



THE RELATIONSHIP BETWEEN PHYSICAL FITNESS AND QUALITY OF LIFE IN ADULTS AND THE ELDERLY

doi: 10.2478/humo-2013-0023

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ABSTRACT

Purpose. The aim of this study was to determine the relationships between physical fitness and various aspects of quality of life in middle-aged adults and the elderly. **Methods.** The sample included 216 women and 43 men, living in a medium-sized city in Poland aged 50–84 years. Physical fitness was determined using a test battery specifically designed for the elderly (Senior Fitness Test); grip strength by the dominant hand was also measured. The short form of the WHOQOL-BREF questionnaire was used to evaluate quality of life. Four domains (physical, psychological, social relationships, environment) of quality of life as well as overall quality of life and health were self-assessed. **Results.** Among the selected components of physical fitness measured in the study, the assessment of overall quality of life in women was related to upper limb strength and, depending on the quality of life domain, also with upper or lower body flexibility. In men, the only factor influencing their overall assessment was upper body flexibility, whereas cardiorespiratory efficiency was the only factor influencing their detailed self-assessment of the physical health domain. Additionally, the self-assessment of general health in men was significantly positively correlated with cardiopulmonary efficiency. In women, the general health assessment was correlated with upper limb strength and upper body flexibility. **Conclusions.** It was concluded that after the fifth decade of life, physical fitness plays a greater role in improving the self-assessment of quality of life in women than men. Physical activity undertaken by middle-aged and elderly adults should focus on first improving cardiorespiratory efficiency and then strength and flexibility.

Key words: adults 50+, physical fitness, quality of life

Introduction

Quality of life, according to the World Health Organization, is “an individual’s perception of his or her position in life in the context of the culture and value system where they live, and in relation to their goals, expectations, standards and concerns. It is a broad ranging concept, incorporating in a complex way a person’s physical health, psychological state, level of independence, social relationships, personal beliefs and relationships to silent features in the environment” [1, p. 1405]. Among the various aspects that determine quality of life, one important quantifier is independence. Independence, if considered to be a sign of proper functioning in everyday life and done without the help of others, can be associated with maintaining an adequate level of physical fitness. Physical fitness is often congruent to health, itself an important element in determining quality of life [2, 3]. In light of the current phenomenon of population aging, the question arises as to whether the observed increase in life expectancy also involves an increase in fitness levels in old age. In other words, if quality of life decreases with age, then to what extent is this connected with the involutional changes that shape physical fitness in senescence?

In Poland, knowledge on the physical fitness of adults and, in particular, the elderly is lacking. Similarly, the literature on the subject is also scant in regards to what

can be considered as valuable research on the relationships between physical fitness and various aspects of an individual’s living environment, which has been suggested to be a very important aspect in this regard [4]. Those studies that were identified focused on the relationship between physical activity and health and quality of life [2, 5–9]. Others discussed the relationships between quality of life and economic status, age, education, marital status, sex, and other factors unrelated to what can be understood as the sphere of physical culture [10–12]. In order to further the understanding of this issue, the aim of this study was to investigate the relationships between the physical fitness levels and self-assessed quality of life in adults and the elderly.

Material and methods

The research sample included 216 women and 43 men aged 50 to 84 years living in Wrocław, a medium-sized city in Poland. The mean age for women was 65.2 ± 7.6 , for men 65.8 ± 8.8 years. A general questionnaire was administered to the participants asking about demographic data, life satisfaction, and overall health. The majority of the participants completed secondary or higher education. In the group of women, 48% completed higher education while 45% finished secondary education. In the group of men, these values were 64% and 29%, respectively. About 7% of the men and 7% of the women only completed primary education or vocational training. In terms of marital status, 51% of the women and 91% of the men were married.

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The majority of the sample (92% women, 87% men) declared being in good or rather good health. Those representing the extreme ends of the scale, being in bad and very good health, were 4% and 4% in women and 5% and 8% in men, respectively. Despite the overall high self-reported scores for health, the majority (80%) of the participants declared they had been diagnosed with cardiovascular disease (hypertension, high cholesterol, atherosclerosis) and bone and joint disorders (osteoporosis, osteoarthritis). The vast majority reported that they did not smoke cigarettes or consume alcohol. In the group of women, 88% were non-smokers and 84% abstained from alcohol, in men, 81% of the respondents declared they did not smoke nor consume alcohol.

