

THE STRUCTURE OF PHYSICAL ACTIVITY IN SENIORS FROM LOWER SILESIA

Zofia Ignasiak¹, Teresa Sławińska¹, Andrzej Dąbrowski², Rafał Rowiński³

¹Department of Biostructure, University School of Physical Education, Wrocław, Poland

²Faculty of Physical Education and Sport in Białá Podlaska, Józef Piłsudski University of Physical Education, Warsaw, Poland

³Faculty of Physical Education, Józef Piłsudski University of Physical Education, Warsaw, Poland

ABSTRACT

Background. Physical activity is considered to be one of the most important determinants of human health. Many authors emphasize the benefits of physical activity for elderly people – its positive influence on the functioning of many organs and systems, development of greater mobility, slowdown of the involution processes, and counteracting the effects of civilization diseases.

Objective. The aim of this study was to analyze the structure of physical activity in older adults from the Lower Silesian region.

Material and method. The data was collected as part of the PolSenior national program. The subjects were selected randomly in three stages. The analysis was performed on the data from questionnaires filled out by 192 men and 164 women over the age of 65 years living in the Lower Silesian region. The answers were analyzed in categories such as: age (3 groups: 65-74 years, 75-84 years and over 85 years), gender, place of residence (communities up to 20 000 and over 20 000 inhabitants) and social-occupational status (blue-collar and white-collar workers). The survey results were shown in percentage form and concerned the different types of physical activity performed, the most frequent reasons for undertaking physical activity, sports and recreational physical activity during the respondents youth, between 30 and 60 years of age and at present, as well as the constraints and reasons that prevent an active lifestyle.

Results. With age the percentage of people who spend their free time actively decreases. In each age group of elderly people men declared a greater need for physical activity than women. The subjects also differed with the urban factor and social-occupational status. Moreover, the results showed that the larger community, the better the condition created for recreation of older adults and the people whose previous profession was not connected with physical work tried to be physically active in various forms more often than ex-manual laborers. It is probable that education significantly influences an active attitude towards one's health and proper lifestyle.

Conclusions. Physical activity of seniors as a one of the basic elements of lifestyle is clearly connected with the environment in which older people live.

Keywords: *physical activity, population 65+, Lower Silesia*

STRESZCZENIE

Wprowadzenie. Aktywność ruchowa jest postrzegana jako jeden z bardzo istotnych czynników zdrowia człowieka. Wielu autorów podkreśla korzyści płynące z aktywności ruchowej osób starszych – pozytywny wpływ na pracę wielu narządów i układów, rozwinięcie większej mobilności, spowolnienie procesów inwolucyjnych i przeciwdziałanie chorobom cywilizacyjnym.

Cel. Celem niniejszej pracy jest analiza struktury aktywności ruchowej osób starszych z Dolnego Śląska.

Material i metoda. Badania zostały wykonane w ramach ogólnopolskiego programu PolSenior. Dobór badanych miał charakter losowy, trzystopniowy. W pracy wykorzystano dane ankietowe 192 mężczyzn i 164 kobiet po 65 roku życia, mieszkańców Dolnego Śląska. Wyniki analizowano w kategoriach wieku (3 grupy: 65-74, 75-84, powyżej 85 lat), płci, wielkości osiedla (do 20 tys. i powyżej 20 tys. mieszkańców) i statusu społeczno-zawodowego badanych (pracownicy fizyczni i niepracujący fizycznie). Wyniki przedstawione zostały w postaci wartości odsetkowych i dotyczyły form podejmowanej aktywności ruchowej, najczęstszych przyczyn podejmowania aktywności ruchowej, aktywności sportowo-rekreacyjnej w młodości, między 30 a 60 rokiem życia i obecnie, oraz powodów i ograniczeń uniemożliwiających aktywny styl życia.

