1 | >0,05 | <0,05 | 0,2 | 0,6 |
| Forward bend (points) | 2,2 | 1,6 | 2,2 | 1,6 | 0 | 0 | >0,05 | <0,05 | 0,1 | 0 |
| PWC-150 (kgm/min) | 354,8 | 324,34 | 428,5 | 306,1 | 73,7 | -18,3 | <0,05 | <0,05 | 2,9 | 0,4 |

Note: Stating – ascertaining stage, Control – control phase; EG – experimental group participants, CG – control group participants.

**Table 2.** Test scores of men in the experimental and control groups

| Test | Stating | | Control | | Alteration | | P | | t | |
|---|---|---|---|---|---|---|---|---|---|---|
| | EG | CG | EG | CG | EG | CG | EG | CG | EG | CG |
| Arm flexion/extension (number) | 35,2 | 24,3 | 35,8 | 23 | 0,6 | -1,3 | <0,05 | <0,05 | 0,8 | 0,3 |
| Squats (number) | 37 | 24,8 | 37,9 | 22,7 | 0,9 | -2,1 | >0,05 | <0,05 | 1 | 1,3 |
| Forward bend (points) | 2,3 | 1,8 | 2,2 | 1,5 | -0,1 | -0,3 | >0,05 | <0,05 | 0,3 | 0,7 |
| PWC-150 (kgm/min) | 499,5 | 479,2 | 617,1 | 387,4 | 117,7 | -91,8 | <0,05 | <0,05 | 2,6 | 1,8 |

As for the respondents of the control group, who did not participate in the formative experiment, they also took control tests and were interviewed to determine changes in their current state of health and functional abilities. During March-September 2024, the participants of this group did not engage in physical activity either within the framework of this project or on their own.

According to the results of the final control tests we came to the conclusion that the lack of proper and regular physical activity leads to deterioration of general well-being of pensioners. The respondents of the control group complained about sleep, mood and appetite disorders, feelings of fatigue and sleepiness. Also, many subjects reported an increase in the cases of exacerbation of chronic diseases.

The dynamics of muscle tone indices of the respondents of the control and experimental groups are presented in Tables 3 and 4.

**Table 3.** Changes in muscle tone indices of women of experimental and control groups

| Test | Stating | | Control | | Alteration | | P | | t | |
|---|---|---|---|---|---|---|---|---|---|---|
| | EG | CG | EG | CG | EG | CG | EG | CG | EG | CG |
| Muscle tension tone T | 98,8 | 97,1 | 99,5 | 94,6 | -0,7 | -2,5 | <0,05 | <0,05 | 0,4 | 1,2 |
| Muscle relaxation tone T | 83,8 | 77,9 | 82,5 | 77,2 | -1,3 | -0,7 | <0,05 | <0,05 | 0,96 | 0,35 |
| Muscle amplitude tone T | 15 | 19,2 | 17 | 17,4 | 2 | -1,8 | <0,05 | <0,05 | 0,47 | 0,94 |
| Muscle Tension Tone U | 95,2 | 99,9 | 95,8 | 98,3 | 0,6 | -1,6 | <0,05 | <0,05 | 0,32 | 0,74 |
| Muscle relaxation tone U | 77,4 | 78,3 | 77,1 | 77,5 | -0,3 | -0,8 | <0,05 | <0,05 | 0,15 | 0,48 |
| Muscle amplitude Tonus U | 17,8 | 21,6 | 18,7 | 20,8 | 0,9 | -0,8 | <0,05 | <0,05 | 1,42 | 1,39 |

Note: T – thigh (quadriceps muscle), U – upper arm (biceps muscle); EG – experimental group, CG – control group

**Table 4.** Changes in muscle tone indices in men of the experimental and control groups

| Test | Stating | | Control | | Alteration | | P | | t | |
|---|---|---|---|---|---|---|---|---|---|---|
| | EG | CG | EG | CG | EG | CG | EG | CG | EG | CG |
| Muscle tension tone T | 106,9 | 107,7 | 108,5 | 105,3 | 1,6 | -2,4 | <0,05 | <0,05 | 0,92 | 0,79 |
| Muscle relaxation tone T | 86,6 | 87,5 | 86 | 85,1 | -0,6 | -2,4 | <0,05 | <0,05 | 0,35 | 0,95 |
| Amplitude of muscle tone T | 20,3 | 20,2 | 22,5 | 20,2 | 2,2 | 0 | <0,05 | <0,05 | 0,92 | 0,24 |
| Muscle tension tonus U | 107,5 | 110,3 | 107,8 | 108,3 | 0,3 | -2 | <0,05 | <0,05 | 0,21 | 0,69 |
| Muscle relaxation tone U | 80,7 | 86,2 | 80 | 85,3 | 0,5 | -0,9 | <0,05 | <0,05 | 0,30 | 0,33 |
| Amplitude of muscle tone U | 26,8 | 24,1 | 27,8 | 23 | 1 | -1,1 | <0,05 | <0,05 | 1,36 | 0,81 |

Note: T – quadriceps femoris muscle, U – double-headed shoulder muscle; EG – experimental group, CG – control group

After the end of the experiment, absolutely all members of the experimental group began to have a positive attitude to recreational physical culture. The dynamics of changes is reflected in Figure 1.

