

## **The Influence of Physical Activity Program on Physical Fitness of Older Adult Women**

*Pope John Paul II State School of Higher Education (Poland)*

### **Introduction**

In recent years, there has been observed a growing interest in the aging period, which undoubtedly is closely associated with the increase in population of the elderly. The problem of aging of Europe and Polish population is probably the most important health challenge of the coming years. In Poland, at the end of the year 2000 the proportion of people aged 65 years and older was 12,3 %, and in 2005 already reached 13,39 % of the total population. The forecasts of Central Statistical Office of Poland (CSO) suggest an increase of this ratio to 31,6 % in 2050, which will constitute one-quarter of the entire population of the European Union. Maintaining a satisfactory state of health and functional efficiency of seniors are also priority actions of the European Commission (Kostka, 2010).

Physical fitness of the older adults today is a subject of interest to researchers from many fields of science (Frisard et al, 2007; Grzeškowiak et al, 2009; Ignasiak et al, 2009; Rutkowska et al, 2011; Zdrodowska et al, 2012). Nowadays there is observed a significant reduction of physical fitness as a consequence of low physical activity in almost every age group.

Along with the inevitable aging there have occurred multidirectional changes in motor abilities of a man. In none of the earlier periods there have occurred in motor skills such a large individual differences, as just in this one. The picture of the overall motor skills in so called the «third age of a man» bears a particular mark of the existing style of life and general health condition. Regular physical exercises are taken by approximately 30 % of people over 65 years of age in the American population. According to a nationwide data over 50 % of seniors declared the need for movement, but only 7 % of people aged 60–64 years take regular physical activity (Kozdroń 2008). It should be noted that it is the lack of physical activity that can lead to a reduction in the level of efficiency, independence or may cause social isolation, loneliness and even premature mortality of the older adults. The results of the European project SHARE (Survey on Health, Aging and Retirement Europe, 2009) are also very alarming. According to them the Polish population over 50 years of age is in a worse physical and mental condition than their peers in comparable 14 European countries.

Not age, but the actual physical fitness and overall efficiency determine the independent participation in a daily life activities, physical activities, participation in a life of community or in socializing. It appears that even in the late period of life one can improve an efficiency and by proper training strengthen the muscles, increase their volume. Knowledge of these recommendations should be reflected in the programs of physical activity of the older adults. Such programs should be based on more and more often occurring recommendations for the type of physical activity, intensity and duration.

Physical fitness improves quality of life, makes it easier to perform daily activities, a person is not dependent on the help of others, which also affects favorably the increase of self-esteem. If physical activity does not find its unquestioned place in the style of life of older adults, many of them will require rehabilitation not only because of the disease, but also because of the decrease with age in functional efficiency.

Despite numerous studies of the problem there still appears that physical analysis of the elderly and checking the effectiveness of different programs is intentional. Hence, the purpose of the study was to gain knowledge about physical fitness in older adult women after application of the 6-month program of physical activity.

### **Material and methods**

The study included thirty five women aged from 60 to 72 years of age (body height 161,8±5,26 cm, weight 71,58±8,23 kg, BMI 23,18±2,74), that were the listeners of Third Age University in Biała Podlaska. The subjects were divided into two groups: the first was people aged 60 to 65 years of age, and the second from 66 to 72 years.

The Fullerton Functional Fitness Test intended for people over 60 years of age was used to assess physical fitness. The battery of tests can evaluate individual and group rate of changes of individual properties, allows to compare the results of individuals of the same age and the same sex, motivates older people to improve physical fitness and allows to document the effectiveness of implemented programs of physical activity. This test evaluates all the physiological properties that support and are necessary to maintain the independence and safe daily activity (aerobic fitness, flexibility, strength, agility, dynamic balance).

The individual tests were carried out in accordance with the standards described by the authors of the Fullerton test battery. The study was conducted in two stages: the first took place in January 2011 and the second in June 2011. The applied program of physical activity lasted six months, was adapted to the study group and included group physical exercises of streamline gymnastics, aqua aerobics and nordic walking. Each of the classes held once a week for 45–60 minutes. Before carrying out individual tests a 10-minute warm-up was conducted.

Statistical analysis was performed with STATISTICA computer program Version 7.1. The variables have been described with standard descriptive statistics by presenting in both age groups arithmetic means, standard deviation, and the differences between the separated groups were evaluated with the use of Student's t-test.

### Results

The results obtained after the application of physical activity program in the individual trials were assessed using standards developed and presented by the creators of battery of the Fullerton tests. The mean scores in the test of physical fitness (Table 1) of the surveyed women at the end of the 6-month program of physical activity in the majority of cases were statistically significant ( $p < 0,01$  and  $p < 0,001$ ).