Corresponding address: Zofia Ignasiak, Department of Biostructure, University School of Physical Education in Wrocław, J. Paderewskiego Street 35, 51-612 Wrocław, Poland, phone: +48 71 347 3361, fax: +48 71 347 3034
e-mail: zofia.ignasiak@awf.wroc.pl

Wyniki. Wraz z wiekiem zmniejsza się odsetek osób spędzających czas wolny w sposób aktywny. W każdej wydzielonej grupie wieku osób starszych mężczyźni niż kobiety częściej wykazywali potrzebę ruchu. Różnicują także badanych pozostałe czynniki: urbanizacyjny oraz status społeczno-zawodowy. Wyniki badań wskazują, że większe osiedle stwarza korzystniejsze warunki rekreacji dla seniorów oraz że osoby, których praca zawodowa nie wiązała się z wysiłkiem fizycznym, częściej niż pracownicy fizyczni uprawiali ćwiczenia fizyczne w różnej formie. Być może zadziałał tutaj czynnik wykształcenia związany wyraźniej z aktywnym podejściem do własnego zdrowia i właściwego stylu życia.

Wnioski. Aktywność fizyczna seniorów będąca jednym z podstawowych elementów stylu życia jest wyraźnie związana ze środowiskiem bytowym badanych.

Słowa kluczowe: *aktywność ruchowa, populacja 65+, Dolny Śląsk*

INTRODUCTION

Within lifestyle, physical activity and physical fitness are of great importance and are considered to be one of the most crucial determinants of human health in all stages of ontogeny. As a result of today's aging population, optimal physical activity translates into largely independent seniors, both in everyday activities as well as in their social and professional life. The period of work has been prolonged not only in Europe so retirement is postponed until 65-70 years of age. Thus, public health policy should popularize behaviors that aim at maintaining good health not only among adolescents and adults but also among the elderly. Many authors emphasize the benefits of physical activity for older adults – its positive influence on the functioning of many organs and systems, on development of greater mobility, the slowdown of the involution processes, and counteracting the effects of civilization diseases [2, 6, 7, 12-14, 17-19, 20].

Maintaining the health of the elderly is also of great importance in view of the economy. Definitely, it is easier to prevent diseases and dysfunctions of the body than to cure them (*1997 WHO Guidelines*). Therefore, at the end of the last century, the National Health Program was developed in Poland. One of the goals of this program was to increase the physical activity of the Polish population. Recent programs and studies have shown that levels of physical fitness and physical activity in Poland are still too low [3, 5, 17]. At the same time emphasis has been laid on the differences in the active approach to health depending on the respondents' education, social-occupational status, size of inhabited neighborhood, and habits learned at an early age [5, 8-10, 12, 15].

Many papers and research projects concern specific often very narrowly treated issues of aging in humans. Undoubtedly, the most comprehensive research project in Poland has been the PolSenior program, which covers many areas of research such as medical, psychosocial and socioeconomic in regard to elderly people. The authors of the project worked from the assumption that human health is multifaceted in character. The PolSenior program was funded by the Ministry of Science and Higher Education under a grant PBZ-MEIN-9/2/2006.

The research material includes data collected from men and women over 65 years old from all over Poland. The aim of this study was to analyze the physical activity structure of older adults from the Lower Silesian region.

MATERIAL AND METHODS

The subjects were selected randomly in three stages. A detailed description of the project and the selection methods were included in the work by *Błędowski et al.* [1]. The examinations were performed by BGA Social Research Company in Sopot in 2007-2010 by a specially trained team of nurses. The project was coordinated by the International Institute of Molecular and Cell Biology in Warsaw and approved by the Bioethics Committee of the Medical University of Silesia in Katowice. In the region of Lower Silesia tests were carried out on 215 men and 177 women, representing 41.6% of all respondents over the age of 65 [1].

In this paper we present the part of the PolSenior project relating to physical activity undertaken by the inhabitants of Lower Silesia in the categories of age, gender, size of place of residence and social-occupational group. This study was based on surveys gathered from 356 people, including 192 men and 164 women from 65 to over 90 years of age. Due to the number of subjects in both groups the smaller groups were created: younger older adults, covering the age range from 65 to 74 years (57 men and 59 women), middle older adults from 75 to 84 years (73 men and 49 women) and older older adults aged above 85 years (62 men and 56 women). In the category of place of residence, the smaller communities of up to 20 000 inhabitants (102 men and 85 women) and large communities of more than 20 000 inhabitants (90 men and 79 women) were distinguished. Similarly, two categories were distinguished on the basis of the nature of professional work, that is a group of blue-collar workers (122 men and 100 women) and white-collar workers (69 men and 61 women).

