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FUNCTIONAL FITNESS ASSESSMENT AMONG ELDERLY WOMEN (60+) PARTICIPATING IN YOGA OR SWIMMING EXERCISES

INTRODUCTION

The number of elderly people worldwide is increasing faster than ever before. Most of this increase is occurring in developing countries.

Ageing is associated with a deterioration of various physiological capacities, such as muscle strength, aerobic capacity, neuro-motor coordination, and flexibility. These age-related declines result in a host of negative outcomes, including functional limitations and, therefore, loss of independence and increase in disability rate [7, 8].

Despite the well-documented benefits of exercise, the percentage of inactive adults is still high. This is particularly disturbing when talking about elderly, because regular exercise has been shown to provide a myriad of benefits in older adults and to play an important role in enhancing quality of life and maintaining long-term independence [2, 6].

Improvements in cardiovascular, metabolic, endocrine, and psychological health have been also well documented. Regular physical activity has been shown to decrease mortality and age-related morbidity in older adults. It also reduces the risk of cardiovascular system diseases, diabetes, obesity, selected kinds of cancer and musculoskeletal system dysfunctions. What is more, physical activity and structured exercises are connected with increased longevity among the elderly. A subgroup analysis of the Harvard Alumni study found that modest increases in life expectancy were possible even in those patients who did not begin regular exercise until the age of 75 [4].

The aim of this study was to assess the functional fitness, body mass and percentage body fat among active elderly women.

METHODS

A total of 20 women aged 60-74 years (mean age of 63.5 years) were subjected to this study. Two groups were distinguished. The first group consisted of 9 women regularly participating in swimming exercises (45 minutes, twice a week). The second group included 11 women participating in yoga exercises (60 minutes, twice a week).

Body height was measured to the nearest 0.5 cm with the subject in standing position wearing no shoes. Body weight and percentage body fat were measured with a body composition monitor (Tanita BF-666) using bioelectrical impedance analysis. Body Mass Index (BMI) was calculated as body weight in kilograms divided by the squared height in meters. Waist to Hip Ratio (WHR), which informs about body fat distribution, was calculated using circumferences of waist and hips.

Physical fitness was assessed using Senior Fitness Test [5]. It measures the underlying physical parameters associated with functional ability, and identifies whether an older adult may be at risk of loss of functional ability. Each of the six test items has accompanying performance standards for men and women aged 60 to 94. Participants scoring above the normal range would be considered *above average* for their age, while those scoring below the range would be *below average*.

The test included the following items: 1) 30-second Chair Stand assessing lower body strength; 2) Arm Curl evaluating upper body strength; 3) 6-minute Walk assessing aerobic endurance; 4) Chair Sit-and-Reach evaluating lower body flexibility; 5) Back Scratch performed in order to assess upper body (shoulder) flexibility; 6) 8-foot Up and Go evaluating agility/dynamic balance.

RESULTS

BMI

We found normal body weight in the majority of subjects from both groups.

In the first (I) group BMI values between 20-24.99 kg/m² in 6 out of 9 women was found, which makes 66.6 percent. The three remaining cases represented BMI over 25 kg/m², which stands for overweight. In the second study group normal weight was stated in 7 of 11 cases (63%), and overweight only in one woman (9%). 3 women were underweight, which represents 27.3% of this group. In both groups no obesity cases were found (BMI did not exceed 30 kg/m²).

WHR

In the first group, i.e. women participating in swimming exercises, no cases of central obesity were found (WHR did not exceed 0.85). In the second study

group, however, a WHR indicating central obesity was found in one case.

Percentage body fat

Standard values defined by the WHO for the studied sex and age group are estimated for 24-36%. As much as 81.9% of women from group II and 66.7% from group I appeared to be within those limits. None of the women in the yoga group exceeded the standard values for body fat percentage and in two cases (18.1 percent) we found fat content to be lower than the WHO standard values. Excessive percentage body fat was found in one third (33.3 percent) of the group participating in swimming exercises. Table 1 illustrates selected values of the abovementioned parameters.

