

Physical performance, body composition, and quality of life in elderly women from clubs for the retired and living in twilight homes

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Summary

Study aim: To explore how elderly people with different living conditions are characterized by their fitness, body composition, and quality of life.

Material and methods: Women aged 60 years and over ($n = 60$; age = 76.2 ± 7.6 years) were examined in cross-sectional study from a medium-sized city in western Hungary. Participants were chosen from a twilight home ($n=27$, age = 79.4 ± 7.7 years) and clubs for retired people ($n = 33$, age = 73.7 ± 6.6 years). Physical fitness status was assessed by Fullerton Functional Fitness Test – Senior Fitness Test (FFFT); body composition (BC) with Inbody-720 bioelectrical impedance spectroscopy; and quality of life with WHOQOL-OLD questionnaire. Data were analysed with the use of t-test for independent samples and stepwise discriminant analysis.

Results: FFFT shows significant differences in each variable: lower and upper body strength, aerobic endurance, upper and lower body flexibility, and dynamic balance. These variables were significantly higher in the clubs for retired people. The BC of twilight home residents was significantly lower in height and fat-free mass. Regarding quality of life, there were significant differences in perception, autonomy, and sociability for the favour of elderly in clubs; however, there were no differences in activities of past, present and future, or differences in attitudes towards death or intimacy.

Conclusions: A sedentary and institutionalized lifestyle with little variety in daily activity and programming has a negative effect on physical fitness status, body composition, and quality of life. Self-motivation, active lifestyle, and regular and varied programs seem to have leading roles in the quality of life in elder population.

Key words: Physical fitness - Body composition - Quality of life - Elder population

Introduction

The demographic landscape of the world is rapidly changing, with older adults representing the fastest growing segment of the populations in many areas in the world [6]. It is well-known that advancing age is associated with predictable sensory, motor and cognitive changes, many of which potentially impact an older person's ability to function effectively in society [12]. At an advanced age, structural and functional deterioration occurs in most physiological systems, even in the absence of discernible disease. These age-related physiological changes affect a broad range of tissues, organ systems and functions, and can cumulatively impact successes and activities of daily living (ADL) [8].

Several research studies have investigated the difference in body composition, physical activity level, and quality of life between different age groups. There is strong evidence that we can improve our muscle strength, endurance and quality of life (QOL), and can reduce the risk

of falls by regular physical training programme. Yet the quantity, quality, and type of exercises most effective have not been accurately established [1,3,10,11,17,18].

Malnutrition and weight loss are often observed in institutionalised elderly persons. Consequences of weight loss, which can vary from 4.0% to 6.5%, include an increased risk of infections, number of falls, and length of hospitalization. Knoop *et al.* [9] explained that dependency and decreased appetite were significantly associated with body weight loss, whereas body mass index (BMI) and intake of fat were significant predictors of weight gain. Some of most frequently reported predictors for institutionalization are increased age, lower cognitive function, dementia, lower ADL, physical functioning, female gender, not being married, or living alone [2]. The combined effect of mobility and cognitive capacity as a risk factor of institutionalization among initially community-dwelling people aged 75-80 years prove that the risk for dependency is 4.9 times greater for those who had some mobility limitation or cognitive deficit than for those with no limitation.

In one study, body composition of people aged 65-99 years with functional and cognitive impairment was examined in residential care facilities and proved that sarcopenia may lead to significant problems in daily life [4]. A large percentage (62%) of the participants had BMI above 23 kg/m², which is the lower limit suggested for people over 65 years. Also, women had lower fat-free mass (FFM) and higher fat mass (F%), inversely related to age, than men.

Physical activity has been consistently associated with quality of life in older adults [20]. Increased physical activity (PA) protects against functional decline, health disease, diabetes, bone fracture and falling, and also improves sleep and quality of life for older adults [13].

Very few studies have been conducted amongst the Hungarian elderly sample that focus on quality of life, physical fitness, and body composition altogether. Also, in this matter it is a relatively new area to compare and contrast elderly women in one institution that provides different types of services and programs. The system in this integrated institution is fairly unique because of the large extent of different services provided for elderly at different venues and settings. Old people living in twilight homes maintained by both state and local (city) municipal seem to have very few opportunities for program due to lack of financial support, appropriate equipment and facilities, and also a lack of trained professionals. Clubs for the elderly have similar difficulties but they generally manage to organize cultural and social programs 2 times a week on a low budget. Hence, the aim of the study was to describe how living conditions influence fitness, body composition, and quality of life of inactive elderly from twilight home and clubs for the retired.

