

Physical fitness of women over 50 years of age and self-esteem quality of life and health

Mariusz Tomczak, Zofia Ignasiak, Teresa Sławińska

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

Summary

Study aim: The aim of this study was to examine whether in women over 50 years of age the rate of decline in physical fitness with age affects the self-assessment of health and quality of life.

Material and methods: The survey was conducted among 113 women, aged 50–70. The women were divided into two groups: of low and high assessment of their own health and quality of life (WHOQOL-bref). The strength of the dominant hand muscles was tested and the Senior Functional Fitness Test was performed [21]. Linear regression analysis was used in the studies.

Results: Women satisfied with their health and quality of life were characterized by a lower rate of decline in physical fitness after the age of 50, in particular the strength of the dominant hand muscles, aerobic capacity, upper body flexibility, and speed and coordination, than the dissatisfied or undecided women.

Conclusions: Physical fitness of women is important in assessing one's own health and quality of life.

Key words: Elderly women – Senior Functional Fitness Test – Quality of life

Introduction

The decline in physical fitness with age results from natural, irreversible processes of aging that disrupt the proper functioning of the body [1, 11, 23, 26]. The ongoing destructive processes are long-lasting, and their effects become more visible and cumulative after 50 years of age. In women, an increase in morbidity, physical and mental bad well-being as well as a decline in physical activity is observed during menopause. This is the stage leading to the change of lifestyle to a more sedentary one, which favors the deterioration of the quality of movement [2, 7]. The common sedentary lifestyle and work, but also passive leisure time, intensify the involutional decline in the level of physical fitness.

According to research, systematic physical activity is one of the main factors supporting maintaining well-being and health in late adulthood [26, 28]. Its lack leads to the weakening of all human life functions [9]. The problem today is to change the lifestyle of elderly people to one that would allow for active living to a late age. Therefore, the goal of many actions and programs aimed at seniors is to promote physical activity and other pro-health

behaviors that can provide elderly people with the ability to function independently and thus reduce the costs of health and social care. Maintaining the ability to work and functional physical fitness at a satisfactory level makes it easier for older people to actively participate in social and family life [2, 10]. This, in turn, contributes to the promotion of a positive and active image of older people. It can also affect the self-esteem of one's health and quality of life [15].

Direct support for elderly people in undertaking physical and mental activity, developing passions, finding new interests, which is especially important with the end of professional work, can be obtained, among other places, in senior clubs and universities of the third age. As shown by numerous studies of older people actively involved in these facilities, undertaking new tasks reduces the risk of depression, reduces the feeling of loneliness, as a result of making new acquaintances, improves functioning in a social group, increases satisfaction and self-confidence, and consequently improves the quality of life of a senior citizen [4, 10, 12, 13].

The aim of the study was to determine whether self-esteem of quality of life and health among women aged 50+ could be related to the level of their physical fitness.

Material and methods

The research was carried out in 2011, excluding winter months, in the Laboratory of Biokinetics Research, in the Department of Biostructure of the University of Physical Education in Wrocław, which holds the Quality Management System Certificate – PN-EN ISO 9001: 2009 (Certificate No.: PW-48606-10E). The research program was carried out under a grant from the Ministry of Science and Higher Education, N N404 075337. The condition for inclusion of women in the study was a lack of medical contraindications. Before each examination participants were informed about the purpose and the course of the examination, and written consent of the respondents to participate in the research project was obtained.

The study analyzed the data of 113 women aged 50–70 living in the Lower Silesia region: 39 women aged 50–59 and 74 women aged 60–69. The height and body mass were measured and the BMI index was calculated. The somatic characteristics of women in the 6th and 7th decades of life are presented in Table 1.