The survey results were shown in percentage form and concerned physical activity during leisure time. The analysis included different types of performed physical activity, the most frequent reasons for undertaking phy-

sical activity, sports and recreational physical activity during the respondents' youth, between 30 and 60 years of age and at present, as well as the constraints and reasons that prevent an active lifestyle.

RESULTS AND DISCUSSION

The most common form of physical activity reported by the respondents was taking short walks in their neighborhood (Table 1). This type of activity differentiates the categories of age, gender, and social-occupational group. In general, short walks a few times a week or month were chosen more frequently by men than women. As the age of the respondents increased this trend continued but generally the percentage of people engaging in this type of activity decreased: in the oldest age group, i.e. over 85 years, it was only 58.4% of men and 46.2% of women. This kind of activity was chosen much more often by people whose previous profession was not connected with physical work (76.6%) compared to blue-collar workers (64.1%). The size of place of residence was the factor that differentiated these subjects the least.

A few hours of walking and trekking as a form of activity were chosen more often by men than women but the proportion of those people significantly declined with age. In the group of younger older adults, one in three men and one in five women reported long trips and walks, and in the oldest age group, the percentage was only 14.5% among men and 5.0% among women. The size of town and social-occupational status did not indicate substantial differences among the respondents (Table 1).

Gymnastics as a chosen form of physical activity was reported by a small percentage of the respondents – about 12%. With age the number of respondents exercising decreased more clearly among women (to 5.3%) than men (to 9.8%). This form of activity was definitely preferred by persons whose previous profession was not connected with physical work (24.7%) compared to former blue-collar workers (4.5%), and more often by inhabitants of large communities (16.4%) rather than small communities (8.8%).

Cycling was almost twice as more likely to be chosen by men than women and, with the age of the respondents, the percentage of people riding a bike decreased, as expected – especially among women (1.1% after 85 years of age). In general, one third of men opted for this form of activity. The size of community also differentiated the respondents; the larger the community, the less people used this form of exercise. The persons representing blue-collar workers used this means of transport almost twice as often (27.6%) than the persons whose previous profession was not connected with physical work (15.9%).

Gardening was of great interest to those surveyed. In the group of younger older adults, more women (45%) than men (32.6%) reported this form of activity. Men who declared this form of activity were more numerous in the next two age groups, although the proportion of these people decreased significantly among 80-year-olds. The size of community also differentiated the respondents and people from small communities were much more likely to work in the garden (nearly 50% of the surveyed) than those from large communities

Table 1. Physical activities undertaken by the subjects several times a month or more in relation to age, gender, place of residence, and social-occupational status (in %)

Factors	Category	n	Gender	Short walks in the neighborhood (%)	Long walks, trekking (%)	Gymnastics, aerobics, etc. (%)	Cycling (%)	Gardening (%)
Age (years)	65-74	56	man	69.9	29.3	13.1	32.0	32.6
		59	woman	73.2	18.6	14.5	19.6	45.0
	75-84	73	man	79.3	14.4	11.5	31.9	46.0
		49	woman	60.5	14.9	10.9	18.5	30.3
	> 85	62	man	58.4	14.5	9.8	24.5	24.0
		56	woman	46.2	5.0	5.3	1.1	11.2
	Total	191	man	72.7	23.2	12.4	31.6	36.9
		164	woman	66.4	16.0	12.4	17.6	36.8
Size of community (population)	up to 20 thousand	102	man	75.2	28.2	11.0	40.9	40.8
		85	woman	63.1	14.4	7.2	26.6	50.1
		187	total	68.2	20.1	8.8	32.5	46.2
	over 20 thousand	89	man	69.3	16.5	14.2	19.0	31.8
		79	woman	69.6	18.0	17.6	8.5	23.3
		168	total	69.5	17.4	16.4	12.1	26.4
Social-occupational status	manual laborer, farmer	121	man	69.9	24.5	5.7	36.2	37.4
		100	woman	59.9	12.0	3.6	21.4	39.3
		221	total	64.1	17.3	4.5	27.6	38.5
	not working physically	69	man	78.2	20.8	25.7	22.5	36.1
		61	woman	75.8	21.6	24.3	12.6	33.9
		130	total	76.6	21.3	24.7	15.9	34.6