Material and Methods

Subjects: women over 60 years ($n = 60$; age = 76.2 ± 7.6 years) were examined in our cross sectional study from the United Health and Social Care Institute in a medium-sized city in western Hungary. Sedentary participants were chosen from twilight home ($n = 27$, age = 79.4 ± 7.7 years) and from a club for the retired people ($n = 33$, age = 73.7 ± 6.6 years). All participants were assessed by medical staff for eligibility and all those not having an appropriate physical, health, and mental status were released from the study. All subjects supplied their written consents to participate; the study was approved by the local Committee of Ethics.

Methodology: physical fitness status was assessed by Fullerton Functional Fitness Test - Senior Fitness Test. This instrument was developed and validated by a research group at the Lifespan Wellness Clinic at California State

University, Fullerton for measuring functional fitness [14]. The test includes:

- Chair Stand Test – to assess lower body strength: stand up and sit down from a chair for 30 seconds (No.).
- Arm Curl Test – to assess upper body strength: curl and elongate of the arm with 2 kg dumbbell in the hand for 30 seconds (No.).
- Walk Test – to assess aerobic endurance: determine the walking distance through 6 minute (m).
- Back Scratch Test – to assess upper body (shoulder) flexibility: measure the distance between big toe and tip of middle digits (+, - cm).
- Chair Sit and Reach Test – to assess lower body (primarily hamstring) flexibility: measure the distance between middle digits (+, - cm).
- 8-Foot Up and Go Test – to assess physical mobility, involves power, speed, agility, and dynamic balance: set the time through stand up from a chair, come round a buoy and sit down (s).

Body composition: body height (cm), body weight (kg), body mass index (kg/m²), fat percent (%), visceral fat area (cm²), and fat free mass (kg) were assessed with Inbody-720 bioelectrical impedance spectroscopy.

Quality of life was examined with Hungarian version of WHOQOL-OLD questionnaire, a 24-item, 6-facet test about perception, autonomy, sociability, activities of past, present and future, attitudes towards death, and intimacy [19].

Data analysis: Data were processed by SPSS 17.0 for windows with descriptive statistics, independent samples *t*-test and stepwise discriminant analysis; the level of $\alpha = 0.05$ was considered significant.

Results

Mean values of fitness, body composition and quality of live variables recorded in elderly living in twilight home and members of a club are shown in Table 1. Each variable of FFFT proved better results for the participants in clubs. There were only two significant differences in body composition, i.e., institutionalized elderly had lower body height (by about 8 cm) and fat free mass (by about 5 kg) than those living at home and members of the club. Regarding quality of life, there were remarkable differences in perception, autonomy and sociability, but not in activities of past, present and future attitudes towards death or intimacy.

The results of discriminant analyses are significant (eigenvalue = 3.24; canonical correlation = 0.874), which means, that the discriminant function explain the notable part of the total variance. The independent variables were

defined by grouping variable and Wilks' lambda was highly efficient ($\lambda = 0.236$; $\chi^2 = 80.16$; $df = 5$; $p < 0.001$), so the discriminant function was significant ($p < 0.001$). The 6-minute walk test (Function = 0.925) and the Body height (function = 0.740) seem to have the best discriminator value between old women live in twilight home or participant a retired people's club resulting by the discriminant analysis. Also, the chair stand test (function = -0.573), the arm curl test (Function = 0.440), and the sociability (function = 0.361) discriminate well between the two groups. The classification results of discriminant analysis in this model are really high, as 96.7% of original grouped cases were correctly classified and 93.3% of cross-validated grouped cases were correctly classified.

old women living at home and participating in a variety of cultural and social events have better lower and upper muscle strength, lower and upper flexibility, endurance, and dynamic balance than those living in a twilight home. A relationship can be seen between physical fitness status, social independence, and disability limitations in our cross-sectional study. According to our discriminant model the endurance, body height, the muscle strength of lower extremities seem to be the most discriminant factors between active and sedentary women. Based upon these results, it would be important to focus more on these factors in people living in twilight homes.