Table 1. Somatic characteristics of the women in relation to age

Trait	50–59 years old (n = 39)	60–69 years old (n = 74)
	Mean ± SD	Mean ± SD
Age [years]	56.03 ± 2.35	63.16 ± 2.64
Height [cm]	162.56 ± 6.52	158.25 ± 5.79
Weight [kg]	74.44 ± 12.59	74.14 ± 13.04
BMI [kg/m ²]	28.14 ± 4.26	29.63 ± 5.15

In order to estimate the physical fitness of the subjects, strength of the dominant hand was measured by means of the JAMAR dynamometer and the Functional Senior Fitness Test was performed [21]. In six tests, the strength and flexibility of the upper and lower body, cardiorespiratory endurance, and speed and motor coordination were assessed. The self-assessment of one's own health and quality of life was made on a 5-point scale (from 1 = very

dissatisfied to 5 = very satisfied) in accordance with the proposal included in the WHOQOL-BREF questionnaire [30]. After analyzing the answers, the examined women were divided into subgroups differing in self-assessment of health: low-high. Another criterion used to divide women into subgroups was the self-assessment of quality of life: low-high (Table 2). Subgroups with low self-esteem, health and quality of life comprised women who were very dissatisfied, dissatisfied or undecided (neither yes nor no). The subgroups with high self-esteem health and quality of life included satisfied and very satisfied women.

In separate subgroups that differ in self-assessment of health and quality of life, the Shapiro-Wilk test and histograms were used to assess whether the distributions of selected tests are normal. After verifying the data, the hypothesis about the normality of distributions was not rejected. The significance of age-related changes in the results of physical fitness tests was initially estimated using Student's t-test (in groups divided into younger <60 years and older ≥60 years). In subsequent proceedings, the division into age groups was omitted, assessing the variability of the results of physical fitness tests between 50 and 70 years of age using linear regression analysis with significance tests of individual coefficients of $y = b_0 + b_{age}x$. The comparison of physical fitness of women who differ in low and high self-esteem quality of life and low and high assessment of their own health is shown graphically for tests whose results showed a significant decline with age. A regression equation was used to develop the test results. In order to compare the rate of changes in the physical fitness of women who differ in the assessment of their own health and quality of life, the beta (β) coefficients were calculated. In all analyses, the p level <0.05 was considered statistically significant.

Results

Statistical characteristics of the results of physical fitness tests of women are presented in Table 3. Of the seven physical fitness tests performed, only four showed significantly worse results of physical fitness tests of women under study in the seventh decade of life compared to the previous decade. Significant changes with age relate to

Table 2. Distribution of subgroups according to self-esteem health and quality of life

Self-esteem health	Self-esteem quality of life				n total	
	n low		n high			
Low	26	23.01 %	24	21.24 %	50	44.25 %
High	5	4.42 %	58	51.33 %	63	55.75 %
Total	31	27.43 %	82	72.57 %	113	100 %

$$\chi^2 = 27.18; p < 0.001; \rho_{\text{Spearman}} = 0.49; p < 0.001$$

the results: strength of the hand grip, distance length in a 6-minute walk, attempts to join hands behind the back “back scratch” and speed-agility tests “8-foot up and go” (Table 3). The linear regression coefficients presented in Table 4 confirmed the relationships between age and the results of physical fitness tests and indicate the direction of changes with age.

In further analyses, comparing the physical fitness of women in two separate subgroups that differ in their own

health or quality of life assessment, only those trials whose results showed significant involutionary changes were considered. The comparison of standardized β coefficients in Table 5 shows that in each of the four physical fitness tests, a faster rate of decline in physical fitness is observed in women who poorly assess their quality of life and health or are undecided in their assessment, compared to women responding positively (satisfied and very satisfied), indicating a high level of satisfaction with health and life quality.

Table 3. Results of physical fitness tests in relation to age (bold print for $p < 0.05$)

Physical fitness test	50–59 years old	60–69 years old	t	p
	Mean \pm SD	Mean \pm SD		
Hand grip [kg]	30.05 \pm 9.28	25.00 \pm 6.86	3.28	0.0014
30-second chair stand [n]	17.26 \pm 4.48	16.19 \pm 3.34	1.43	0.1552
Arm curl [n]	19.77 \pm 3.97	18.80 \pm 3.31	1.38	0.1693
6-minute walk [m]	611.15 \pm 74.02	548.97 \pm 83.54	3.91	0.0002
Chair sit and reach [cm]	7.83 \pm 8.03	5.28 \pm 8.29	1.57	0.1181
Back scratch [cm]	0.49 \pm 6.34	–3.57 \pm 7.60	2.85	0.0052
8-foot up and go [s]	5.12 \pm 0.66	5.57 \pm 0.82	–3.00	0.0033

Table 4. Coefficients of regression equations of the physical fitness parameters as a function of women’s age (bold print for $p < 0.05$)

