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Functional fitness level of older women from the Małopolska Region

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Abstract

Introduction. *Functional fitness meaning the physiological ability to safely and independently perform activities of daily living is essential for living during the aging process.* **Aim.** *The aim of study was to assess the functional fitness of older women using the Senior Fitness Test (SFT) and to analyse the relationship between the BMI and functional fitness of the subjects.* **Material and methods.** *Study participants comprised 280 elderly women from the Małopolska region aged 60 to 74 years. The SFT was used to assess women's functional fitness.* **Results.** *In the older women under study, the majority of the results obtained for the individual SFT tests were within the American norms, expect for the 8-Foot Timed Up-and-Go test. The analysis revealed a statistically significant correlation between BMI and the tests included in the SFT. The correlation between age and the individual SFT tests did not reveal statistically significant results.* **Conclusions.** *The majority of the SFT results fell within the norm, indicating a healthy level of functional fitness among senior women from the Małopolska region. This study was registered ACTRN12625000592448. (Gerontol Pol 2026; 34; 81-88) doi: 10.53139/GP.20263415*

Keywords: *Senior Fitness Test, Body Mass Index, elderly people*

Introduction

Functional fitness–meaning the physiological ability to safely and independently perform activities of daily living without excessive fatigue–is of great significance for older adults [1]. Unfortunately, the physical fitness of seniors declines with age [2,3], which is associated with an increased risk of disease, disability and mortality [1].

Lifestyle plays a key role in maintaining health and a good quality of life. Physical activity and nutrition are important and should be prioritised. In many studies, it is demonstrated that physical inactivity–in addition to lifestyle diseases–leads to decreased physiological aging parameters, reduced daily mobility and reduced functional capacity [4,5]. Maintaining a high level of physical fitness is essential for independent living during the aging process [6]. Muscle strength, aerobic endurance, flexibility and balance are essential for the performance of many daily activities, such as running errands, carrying groceries, preparing meals, getting dressed and cleaning. Furthermore, physical fitness is positively correlated with health-related quality of life and well-being [7,8].

In recent decades, there has been a significant increase in the elderly population, accompanied by a parallel increase in the prevalence of obesity [9]. Approximately 15% of older men and 18% of older women worldwide are obese [10]. Obesity poses a significant public health challenge worldwide, particularly among seniors, who are highly susceptible to this condition. Obesity in this population is of specific importance due to the increased risk it creates for the overall health of older adults [9]. Weight gain among women is associated with low physical activity [11], which further impacts functional capacity [12].

Therefore, it is crucial to monitor biological aging processes among older adults living independently. This requires standardised research tools allowing for the assessment of functional fitness and relating them to daily activities [13]. Rikli and Jones [1,14] developed and refined the Senior Fitness Test (SFT), which meets safety requirements; it is simple and easy to administer, with its reliability and accuracy ranging from 0.79 to 0.97, and repeatability being between 0.80 and 0.97.

It is used to assess upper and lower body strength, aerobic endurance, lower and upper body flexibility, and dynamic balance, providing a comprehensive image of an older adult's physical fitness and not just its individual characteristics. It is multidimensional and reflects the

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overall functional status of a senior and his/her quality of life [15].

Due to constantly deteriorating (or changing) environmental conditions and the trend towards an increasingly sedentary lifestyle, systematically monitoring of functional fitness among seniors is crucial. It is essential for developing optimal rehabilitation programmes tailored to the needs of seniors, aimed at improving independence, traffic safety and broadly understood quality of life [16].

Aim

The aim of the study was to assess the functional fitness of older women using the Senior Fitness Test and to analyse the relationship between the BMI and functional fitness of the subjects.

Material and methods

Study participants comprised 280 elderly women from the Małopolska region aged 60 to 74 years (table I). The examined women were divided into three groups according to age:

Group A – age 60 – 64 years (N = 93).
Group B – age 65 – 69 years (N = 111).
Group C – age 70 – 74 years (N = 76).