Changes in body fat and muscle mass are particularly obtained in old people with a multi-system reduction in

Table 1. Mean values (\pm SD) of fitness, body composition, and quality of live variables recorded in elderly living in twilight home and members of a club for retired people

| Variable | Twilight home (n = 27) | Club (n = 33) |
|------------------------------------|---------------------------|----------------------|
| Chair Stand Test (n) | 8.6 \pm 3.8 | 11.1 \pm 4.1* |
| Arm Curl Test (n) | 12.1 \pm 3.9 | 16.9 \pm 3.2*** |
| Walk Test (m) | 196.7 \pm 81.1 | 393.6 \pm 102.1*** |
| Chair Sit and Reach Test (cm) | -3.5 \pm 10.0 | 0.3 \pm 0.9* |
| Back Scratch Test (cm) | 1.3 \pm 20.5 | 10.1 \pm 10.5** |
| 8 Foot Up and Go Test (sec) | 13.5 \pm 6.1 | 7.6 \pm 2.1*** |
| Body height (cm) | 149.4 \pm 4.1 | 157.8 \pm 6.5*** |
| Body weight (kg) | 66.9 \pm 14.8 | 70.9 \pm 7.8 |
| BMI (kg/m ²) | 29.3 \pm 7.0 | 28.3 \pm 3.4 |
| Fat% (%) | 42.5 \pm 7.0 | 44.0 \pm 4.6 |
| Visceral fat (cm ²) | 158.7 \pm 25.5 | 163.8 \pm 26.3 |
| Fat free mass (kg) | 37.4 \pm 4.3 | 42.49 \pm 8.4** |
| Perception (Likert scale) | 2.7 \pm 0.8 | 2.31 \pm 0.4* |
| Autonomy (Likert scale) | 3.4 \pm 0.4 | 3.74 \pm 0.7* |
| Past-Present-Future (Likert scale) | 3.4 \pm 0.7 | 3.7 \pm 0.7 |
| Sociability (Likert scale) | 3.3 \pm 0.8 | 3.9 \pm 0.1** |
| Death (Likert scale) | 2.3 \pm 0.9 | 2.2 \pm 1.0 |
| Intimacy (Likert scale) | 2.2 \pm 0.8 | 2.4 \pm 0.9 |

Significantly different from the twilight home group: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Discussion

Immobility is one of the most significant causes of hospitalization; it reduces motor function and social independence, increases the risk of outpatient care, nursing home admission, and death [16]. The subsequent decline in strength reduces the capacity to carry out basic activities of daily life and also puts people at risk for falls, impaired mobility, and dependence. It is no surprise that older populations tend to be less physically active than young adults [7,8]. The results of our FFFT test show that

reserve capacity. A small decrease in fat free mass may lead to significant problems in daily life [4,5,9]. There can be seen significant differences in body height and fat free mass between the two groups. These results of these variables were lower in the institutionalised elderly participants probably due to the too few organized programs, opportunities for enjoyment and fun, and obviously to the sedentary lifestyle. This conclusion is proved by strong correlation coefficients between body mass index, body height, fat percent, and visceral fat mass.

Physical activity has been consistently associated with enhanced quality of life (QOL) in older adults [20]. The role of self-efficacy in relationship between QOL and physical activity depended on health and social status. The self-perception and attitudes toward death were higher in women who live in twilight home, but autonomy and sociability were better in community dwelling ones in our sample. These results could be explained by age, social status and partnership-friendship, as people in twilight home are usually older and functionally impaired than who live active life in the club to some extent. Women in residential care facilities fear death and pain; they are bare to their sensory organs – vision, audition, vent, or sense of feeling – in their activity of daily living. Due to these conditions it is a lot more difficult to maintain regular communication, participation in programs, and keep a positive attitude.

Although no amount of physical activity can stop the biological aging process, there is evidence that regular exercises can minimize the physiological effects of an otherwise sedentary lifestyle and increase active life expectancy by limiting the development and progression of chronic disease and disabling conditions. Self-efficacy and sociability play an important role as both an outcome of physical activity and QOL indicators. Perceptions of capabilities are modifiable by information from physical activity and interventions.

Although the test is designed for everybody, there are however certain limitations for the use of it. It might not be used in its complete form in patients with severe damage to the locomotor system, severe balance disturbances, severe coronary artery disease and physical effort associated life-threatening heart dysrhythmias, or with unstable arterial blood pressure [15]. However, we can conclude that sedentary and institutionalized lifestyle has a negative effect on physical fitness status, body composition, and quality of life. However, sociability and self-motivation has a leading role in quality of life in elder population. According to our model it is worth putting a lot more emphasis into continuous cultural, social and most importantly into physical activity programs for elderly.

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