Test	b_0	Standard error b_0	t	p	b_{age}	Standard error b_{age}	t	p
Hand grip [kg]	65.377	10.397	6.29	<0.001	–0.636	0.171	–3.72	0.0003
30-second chair stand [n]	24.964	5.090	4.90	<0.001	–0.138	0.084	–1.66	0.1006
Arm curl [n]	28.547	4.767	5.99	<0.001	–0.155	0.078	–1.98	0.0502
6-minute walk [m]	959.717	110.128	8.71	<0.001	–6.413	1.810	–3.54	0.0006
Chair sit and reach [cm]	24.392	11.102	2.20	0.0301	–0.300	0.182	–1.65	0.1025
Back scratch [cm]	20.837	9.859	2.11	0.0368	–0.379	0.162	–2.34	0.0211
8-foot up and go [s]	1.754	1.021	1.72	0.0885	0.060	0.017	3.60	0.0005

Table 5. Standardized β coefficients of simple regression equations of physical fitness parameters as a function of age in two groups of women, which differ in the level of satisfaction with health and quality of life (low-high)

Test	Self-esteem	Health				Quality of life			
		β	Standard error β	Confidence limit		β	Standard error β	Confidence limit	
				–95%	+95%			–95%	+95%
Hand grip	low	–0.353	0.135	–0.625	–0.082	–0.392	0.171	–0.741	–0.043
	high	–0.283	0.123	–0.529	–0.037	–0.306	0.106	–0.518	–0.094
6-minute walk	low	–0.404	0.132	–0.669	–0.138	–0.489	0.162	–0.820	–0.157
	high	–0.276	0.123	–0.522	–0.030	–0.284	0.107	–0.497	–0.071
Back scratch	low	–0.267	0.139	–0.547	0.013	–0.313	0.176	–0.673	0.048
	high	–0.186	0.126	–0.438	0.066	–0.181	0.110	–0.400	0.037
8-foot up and go	low	0.363	0.135	0.092	0.633	0.398	0.170	0.049	0.746
	high	0.356	0.120	0.117	0.595	0.327	0.106	0.116	0.537

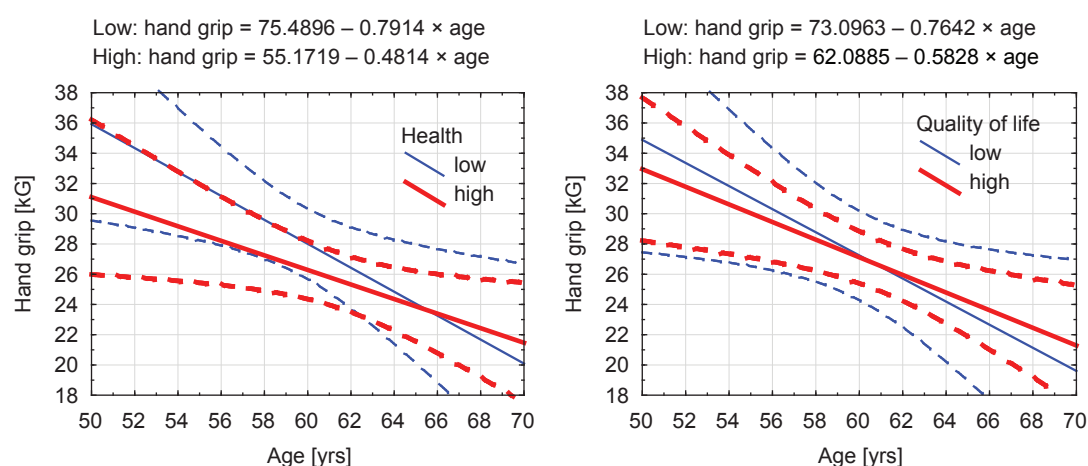


Fig. 1. Age-related changes in results of hand grip in groups of women in relation to their self-evaluations of health and quality of life