Table 1

Comparison of the average scores in individual trails in test I and II

Test items assessing physical fitness	Test Group	Test Stage	$\bar{x}$	S	t
30 s chair stand [number of repetitions]	Group I	Test I	18,15	6,54	2,75***
		Test II	21,62	5,95	
30 s chair stand [number of repetitions]	Group II	Test I	17,67	4,76	2,20**
		Test II	22,17	5,12	
Arms curl [number of repetitions]	Group I	Test I	22,23	5,97	3,18***
		Test II	27,00	4,92	
Arms curl [number of repetitions]	Group II	Test I	25,17	5,89	1,68**
		Test II	27,83	4,71	
2-minute step [number of repetitions]	Group I	Test I	89,38	28,58	2,90***
		Test II	98,08	21,85	
2-minute step [number of repetitions]	Group II	Test I	89,38	28,58	0,1
		Test II	106,83	25,06	
Chair sit and reach RL [cm]	Group I	Test I	5,62	7,33	2,27**
		Test II	6,85	7,19	
Chair sit and reach RL [cm]	Group II	Test I	6,17	6,49	1,89**
		Test II	7,50	5,72	
Chair sit and reach LL [cm]	Group I	Test I	5,69	6,45	2,31**
		Test II	6,77	5,93	
Chair sit and reach LL [cm]	Group II	Test I	8,33	6,95	1,15
		Test II	9,33	7,50	
Back scratch RA [cm]	Group I	Test I	-1,69	7,15	2,58***
		Test II	-0,46	6,36	
Back scratch RA [cm]	Group II	Test I	1,50	1,87	2,68***
		Test II	2,17	2,48	
Back scratch LA [cm]	Group I	Test I	-5,27	8,47	2,20**
		Test II	-4,08	7,73	
Back scratch LA [cm]	Group II	Test I	1,75	2,44	0,94
		Test II	2,83	1,94	
Up and go [s]	Group I	Test I	4,28	0,65	3,10***
		Test II	4,00	0,47	
Up and go [s]	Group II	Test I	4,16	0,44	0,85
		Test II	4,08	0,44	

Descriptions:

$\bar{x}$  – arithmetic mean, S – standard deviation, t – Students' t-test

\*\*\* – changes statistically significant at  $p < 0,001$

\*\* – changes statistically significant at  $p < 0,01$

As a consequence of the application of the physical activity program there were observed physical changes in both groups of the examined women. In the age group of 60 to 65 years in all trials statistically significant changes were reported while in the age group of 66 to 72 years statistically significant changes were recorded in the following trials: getting up from a chair for 30 seconds, sitting on a chair, reaching out to the right leg and back scratching onto the right and left hand.

The strength was evaluated in the two trials. In the arms curl trial the increase of the average results in group I and group II was sequentially 21 % and 11 %. In this trial the advantage of group I over the group II was even higher and amounted to 91 %. A similar increase in the average results was recorded in the 30 s chair stand trial. In group I it amounted 19 % and in group II 25 %. In this trial, the increase of the average results in group I was about 24 % lower than in group II.

The aerobic endurance was assessed in the 2-minute step test. The increase in average scores in group I was 10% and in group II 20 %. The difference in the increase was in favor of group II and amounted to 50 %. The smallest increases in average scores were recorded in the get up and go trial. In group I it was 7 %, while in group II, 2 %. In this trial, despite of the such small increments of average scores the largest of their difference was marked. It was 2.5 times higher in group I.

In trials evaluating flexibility the greatest increase of average scores was noted in group I, in the scratching the back onto the right hand trail. It amounted to 73 %, and 45 % in group II. A similar increase in average scores was recorded in group II, in the scratching the back onto the left hand trial. It amounted to 62 %, while in group I, 23 %. On the basis of obtained results it can be concluded that the flexibility of the upper body in the group I was negative (this is the distance, lack the combination of both hands on back). However, in group II positive distances were noted, which indirectly indicates the gaining of the better average result.

The analogous increase in the average scores was recorded in both groups in the trial sit on a chair and reach onto the right foot. It amounted to 22 %. In the same test performed on the left foot the increase in the average score in group I was 19 % and in group II 11 %. The advantage of the average scores was in favor of group I. It amounted to as much as 73 %.

### **Discussion**

The physical fitness of older adults depends to a large extent on their current level of physical activity. Positive effects of different forms of physical activity are revealed by a growing number of studies in older adults (Frisard et al, 2007; Kozak-Szkopek et al, 2009; Grzanka – Tykwińska et al, 2010; Morgulec-Adamowicz et al, 2011). It is believed that in the late period of life an efficiency can be improved, and by proper training one can strengthen muscles and increase their volume. Physical fitness improves quality of life, makes it easier to perform daily activities, a person is not dependent on the help of others, which also increases favorably his/her self-esteem. This is confirmed by the studies of Grzanka-Tykwińska et al (2010), who showed that physically active people have better physical and mental health, were less burdened with cardiovascular diseases, and less likely to benefit from hospital care.

The aim of this study was to gain knowledge about the physical fitness of older adult women after the application of the 6-month program of physical activity. The research found that the participation of older women after the 6-month program of physical activity, in which the dominant forms were classes in streamline gymnastics, aqua aerobics and nordic walking, had a positive impact on changes in the level of their physical fitness.