(26.4%). The social-occupational status was insignificant in differentiating the respondents (Table 1).

In our opinion, one of the crucial survey questions related to the subject of the study was the question about the regular practice of sports and undertaking physical recreation in adult life (up to 30 years of age), between 30 and 60 years of age, and currently (Table 2). Undertaking regular physical activity and participating in sports and recreation activities was more characteristic for men than women before reaching 30 years of age. Nearly a quarter of the men surveyed responded affirmatively, while only 10% of women declared participation in sports and recreational activities. Active participation in exercise was also declared by a lower percentage of the respondents from small communities compared to the inhabitants of larger communities (13% and 18%, respectively). Also the persons whose previous profession was not connected with physical work used to do sports in their youth more often (25%) than the former manual laborers (9%).

During their working lives, a very low proportion of both men and women undertook regular and recreational and sporting activities. It amounted to approximately 10%, being lower by a few percent among women. Physical activity also differentiated the surveyed depending on the size of community and social-occupational status. The inhabitants of large communities were more than twice as likely to do sports and recreational activities (12.5%) than the inhabitants of small communities (4.8%). Only 5% of the former blue-collar workers declared regular physical activity in comparison to 14.6% of the persons whose previous profession was not connected with physical work (Table 2)

Regardless of being mature and fully aware of one's health, few people took part in various forms of physical activity and it can be presumed that at old age they will avoid sport and recreation even more. The proportion of people over 60 regularly exercising did not exceed 6% in all age groups and once again was lower for women than men, in small communities only 1% of respondents compared to 4.2% of the population of large communities. Among the former blue-collar workers, the percentage of women and men in total was less than 1%, while among the persons whose previous profession was not connected with physical work was 5% (Table 2).

Among the reasons for undertaking any kind of physical activity, the respondents most frequently declared the desire to remain healthy (Table 3). This reason, physical activity for health, was poorly differentiated by age and gender, size of community, or social-occupational status. Another reason for performing physical activity was the need for rest. Nearly 39% of men surveyed and 37% of women in the youngest group chose this answer. With age these percentages decreased to about 25% of men and 20% of women in the oldest group of subjects. This reason was mentioned more often by the inhabitants of larger communities than smaller ones as well as by ex-white-collar workers (almost one half) compared to blue-collar workers (28%).

Another reason given as often as the previous was the opportunity to fill one's free time; about one third of the respondents, regardless of their gender and age, declared such reason. The difference of the reason depended on the size of communities and social-occupational status. The greater need to fill time with physical

Table 2. Percentage of persons doing sports or undertaking recreational activities in the different stages of life in relation to age, gender, place of residence, and social-occupational status (in %)

Factors	Category	Gender	Up to 30 years of age (%)	Between 30 and 60 years of age (%)	Over 60 years of age (%)
Age (years)	65-74	man	24.1	9.0	1.6
		woman	10.2	7.0	3.3
	75-84	man	24.6	14.7	5.9
		woman	11.1	8.1	0.0
	> 85	man	19.5	4.7	4.2
		woman	4.2	3.1	1.9
	Total	man	24.1	10.8	3.3
		woman	9.9	7.0	2.1
Size of community (population)	up to 20 thousand	man	28.1	8.7	2.4
		woman	2.2	1.9	0.0
		total	13.1	4.8	1.0
	over 20 thousand	man	18.7	13.5	4.4
		woman	17.6	12.0	4.1
		total	18.0	12.5	4.2
Social-occupational status	manual laborer, farmer	man	19.2	8.4	2.2
		woman	1.7	1.7	0.0
		total	9.1	4.6	0.9
	not working physically	man	33.7	15.5	5.4
		woman	20.9	14.1	4.8
		total	25.2	14.6	5.0