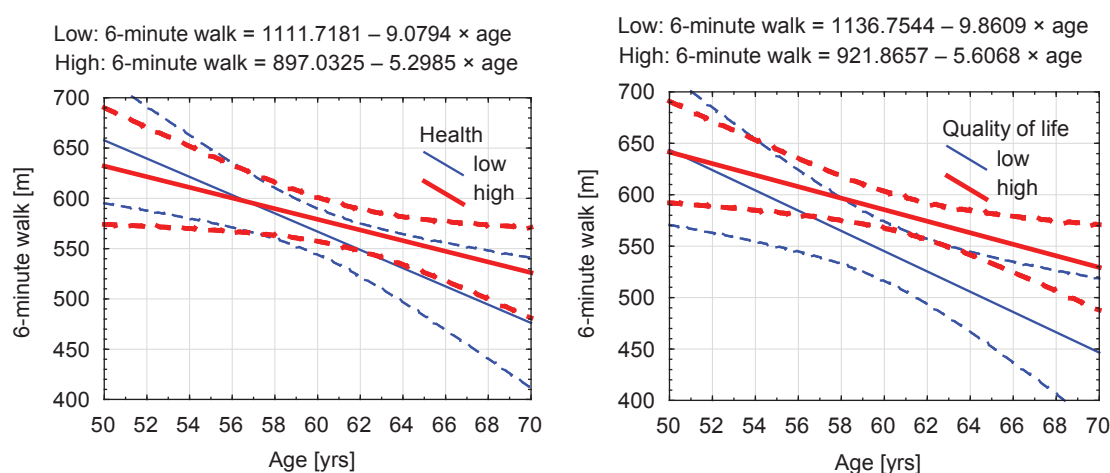


Fig. 2. Age-related changes in results of 6-minute walk in groups of women in relation to their self-evaluations of health and quality of life

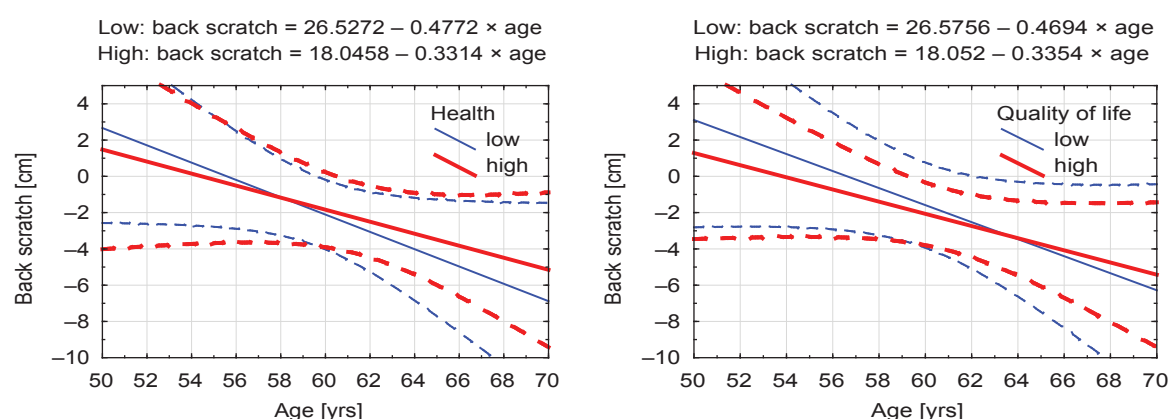


Fig. 3. Age-related changes in results of back scratch in groups of women in relation to their self-evaluations of health and quality of life

Figures 1–4 illustrate the rate of changes with age of the results of physical fitness tests of women with low and high self-assessment of health and with low and high self-

assessment of quality of life. In all figures, the dotted line indicates a 95% confidence interval.