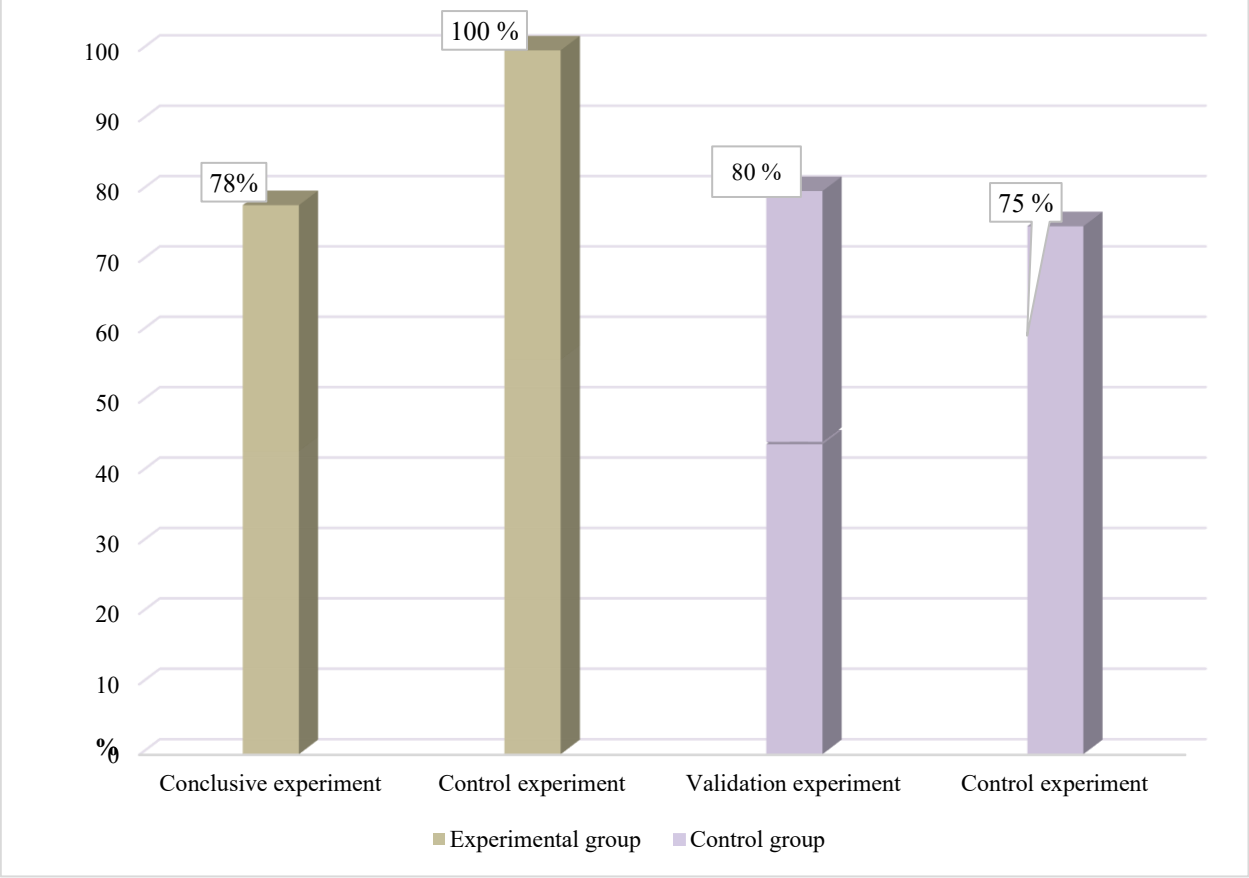


**Fig. 1.** Change in attitudes towards health-improving physical culture of the respondents of the experimental and control groups

The control tests revealed differences that can be considered statistically reliable. The theory about the presence of a persistent positive effect of regular health-improving physical culture classes was confirmed in the improvement of muscle tone in pensioners with regular physical activity, increasing their physical performance and improving their well-being.