Table 3. Reasons for undertaking physical activities in relation to age, gender, place of residence, and social-occupational status (in %)

Factors	Category	Gender	“for health” (%)	“need for rest” (%)	“to kill time” (%)	“my habit from an young age” (%)	“advised by a doctor” (%)
Age (years)	65-74	man	75.3	36.4	38.8	11.3	9.2
		woman	75.7	34.6	36.6	16.4	4.4
	75-84	man	87.4	29.9	34.8	9.1	14.4
		woman	70.6	55.7	21.5	13.4	7.8
	> 85	man	81.3	24.7	30.7	9.4	11.5
		woman	81.1	20.1	27.6	2.7	10.2
	Total	man	80.0	33.6	37.0	10.4	11.2
		woman	74.5	40.1	31.5	14.7	5.8
Size of community (population)	up to 20 thousand	man	79.9	33.2	44.8	9.2	10.8
		woman	76.7	35.0	50.2	22.1	8.9
		total	78.2	34.1	47.6	15.9	9.8
	over 20 thousand	man	80.0	34.2	25.2	12.3	11.8
		woman	72.3	45.2	12.8	7.3	2.6
		total	75.2	41.1	17.4	9.2	6.0
Social-occupational status	manual laborer, farmer	man	80.1	25.6	37.0	6.8	12.4
		woman	70.6	30.4	31.5	20.5	6.6
		total	75.3	28.0	47.8	13.8	9.4
	not working physically	man	79.7	48.5	19.9	17.1	9.0
		woman	78.6	50.2	13.2	8.7	5.0
		total	78.9	49.6	15.5	11.6	6.4

activity was felt by the inhabitants of small communities than those of large (47.6% and 17.4%, respectively) and more by blue-collar workers (47.8%) than the others (15.5%). To exercise as a habit from youth was not a common reason, declared by about 10-15% of men and women, regardless of the size of communities and social-occupational status. Definitely the lowest proportion of people mentioned a doctor's suggestion as a reason – usually less than 10% of respondents (Table 3).

Among the constraints and reasons that prevent an active lifestyle, the respondents declared they were healthy and had no need to exercise (Table 4). Health discomfort as a barrier limiting activity was given by about three quarters of the respondents in the younger groups, more often by men than women. In the oldest group, over 85 years, this reason was reported by as many as 95% of men and 89% women. The urbanization factor also differentiated the respondents. More inhabitants of small towns (over 90%) than of large towns (63%) pointed to poor health as a constraint. However, a similar proportion of people who worked physically or as farmers, 70-80%, described health issues as a barrier. On the other hand, women more often declared no need for exercise (25%) than men (about 22%), and as the subjects aged this reason was given less frequently. This response was related to the place of residence and social-occupational status; 17.3% of inhabitants of small communities did not feel any need to participate or engage in any physical activity and among the inhabitants of larger communities this barrier was indicated by every third respondent. Nearly 20% of blue-collar workers and 37% of other people whose previous profession was not connected with physical

Table 4. The most reasons for not taking part in physical activities in relation to age, gender, place of residence, and social-occupational status (in %)

Factor	Category	Gender	“My health does not allow me to do it” (%)	„I do not feel any need for that” (%)
Age (years)	65-74	man	88.0	24.4
		woman	66.5	31.6
	75-84	man	79.6	20.4
		woman	78.4	20.8
	> 85	man	94.9	11.3
		woman	89.2	14.8
	Total	man	86.0	22.2
		woman	74.4	24.9
Size of community (population)	up to 20 thousand	man	89.8	11.3
		woman	94.1	19.4
		total	93.0	17.3
	over 20 thousand	man	83.2	30.4
		woman	52.4	31.1
		total	63.0	30.9
Social-occupational status	manual laborer farmer	man	84.3	27.5
		woman	76.8	15.1
		total	79.1	18.9
	not working physically	man	89.9	10.1
		woman	68.1	48.6
		total	74.8	36.8

work did not feel the need for exercise. It should be noted, however, that among the respondents there was a high proportion of people engaging in physical activities in a variety of forms, although not regularly (Table 4).