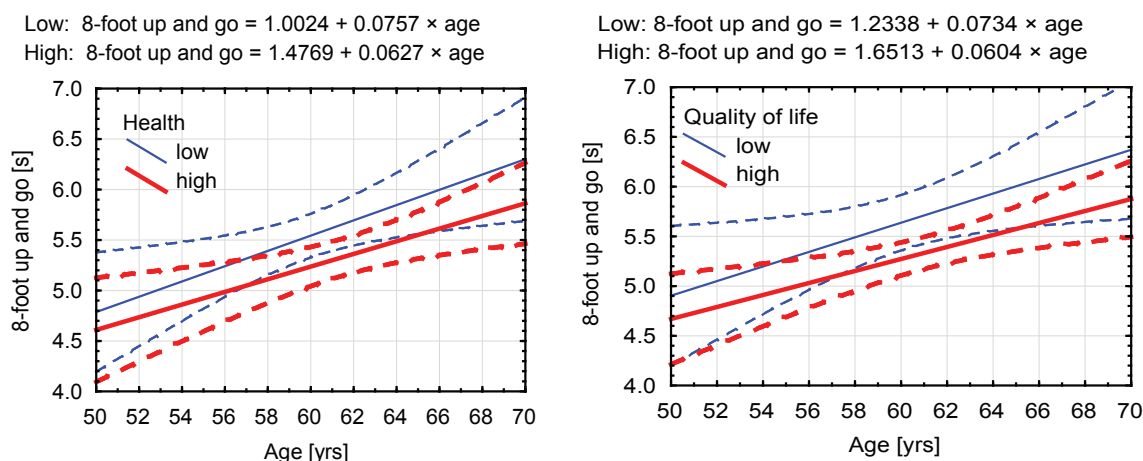


Fig. 4. Age-related changes in results of 8-foot up and go in groups of women in relation to their self-evaluations of health and quality of life

Discussion

The aim of the study was to examine whether the self-esteem health and quality of life made by women in late adulthood could be related to the pace of involutional changes in physical fitness. Analyzing the percentage of women assessing their health and quality of life, a higher percentage of women assessing these aspects positively than negatively was observed. At the same time, women were more likely to positively assess their quality of life (72.6%) than health (55.8%).

In our study, we focused on the relations between the global subjective assessment of health and quality of life and direct measurements of functional physical fitness of women aged 50–70. The results obtained by us indicate a significant dependence of the subjective assessment of health and quality of life on real physical fitness of the surveyed women. People positively assessing their health and quality of life presented a better level of functional physical fitness and slower rate of its decline with age. This applies first of all to the test evaluating the strength of the hand muscles, aerobic capacity, the range of movements of the upper limb and dynamic balance. The above results underline the mutual, positive relationship between self-assessment of health and quality of life, with an optimal level of fitness. This is a suggestion for therapeutic programs, prophylaxis and health promotion, to put a greater emphasis in movement exercises on maintaining muscle strength, the range of motion in joints of limbs, physical performance and dynamic balance. The advantage of our research is that in addition to the questionnaire, we also conducted direct research assessing functional physical fitness and other aspects of aging processes among people in the adult and older age groups.

One of the main problems of aging is the weakening of the function of all organs of the organism, and above all the impairment of the motor skills when undertaking physical activity of varying intensity. The reduction in the rate of decline in physical fitness with age may be influenced by many factors, including the regular participation of motor activities. The slowdown of unfavorable involutional functional changes means more easily taking up the challenges of everyday life, while maintaining independence from other people [6, 15, 16, 17, 18]. Does this translate into satisfaction with one's health and quality of life? We were looking for answers to this question in the study of physical fitness of women over 50 years of age.

Many researchers emphasize the fundamental role of muscular strength in the assessment of the quality of life and health of older people [24, 25, 29]. Rizzoli et al. [22] and Dam et al. [8] show that the decrease in muscle strength is two-dimensional, includes both muscle mass loss and the function of skeletal muscles, and significantly reduces the physical fitness and efficiency of the body, and consequently worsens the quality of life. These changes can be a threat to the loss of functional independence in the everyday life of an elderly person, because muscle strength is the basic parameter of remaining motor skills. This is also confirmed by continuous studies carried out by Reid et al. [19] in terms of the physiological aspects of muscle strength reduction in two groups of older people – healthy and with limitations in the motor system.

The quality of life and health of older people, as demonstrated in many studies, are significantly related to systematic physical activity, which causes a slowdown in the course of involutional processes [2, 10, 11]. It should also be noted that apart from changes in muscle tissue resulting in a decrease in physical performance, the sense of balance is equally important [5, 7, 20, 27]). Dynamic balance and

range of motion in the joints are, in addition to strength, the basis for performing everyday activities and participation in social life.