## 4. DISCUSSION

According to the given data, the test “Arm flexion/extension” among women of the experimental group improved insignificantly by 0.5 times ($P<0.05$). It should also be noted that the control test “Squat” among women indicates the presence of insignificant deterioration at the end of the forming experiment, and the test “Forward bend” shows no change, but these results are not reliable for the experimental group according to Student's criterion ($P>0.05$). PWC-150 test showed a positive result (+73.7 kgm/min). In general, the women of the experimental group showed an increase in physical performance ($P<0.05$).

In men who regularly performed all exercises, the test “Arm flexion/extension” revealed a significant insignificant improvement of this indicator by 0.6 times. The test “Squat”, on the contrary, revealed a decrease by 0.3, a slight deterioration was also recorded in the results of the control test “Forward bend”. Differences in the results of the last two tests were recognized statistically unreliable ($P<0.05$). In the test PWC-150 at the end of the forming stage of the experiment there is an increase in the index by 117.7 kgm/min, this result is statistically significant.

Muscle tone is a complex index, the value of which is determined not only to assess the state of the human nervous system, but also predetermines its functional capabilities (Kopecká et al., 2023). This means that the dynamics of the index may indicate the effect of regular recreational exercise.

Table 3 summarizes the data, according to which the women from the experimental group after the completion of the study recorded an increase in muscle tone by 0.7 and its amplitude by 2. There is also a decrease in relaxation tone ($P<0.05$).

It should be noted that the changes in myotonometer indices in the study of the quadriceps muscles of the shoulder in the experimental group remain insignificant (Tables 3 and 4). In the male half of the subjects, the tension tone of the quadriceps femoris muscles increased slightly more than in women, as well as its amplitude ($P<0.05$). Similar conclusions can be drawn with regard to the indicators of the tone of the biceps brachii muscle. At the same time, in the representatives of the control group, all indicators significantly worsened.

It should be noted that during the experiment the majority of respondents changed their attitude to recreational physical education (Fig. 1), as evidenced by the results of control testing. Positive attitude was noted by all respondents of the experimental group after 62 sessions, while in the control group this indicator decreased by 5%.

There is a similar study by Okpeku (2023), which substantiates the effectiveness of physical education as a mass sport for the elderly. The author shows how exercise can produce positive changes in the physical and psychological health of the respondents. However, the study by Okpeku (2023) did not use the method of statistical testing of data, thus the results may not be accurate. Another study (Zivkovic et al., 2024) evaluated the relationship between physical activity level and quality of life in elderly men, which was confirmed by statistical methods. But this study analyzed physical activity not related to the organization of mass sports, and also the obtained data are gender limited.

## CONCLUSIONS

1. The effectiveness of exercises of pensioners on the system of health-improving physical culture within the framework of mass sports has been proved. The overwhelming majority of participants in the experimental group (88%) noted positive changes in their well-being after 62 sessions. 90% of women and 95% of men significantly improved their physical performance.

2. An increase in muscle strength was recorded in 65% of women and 76% of men. Endurance significantly increased in more than half of all female participants in the experimental group (55%). Among men, 65% of subjects became physically more enduring. Positive changes in flexibility were shown by 15% of women and only 8% of men.

3. Thanks to regular recreational physical training, the neuromuscular apparatus of the subjects was strengthened. This is evidenced by the values of such an indicator as the amplitude of muscle tone of the quadriceps femoris muscle. Its increase was recorded in 66% of the participants, and the amplitude of muscle tone of the biceps brachii muscle increased in 60% of the experimental group members (distribution by sex corresponded to the starting population, but the result of a greater bias was obtained in men).

4. According to the results of control testing, the positive dynamics of muscle tone and functional capacity indicators in the control group was not revealed. On the contrary, the indicators show a tendency to decrease physical performance, flexibility and endurance. At the control stage of the experiment, 67% of respondents noted that they felt deterioration of their general well-being (experienced problems with sleep, lost appetite, observed an increase in the frequency of exacerbations of chronic diseases, etc.).

Thus, a comprehensive examination of all participants of the control and experimental groups showed that recreational physical culture organized in the form of mass sport has a positive effect on the general physical condition of persons of retirement age.

This study is limited by the number of pensioners' sample, time and place of the recreational physical education course. In the perspective of the study, more accurate results can be obtained when the number of pensioners participating in mass sports is increased, the seasons of the exercise program are extended with the use of gyms in the cold season. Another promising direction may be the comparison of the experimental data with the records of medical records of pensioners during the period of mass classes.

**FUNDING**

BR28713049-«Improving the quality of life for middle-aged and elderly populations through the promotion of mass sports using artificial intelligence technologies» The Committee of Science of the Ministry of Science and Higher Education of the Republic of Kazakhstan

**CONFLICTS OF INTEREST**

We declare that there are no conflicts of interest.

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