In many studies, the emphasis is put on the important role of physical activity in relation to health and social behavior not only among elderly people. The need for development of practical educational programs

aimed at different social groups is also highlighted. It seems that the population of elderly people is not properly appreciated and, until recently, they had been the most neglected recipients of such programs according to the socially accepted “stereotype of an old man”, which imposed particular behaviors on seniors marked with infirmity and resignation of being active. The gerontology researchers, including Łobożewicz et al. [11], have described this stereotype of social behaviors. In recent years, as a result of major demographic changes and development of gerontological studies, as well as development of physical culture sciences, especially physiology of physical activity and theory and methodology of recreational exercises, the problems associated with aging have gained significant importance and are more often studied comprehensively taking into account regional distinctions [4]. Our attention was focused on the issues relating to the physical activity of seniors in Lower Silesia. The analysis shows that the surveyed elderly people at a young age were not very active in sports or undertaking physical activity in their leisure time and among the active respondents, there were twice as many men as women. The proportion of people actively spending their free time decreased significantly over time. There was also greater sporting activity among the inhabitants of larger communities than of small communities and among those whose professional work was not associated with physical effort. The effect of low physical activity in youth and adulthood is a scant proportion of people (less than 5%) that actively and regularly undertake different forms of exercise. In other countries the percentage of physically active people is much higher, as the authors point out, it is usually associated with higher levels of awareness and care for one’s health [10, 16]. The respondents declared walking and trekking as a form of physical activity quite often undertaken. People in small communities tended to cycle more often than in large towns. This may be associated with an easier distance to friends’ or family’s houses and at the same time a greater sense of security. In large communities an elderly person riding on a bicycle is subject to greater risk of an accident due to the greater amount traffic on the streets and the lack of an adequate network of bicycle lanes. Also gardening proved to be popular especially among the inhabitants of small communities, which is obvious due to their adjacent gardens.

Among the reasons for undertaking physical activity the respondents mentioned maintaining good health. The reason was not greatly differentiated by gender, age, urbanization factor or social-occupational status. Approximately one third of those surveyed declared the need for rest as the reason for the increased activity and it happened more often in the case of white-collar workers who were the inhabitants of larger communi-

ties. The same number of respondents pointed out that they undertake physical activity to fill their free time. Moreover, fewer people referred to the habits of youth, which is consistent with the fact that only a small proportion of people exercised regularly at a young age. Equally rare was following the suggestion of a doctor about the need to perform regular physical exercise. Among the reasons that prevent or restrict participation in physical activities there were usually health problems and no need for exercise.

CONCLUSIONS

1. Men showed a need for exercise more often than women.
2. The differentiation of time and forms of physical activity of the inhabitants of Lower Silesia by an urbanization factor may be related to the fact that the bigger communities create more favorable conditions of recreation for the elderly than small communities that are generally poorer in sports and recreational facilities.
3. The people whose former professional work was not associated with physical exercise undertook physical activity in various forms more often than blue-collar workers. Perhaps the education factor worked here as it significantly influences an active attitude towards one’s health and proper lifestyle.

Acknowledgments

This study was funded by the Ministry of Science and Higher Education in Poland under a grant PBZ-ME-IN-9/2/2006 for PolSenior Program