Significant differences in the cultural and social conditions and the quality of life of older people are highlighted by Mudrak et al. [13]. The authors emphasize significant differences in the quality of life and physical activity in the community of elderly people from Central Europe (post-communist countries) in comparison to seniors from Western Europe or North America. Systemic transformation, which began in the 1990s in the countries of Central Europe, also applies to the elderly, and is associated with health, physical activity and quality of life, generally recognized as the problem of “active aging”. This problem is well established and described in many countries with optimal economic development [3, 14]. Given the considerable economic, social and cultural differences mentioned above, it is important to take into consideration the great interest of Polish researchers in the problem of the quality of life, health and the role of physical activity in the environment of adults and older people in Poland.

Conclusion

The results of the conducted research indicate that the physical fitness of women, and in particular the strength of the dominant hand muscles, aerobic capacity, upper body flexibility and speed and balance, signify a significant value in assessing one's own health and quality of life. Women satisfied with their health and quality of life were characterized by a lower rate of decline in physical fitness after 50 years of age than women dissatisfied or giving an undecided answer.

Conflict of interest: Authors state no conflict of interest.

References

1. Amarya S., Singh K., Sabharwal M. (2014) Health consequences of obesity in the elderly. *J. Clin. Gerontol. Geriatr.*, 5(3): 36-67. DOI: 10.1016/j.jcgg.2014.01.004.
2. Aparicio-Ugarriza R., Pedrero-Chamizo R., del Mar Bibiloni M., Palacios G., Sureda A., Meléndez-Ortega A., Tur Mari, J.A., González-Gross M. (2017) A Novel Physical Activity and Sedentary Behavior Classification and its Relationship with Physical Fitness in Spanish older Adults: the Physmed Study. *J. Phys. Act. Health*, 14: 815-822.
3. Bauman A., Schoeppe S., Lewicka M. (2008) Review of best practice in interventions to promote physical activity in developing countries. WHO, Geneva.
4. Bilewicz A., University of the Third Age in Wrocław in the years 1976–2007, University of Wrocław 2009 [in Poland; Uniwersytet Trzeciego Wieku we Wrocławiu w latach 1976–2007, Uniwersytet Wrocławski 2009].
5. Błaszczyk J.W., Czerwosz L. (2005) Postural stability in the process of aging. *Gerontologia Polska*, 13(1): 25-36.
6. Cress M.E., Buchner D.M., Prohaska T., Rimmer J. (2005) Brown M., Macera C., DiPietro L., Chodzko-Zajko W. Best Practices for Physical Activity Programs and Behavior Counseling in Older Adult Populations. *J. Aging Phys. Act.*, 13: 61-74.
7. Da Silva Chaves L.M., De Rezende-Neto A.G., Costa Nogueira A., Aragao-Santos J.C., Albuquerque Brandao L.H., Da Silva-Grigoletto M.E. (2017) Influence of functional and traditional training on muscle power, quality of movement and quality of life in the elderly: a randomized and controlled clinical trial, *Revista Brasileira de Cineantropometria e Desempenho Humano*, Brasil.
8. Dam T.T., Peters K.W., Fragala M. (2014) An evidence-based comparison of operational criteria for the presence of sarcopenia. *Journals of Gerontology Series A: Biological Sciences and Medical Sciences*, 69: 584-590.
9. Furtado G., Patricio M., Loureiro M., Teixeira A.M., Ferreira J.P. (2017) Physical Fitness and Frailty Syndrome in Institutionalized Older Women, *Percept. Motor Skills*, 124(4): 754-776.
10. Garrido N., Silva J.D.P., Novaes J.S., Cirilo-Sousa M.S., Neto G.R. (2016) Effect of Water Aerobics on the Quality of Life, Satisfaction, and Perception of Body Image among elderly Women, *Official Research Journal of the American Society Exercise Physiologists*, 19: 5.
11. Ignasiak Z., Sławińska T., Skrzek A., Rożek K., Pośluszny P., Kozieł S., Malina R.M. (2017) Functional capacities of Polish adults of 60–87 years and risk of losing functional independence, *Ann. Hum. Biol.*, 44: 502-509.
12. Morgulec-Adamowicz N., Rutkowska I., Rekowski W., Kosmol A., Bednarczuk G. (2010) Physical activity of the elderly at the Universities of the Third Age in Poland. *Advances in Rehabilitation*, 2: 73-80.
13. Mudrak J., Stochl J., Slepicka P., Elavsky S. (2016) Physical activity, self-efficacy, and quality of life in older Czech adults. *Eur. J. Ageing*, 13: 5-14.
14. Nelson M.E., Rejski J., Blair S.N., Duncan P.W., Judge J.J., King A.C., Macera C.A., Castaneda-Sceppa C. (2007) Physical activity and public health in older adults: recommendation from the American College of Sport and Medicine and American Heart Association. *Med. Sci. Sports Exerc.*, 39: 1435-1445.
15. Osiński W. (2013) Gerokinesiology, science and practice of physical activity in the elderly [in Poland: Gerokinezyjologia, nauka i praktyka aktywności fizycznej w wieku starszym], Wydawnictwo Lekarskie PZWL.