The mean scores in the test of physical fitness of the surveyed women after the application of a physical activity program have changed significantly. In the second study the seniors achieved better results than in the first. Kozdroń and Leś (2010) argue that regular exercises aimed at improving the functional efficiency of the participants are important in creating physical activity programs for older adults. The authors have shown the impact of a comprehensive Physical Recreation Program of the Older Adults. They stated that participation in this program improved the functional capacity of women, as much as 99 % of the women examined. The studies performed by Grześkowiak et al (2009) also confirmed that regular physical activities can not only stop the regression of fitness level but also contribute to the progressive development. However, in studies of Kozak-Szkopek et al (2009) after applying the 8-week exercise program for people aged 72–88 years there no progress has been registered in physical fitness. However, it should be considered that too long duration of the exercises taken by people in this age, as a result of ongoing changes associated with aging, could cause actual changes resulting from the very exercises.

The slow, gradual increase in life expectancy allows to assume that in the next years the increase in the population of older people will become a fact. Therefore, there is a problem of physical fitness evaluation

methods, which also allow to improve programming of activities and evaluate their effects. Another major problem is the comparison of physical activity programs in different European countries, and it seems to be an interesting problem requiring further research.

The most outstanding countries in the field of activation of the older adults through physical activity are: the Netherlands, Spain, France, Great Britain and the Scandinavian countries. These programs according to the World Health Organization should include simple forms of physical activity such as walking, dancing, swimming, riding a bike, which were also used in this study. Appropriately selected physical activity not only improves the quality of life of older adults, but also prolongs its duration. Therefore, it seems to be intentional to develop programs of physical activity of the older people.

### Conclusions

– Physical activity undertaken by the surveyed women within the 6-month program of activities, in which the dominant forms were streamline gymnastics, aqua aerobics and nordic walking had a positive impact on improving their physical fitness.

– As the result of applying the physical activity program there were observed physical fitness changes in both groups of the examined women. In the age group of 60 to 65 years in all trials there were statistically significant changes while in the age group of 66 to 72 years statistically significant changes were recorded in the following trials: getting up from a chair for 30 seconds, sitting on a chair, reaching out onto the right leg and back scratching onto the right and left hand.

– There should be developed physical activity programs for people over 60 years. Programs should be focused on improvement of physical function responsible for the overall functioning of older adults.

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### Abstract

*Physical fitness is one of the main factors determining the basis of health, quality of life and well-being, which is why more and more attention should be devoted to this issue among older adults. The aim of the study was to gain knowledge of physical fitness of older adult women after the application of the 6-month program of physical activity. The study included thirty five women over the age of 60, who were listeners of University of the Third Age in Biala Podlaska. The Fullerton Functional Fitness Test was used to assess physical fitness. Activities undertaken by the surveyed women within the 6-month program of classes, in which the dominant forms were streamline gymnastics, aqua aerobics and nordic walking, had a positive impact on improving their physical fitness. Physical activity programs focused on improvement of physical activity responsible for the overall functioning of an older adult person should be developed for people over 60 years of age.*

**Key words:** *physical fitness, physical activity program, older adult women.*

**Евеліна Ніжніковська. Вплив програми фізичної активності на рівень фізичної підготовки жінок старшого віку.** Фізична підготовка – один з основних чинників, що визначають основи здоров'я, якість життя й хороше самопочуття. Саме тому все більше уваги має приділятися цьому питанню серед літніх жінок. Мета дослідження – отримати знання про фізичну підготовку серед жінок старшого віку після застосування 6-місячної програми фізичної активності. У дослідженні взяли участь тридцять п'ять жінок віком понад 60 років – слухачів Університету третього століття в Бялій Подлясці. Для оцінки фізичної активності використано Fullerton Functional Fitness Test. Фізичну активність здійснено після опитування жінок у межах програми 6-місячних курсів, у яких домінуючими формами визначено гімнастику, аквааеробіку і nordic walking, що мало позитивний вплив на покращення фізичної підготовки досліджуваних. Слід розробити програми фізичної активності для жінок старших 60 років, спрямовані на підвищення фізичної підготовки.

**Ключові слова:** фізична підготовка, програма фізичної активності, жінки старшого віку.

**Эвелина Нижниковская. Влияние программы физической активности на уровень физической подготовки женщин старшего возраста.** Физическая подготовка является одним из основных факторов, определяющих основы здоровья, качество жизни и хорошее самочувствие. И именно поэтому все большее внимания должно уделяться этому вопросу среди пожилых женщин. Цель исследования – получить знания о физической подготовке среди женщин старшего возраста после применения 6-месячной программы физической активности. В исследовании приняли участие тридцать пять женщин старше 60 лет – слушателей Университета третьего века в Бялой Подляске. Для оценки физической активности использовано Fullerton Functional Fitness Test. Физическая активность осуществлена после опроса женщин в рамках программы 6-месячных курсов, в которых доминирующими формами были гимнастика, акваэробика и nordic walking, что оказало положительное влияние на улучшение физической подготовки исследуемых. Следует разработать программы физической активности для женщин старше 60 лет, направленной на повышение физической подготовки.

**Ключевые слова:** физическая подготовка, программа физической активности, женщины старшего возраста.