REFERENCES

1. Błędowski P., Mossakowska M., Chudek J., Grodzicki T., Milewicz A., Szybalska A., Wieczorkowska-Tobis K., Wiecek A., Bartoszek A., Dąbrowski A., Zdrojewski T.: Medical, psychological and socioeconomic aspects of aging in Poland. Assumption and objectives of the PolSenior Project. *Exp Gerontol* 2011, 46, 1003-1009.
2. Boussuge P., Rance M., Bedu M., Duche P., Praagh E.V.: Peak leg muscle power, peak VO(2) and its correlates with physical activity in 57 to 70-year-old women. *Eur J Appl Physiol* 2006, 96, 10-6.
3. Charzewski J.: *Aktywność sportowa Polaków*. AWF, Warszawa 1997.
4. Department of Economic and Social Affairs (DESA). *World Population Prospects: The 2006 Revision. Fact Sheet, Series A*, 7 March 2007.
5. Drygas W., Bielecki W., Pekka P.: Ocena aktywności fizycznej mieszkańców sześciu krajów europejskich. Project „Bridging East - West health gap”. *Med Sport* 2002, 18, 169-174.

6. Dylewicz P., Przywarska I., Borowicz-Bienkowska S., Wilk M.: Aktywność fizyczna w kardiologicznej prewencji pierwotnej. *Kardiol Pol* 2001, 55, 569-574.
7. Fielding R. A., LeBeasseur N.K., Cuoco A., Bean J., Mizer K., Fiatarone Singh, M.A.: High-velocity resistance training increases skeletal muscle peak power in older women. *J Am Geriatr Soc* 2002, 50, 655-662.
8. Ignasiak Z., Sławińska T., Krynicka-Pieleszek I., Domaradzki J.: Aktywność fizyczna dorosłych wrocławian: doniesienie wstępne. *Fizjoterapia* 2009, 17, 2, 33-37.
9. Ignasiak Z., Skrzek A., Sławińska T., Rożek-Piechura K., Steciwko A., Domaradzki J., Fugiel J., Posłuszny P.: Wstępna ocena kondycji biologicznej wrocławskich seniorów. *Gerontol Pol* 2011, 19, 91-98.
10. Laaksonen M., Mcalister A., Laatikainen T., Drygas W., Morava E., Nussel, Oganov R., Pardell H., Uhanov M., Puska P.: Do health behaviour and psychosocial risk factors explain the European East-West gap in health status? *Eur J Public Health* 2001, 11, 65-73.
11. Łobożewicz T.: Stan i uwarunkowania aktywności ruchowej ludzi w starszym wieku w Polsce. Z warsztatów badawczych, Wyd. AWF, Warszawa 1991, p.208.
12. Malina R.M., Bouchard C, Bar-Or O.: Growth, maturation, and physical activity. *Human Kinetics*, Champaign IL, 2004.
13. McAuley E., Doerksen S.E., Morris K.S., Motl R.W., Hu L., Wójcicki T.R., White S.M., Rosengren K.R.: Pathways from physical activity to quality of life in older women. *Ann Behav Med* 2008, 38, 1, 13-20.
14. Mędraś M., Sławińska-Lisowska M., Józków P.: Impact of recreational physical activity on bone mineral density in middle-aged men. *Aging Male*, 2005, 8, 162-165.
15. Osiński W.: Impact of aging on physical activity, fitness and health. AWF, Poznań 2006, p.136.
16. Pell N.M.; McClure R.J., Barlett H.P.: Behavioral determinants of healthy aging. *Am J Prev Med* 2005, 28, 298-304.
17. Rowiński R., Dąbrowski A.: Aktywność fizyczna Polaków w wieku podeszłym. In: Aspekty medyczne, psychologiczne, socjologiczne i ekonomiczne starzenia się ludzi w Polsce. Mossakowska M., Więcek P. Błędowski (ed.) Termedia, Poznań 2011, 531-548.
18. Rowiński R., Dąbrowski A.: Aktywność rekreacyjna osób starszych a zachowanie sprawności funkcjonalnej i jakości życia seniorów. *Polit Społ* 2011 (numer specjalny), 45-52.
19. Smith K., Winegard K., Hicks A.L., McCartney N.: Two years of resistance training in older men and women: the effects of three years of detraining on the retention of dynamic strength. *Can J Appl Physiol* 2003, 28, 462-474.
20. Welon Z.: Biologiczna kondycja starszych mężczyzn (65-84 lat). *Przeł Antropol* 1992, 55, 1-2, 63-71

Received: 07 May 2012

Accepted: 28 November 2012