16. Pantelic S., Randelovic N., Milanovic Z., Trajkovic N., Sporis G., Kostic R. (2012) Physical activity of elderly women in terms of age. *Facta Universitatis, Series Physical Education and Sport*, 10(4): 289-296.
17. Pedrero-Chamizo R., Gómez-Cabello A., Delgado S., Rodriguez-Llarena S., Rodriguez-Marroyo J.A., Cabanillas E., Meléndez A., Vicente-Rodriguez G., Aznar S., Villa G., Espino L., Gusi N., Casajus J.A., Ara I., González-Gross M. (2012) Physical fitness levels among independent non-institutionalized Spanish elderly: The elderly EXERNET multi-center study. *Arch. Gerontol. Geriatr.*, 55: 406-416.
18. Purath J., Buchhloz S.W., Kark D.L. (2009) Physical fitness assessment of older adults in the primary. *J. Am. Acad. Nurse Pract.*, 21: 101-107.
19. Reid K.F., Pasha E., Doros G., Clark D.J., Patten C., Phillips E.M., Frontera W.R., Fielding R.A. (2014) Longitudinal decline of lower extremity muscle power in healthy and mobility-limited older adults: influence of muscle mass, strength, composition, neuromuscular activation and single fiber contractile properties. *Eur. J. Appl. Physiol.*, 114: 29-39.
20. Rejeski W.J., Michalko S.L. (2001) Physical Activity and Quality of Life in Older Adults. *J. Gerontol.*, 56A, 23-35.
21. Rikli R., Jones C.J. (2001) Senior Fitness Test Manual. Human Kinetics, Champaign IL.
22. Rizzoli R., Reginster J.Y., Arnal J.F. (2013) Quality of life in sarcopenia and frailty. *Calcifield Tissue International*, 93: 101-120.
23. Ruiz-Montero P.J., Castillo-Rodriguez A. (2016) Body composition, physical fitness and exercise activities of elderly. *J. Phys. Educ. Sport*, 16: 860-865.
24. Samuel D., Rowe P., Hood V., Nicol A. (2012) The relationship between muscle strength, biomechanical functions moments and health-related quality of life in non-elite older adults. *Age Ageing*, 41: 224-230.
25. Sayer A.A., Syddall H.E., Nartin H.J., Dennison E.M., Roberts H.C., Cooper C. (2006) Is grip strength associated with health-related quality of life? Findings from the Hertfordshire cohort study. *Age Ageing*, 35: 409-415.
26. Skrzek A., Iganskiak Z., Koziel S., Sławińska T., Rożek K. (2012) Differences in muscle strength depend on age, gender and muscle functions. *Isokinet. Exerc. Sci.*, 20(3): 229-235.
27. Skrzek A., Ignasiak Z., Sławińska T., Domaradzki J., Fugiel J., Sebastian A., Rożek K. (2015) Structural and Functional markers of health depending on lifestyle in elderly woman from Poland. *Clinical Interventions in Aging*, 10: 781-793.
28. Sumpter D.A., Garcia A.J., del Pozo J. (2015) The relationship between perceived exertion, physical activity and quality of life in older women. *Revista de Psicología del Deporte*, 24(2): 281-287.
29. Trombetti A., Reid K.F., Hars M., Herrmann F.R., Pasha E., Phillips E.M., Fielding R.A. (2016) Age-associated declines in muscle mass, strength, power and physical performance: impact on fear of falling and quality of life. *Osteoporosis International*, 27: 463-471.
30. WHO Global InfoBase online [online database]. World Health Organization, Geneva 2007.

Received 20.11.2018

Accepted 11.03.2019

© University of Physical Education, Warsaw, Poland