Physical fitness levels were assessed by the Senior Fitness Test, a battery of tests specifically designed for the elderly [13]. This battery is based on the arm curl, chair stand, 6-minute walk, back scratch, chair sit-and-reach, and the 8-foot up-and-go tests. In addition, grip strength of the dominant hand was also measured. Quality of life was scored using the WHOQOL BREF self-assessment questionnaire, an abbreviated generic quality of life scale developed by the World Health Organization [14–16]. It analyzes four life dimensions: physical health (activities of daily living, dependence on medicinal substances and medical aids, energy and fatigue, mobility, pain and discomfort, rest and sleep, work capacity), psychological (bodily image and appearance, negative

and positive feelings, self-esteem, spirituality, religion, faith, thinking, learning, memory, concentration), social relationships (personal relationships, social support), and the environment (financial resources, freedom, physical and psychological security, health care, home environment, opportunities for acquiring new information and skills, participation in and opportunities for recreation and leisure, physical environment). Additionally, information was also collected on satisfaction with overall life and health.

The results were statistically analyzed, calculating basic descriptive statistics such as arithmetic means (\bar{x}) and standard deviations (*SD*). Stepwise regression analysis was also performed, with the dimensions of quality of life and the assessment on overall quality of life and health treated as the dependent variables while selected results on the physical fitness tests were treated as the independent variables. Tables 2 and 3 present the selected independent variables most strongly correlated with the dependent variables. All calculations were performed using Statistica v. 9.0 software (Statsoft, Poland).

Results

Table 1 presents the statistical characteristics of the physical fitness tests for the male and female participants. Stepwise regression analysis revealed a larger difference in terms of gender for the number of quality of life di-

Table 1. Statistical characteristics of the physical fitness results

Sex	Physical fitness tests							
	Hand grip (kg)	Arm curl (n)	Chair stand (n)	6-minute walk (m)	Back scratch (cm)	Chair sit-&-reach (cm)	8-foot up-and-go (s)	
Men	\bar{x}	45.42	19.81	26.35	636.33	4.63	-7.04	4.92
	<i>SD</i>	10.37	5.66	7.40	126.32	9.31	9.88	1.37
Women	\bar{x}	26.84	16.80	20.43	542.73	6.31	-1.06	5.46
	<i>SD</i>	5.47	4.20	5.266	90.17	8.83	8.19	1.12

Table 2. Stepwise regression results for the physical fitness tests that significantly correlated with the quality of life domains and the overall assessment of quality of life and health in men (only significant results presented)

Factor	Life domain				Quality of life	Health
	Physical	Psychological	Social relationships	Environment		
Hand grip	ns	ns	ns	ns	ns	ns
Arm curl	ns	ns	ns	ns	ns	ns
Chair stand	ns	ns	ns	ns	ns	ns
6-minute walk	0.359	ns	ns	ns	ns	0.431
Back scratch	ns	ns	ns	ns	0.341	ns
Chair sit-&-reach	ns	ns	ns	ns	ns	ns
8-foot up-and-go	ns	ns	ns	ns	ns	ns
R ²	0.108	–	–	–	0.095	0.166
F	6.072	–	–	–	5.408	9.365
P	0.018	ns	ns	ns	0.025	0.004

ns – non-significant

mensions that were associated with the results on the physical fitness tests (Tab. 2, 3). In the group of men, the only statistically significant relationship found was between aerobic endurance (6-minute walk) and the “physical” quality of life dimension. The opposite was found in women, where only one of the life dimensions – social relationships – did not show any correlation with the fitness test results. All three of the remaining quality of life dimensions – physical, psychological, and environmental – were better assessed by women who registered greater upper limb strength (arm curl test) and lower (chair sit-and-reach test) or upper body (back scratch test) flexibility.

Differences between the men and women were also observed in their overall assessment of quality of life and health. For women, their self-assessment on overall quality of life was significantly related to upper limb strength (arm curl test); for men, this was upper body flexibility (back scratch test). For the women’s self-assessment of health, the most important factors were upper limb strength (arm curl test) and upper body flexibility (back scratch test); for men, aerobic endurance (6-minute walk) had the most significant impact. Both assessments were more strongly associated with the selected measures of physical fitness in men than in women.

Discussion

The components selected in the present study to measure physical fitness are indicative of various human motor skills. It can be assumed that their role in determining self-assessed quality of life can be varied. Grzegorzczuk et al. [11] also attempted to analyze the relationship between quality of life and physical fitness in the elderly based on a questionnaire (the Nottingham Health Profile). They claimed that among the measured variables, the greatest impact on the quality of life of the respondents was physical fitness. They reported that,

in a group of senior citizens living in nursing homes, the correlation between physical fitness and quality of life was $r = 0.75$, whereas in a group of seniors attending the University of the Third Age, the correlation coefficient was even higher, at $r = 0.90$. These high correlations indicate the important role of physical fitness in self-assessed quality of life. Such a relationship between physical fitness and quality of life in the elderly has also been reported by Wojszel and Bień [17].