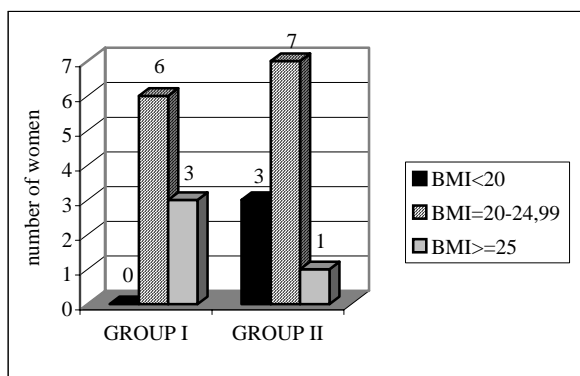


Figure 1. Number of cases depending on BMI value in both study groups

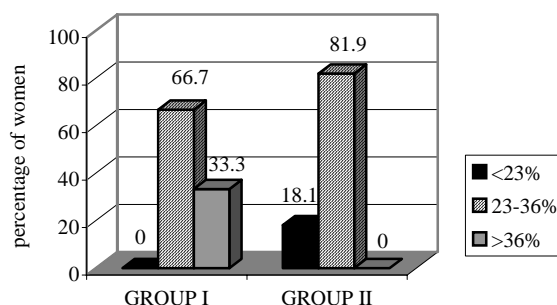


Figure 2. Percentage of women representing normal and abnormal fat tissue content depending on group

Table 1. Selected values of BMI, WHR and body fat content in both groups

	BMI (kg/m ²)			WHR			Body fat (%)		
	Mean	Min.	Max	Mean	Min.	Max	Mean	Min.	Max
GROUP I	24.6	22.3	28.8	0.84	0.77	0.93	35.0	26.2	41.3
GROUP II	21.7	18.6	25.3	0.79	0.75	0.87	26.8	19.8	34.7

Table 2. Mean values obtained in Senior Fitness Test depending on study groups

	30-Sec Chair Stand (no)	Arm Curl (no)	6-Min Walk (m)	Chair Sit and Reach (cm)	Back Scratch (cm)	Up and Go (sec)
GROUP I	13.1	14.2	639.4	0	6.2	5.17
GROUP II	19.4**	17.3*	620.7	0	0.0*	5.28

* p<0.05; ** p<0.005

Functional fitness assessment

The analysis of results obtained in the Senior Fitness Test indicates a high level of functional fitness in both groups. Functional disability was found in no cases. In comparison to group II the women participating in swimming exercises obtained better results in the 6-minute Walk Test. The difference, though, was not statistically significant.

The second study group obtained better results in the 30-second Chair Stand and Arm Curl Test. Furthermore, the women attending yoga exercises obtained better results in tests evaluating upper body flexibility (Scratch test). The above results were statistically significant (Table 2).

DISCUSSION

Regular physical activity maintains muscle strength and range of motion, improves mobility, flexibility and functional ability. Our study confirms the beneficial effect of regular exercise on maintaining body flexibility.

Being active helps in the control of weight and has a beneficial effect on body composition by reducing the percentage of body fat. Thereby, it also reduces the risk of obesity-induced diseases [3]. This study also indicates a profitable effect of regular physical activity on body mass regulation. In the present research group not even one case of obesity was found, and overweight was presented in 20 percent.

Numerous investigations have demonstrated that VO_{2max} declines with age at a rate of approximately 1% per year [1]. Good results obtained in the 6-minute Walk Test by women participating in our study (especially in the group practicing swimming exercises) confirms that physical activity has a beneficial effect on aerobic capacity.

Physical training is important in delaying the crossing of the threshold to physical dependence. Research has proven that up to 50% of the 'frailty' or losses commonly associated with ageing are due to disuse rather than the actual ageing process. Participation in physical activity is the single most important remedy against disuse. It provides the individual with the power to positively influence their own health and functional abilities as they age.

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