However, besides generally confirming that such a relationship exists, what would be more interesting is examining which aspects of physical fitness (motor performance) have the greatest impact on quality of life, but not just quality of life treated as a whole but in terms of the specific dimensions of this rather widely understood concept. For this purpose, a subjective assessment of physical fitness levels is insufficient. Instead, it is necessary to examine its various manifestations using accurate, reliable, objective, and standardized physical fitness tests. These include such instruments as the Senior Fitness Test (otherwise known as the Fullerton Functional Fitness Test) designed specifically for elderly persons. It is intended to assess those elements of physical fitness that are the most essential in performing activities of daily living both independently and safely as well as those that motivate the elderly to improve their efficiency [18]. Therefore, such tests can indirectly aid in both assessing and improving quality of life in the elderly. According to Paffenbarger et al. [19], the results of such tests investigating various aspects of quality of life may also point to their long-term effects.

The present study sought to estimate the mutual relationships between selected measures of physical fitness and various aspects of quality of life in a middle-aged and elderly sample. Based on the obtained results, it was found that higher levels of physical fitness better contributed to a higher assessment of quality of life and health in men than in women. Such sex-based differences

Table 3. Stepwise regression results for the physical fitness tests that significantly correlated with the quality of life domains and the overall assessment of quality of life and health in women (only significant results presented)

Factor	Life domain			Physical	Quality of life	Health
	Physical	Psychological	Social relationships			
Hand grip	ns	ns	ns	ns	ns	ns
Arm curl	0.600	0.433	ns	0.467	0.020	0.031
Chair stand	ns	ns	ns	ns	ns	ns
6-minute walk	ns	ns	ns	ns	ns	ns
Back scratch	ns	0.350	ns	0.284	ns	0.019
Chair sit-&-reach	0.194	ns	ns	ns	ns	ns
8-foot up-and-go	ns	ns	ns	ns	ns	ns
R ²	0.145	0.089	–	0.046	0.022	0.068
F	19.191	11.501	–	6.183	5.744	8.887
P	0.000	0.000	ns	0.003	0.017	0.000

ns – non-significant

were also demonstrated by Król-Zielińska et al. [20], finding that older-aged men are more susceptible to environmental factors than women. At the same time, more detailed analysis showed that this difference only applied to the “physical” quality of life dimension, which consisted of, among others, work capacity and performing activities of daily living. In women, both self-assessed health and quality of life as well as the physical, psychological, and environmental quality of life domains were associated with physical fitness. Although these results were not very strong, they were connected to many different aspects in the functioning of women in everyday life. Other studies have indicated a decrease in sex-based differences in the elderly in terms of their energy expenditure, itself connected with the amount of physical activity performed everyday [20].

Such difference between sexes also was found among the selected physical fitness criteria correlating with different quality of life domains and the self-assessment of overall quality of life and health. In men, these were aerobic capacity and upper body flexibility; in women, these were upper limb strength and overall flexibility. A study performed on a similar sample also in a medium-sized city in Poland (although using a different quality-of-life questionnaire) by Osipiński et al. [21] indicated a small albeit statistically significant relationship between selected elements of quality of life with the levels of aerobic endurance and upper limb flexibility. At the opposite end of the spectrum, those participants who assessed their quality of life as low were found to more frequently report mobility limitations or feeling fatigued. Low cardiorespiratory efficiency and capacity are connected with the occurrence of cardiovascular disease, which is currently one of the most common ailments affecting the elderly population and a factor worsening quality of life [22]. This relationship between cardiorespiratory efficiency and quality of life was also reported by Fleg et al. [23]. Therefore, improving this parameter should be a priority, especially in view of the fact that 82.1% of elderly Polish seniors in the region where this study was performed declared cardiorespiratory problems, which in turn undoubtedly has a negative effect on their quality of life as well life expectancy [24].

Conclusions

After the fifth decade of life, physical fitness plays a greater role in improving the self-assessment of quality of life in women than men.

Furthermore, the self-assessment of health is associated with different components of physical fitness. In women, this was found to be primarily connected to upper limb strength; in men, this was aerobic endurance.

As a result, physical activity among the middle-aged and elderly should focus first on improving cardiorespiratory capacity and then strength and flexibility.

Acknowledgments

This study was supported by the Ministry of Science and Higher Education (grant No. 04 07 53 37).

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Paper received by the Editor: October 18, 2011

Paper accepted for publication: July 11, 2013

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