The inclusion criteria were:

- age between 60 and 71 years.
- consent for participation in the study.
- no contraindications to physical activity.
- no cognitive impairment (MMSE score above 27 points).
- sedentary lifestyle, i.e. lack of any physical activity aside from that associated with activities of daily living.

The exclusion criteria were:

- motor disability preventing independent activity.
- injuries to the musculoskeletal system up to 12 months prior to the beginning of the rehabilitation programme.
- neurological diseases causing balance disorders.
- poor mental state, e.g. depression.
- physical conditions preventing participation, e.g. severe respiratory or circulatory deficiency.

The study was performed in accordance with the ethical standards as laid down in the 1964 Declaration of Helsinki and its later amendments. The research project was approved by the Bioethics Committee as Study No. 8/KBL/OIL/2025 (11.03.2025). This study was registered in the Australian and New Zealand Clinical Trials Registry; registration number: ACTRN12625000592448 (registration date10/06/2025). Furthermore, all women who applied to participate in the study provided written informed consent for participation.

Measurement tools

Anthropometer – body height was measured using a Martin-type anthropometer (Seritex, New York, USA) to the nearest accuracy of 0.1 cm. The patient's height

Table I. Overview of participants

Variable	Group A				Group B				Group C			
	$\bar{x}$	Min	Max	SD	$\bar{x}$	Min	Max	SD	$\bar{x}$	Min	Max	SD
Age (years)	62.5	60.0	64.0	1.3	67.1	65.0	69.0	1.5	71.9	70.0	74.0	1.7
Comparison between groups	A vs. B = 0.00009* A vs. C = 0.00009* B vs. C = 0.00009*											
Body height (cm)	167.0	145.0	181.0	7.8	163.6	147.0	179.0	7.3	162.4	149.0	188.0	8.0
Comparison between groups	A vs. B = 0.71680 A vs. C = 0.19074 B vs. C = 0.28310											
Body mass (kg)	75.0	52.0	188.0	14.1	72.9	54.0	97.4	11.6	73.7	43.0	110.0	13.0
Comparison between groups	A vs. B = 0.26178 A vs. C = 0.54241 B vs. C = 0.68579											
BMI (kg/m2)	27.8	17.4	47.3	4.8	27.3	19.4	40.0	4.3	28.1	17.3	39.8	4.4
Comparison between groups	A vs. B = 0.41361 A vs. C = 0.65441 B vs. C = 0.19180											

*significantly different (p<0.05)

was measured from the top of the head (vertex) in the horizontal plane to the plantar plane of the feet (basis).

Tanita scale – body mass was determined using the Tanita scale (Tanita Corporation, Tokyo, Japan) to the nearest 0.1 kg.

Mini Mental State Examination (MMSE) – cognitive ability was determined using the MMSE, which is a 30-item screening tool used to assess cognition including orientation, attention, language and memory. A patient receives a 0 or 1 score for each question. The interpretation of the scale is as follows: scores of 30-27, normal; 26-24, cognitive impairment; 23-19, mild dementia; 18-11, moderate dementia; 10-0, severe dementia.

Senior Fitness Test (SFT) – a simple tool for evaluating the functional fitness of older adults. The SFT is focused on assessing five basic components of physical fitness: muscle strength (lower and upper body), aerobic endurance, flexibility, motor skills (speed, agility, balance), and body composition. Before testing began, the therapist slowly demonstrated the task to the women and then allowed them to complete two test repetitions. To assess the functional fitness of the women, the following tests were performed:

- **30-Second Chair Stand test –** used to assess lower body strength. The subject sat in the middle of a chair seat with her back straight, feet resting on the floor, and arms crossed over her chest (hands resting on her collarbones). At the "go" command, the subject rose from the chair until her knees and hips were fully extended, and then sat back down to assume the starting position. Scoring for this test was the number of complete repetitions of the "stand up/sit down" sequence completed within 30 seconds. The following normative values were adopted: 60-64 years – 12-17 repetitions; 65-69 years – 11-16 repetitions; 70-74 years – 10-15 repetitions [17].
- **30-Second Arm Curl test –** used to assess upper body strength. The subject sat on a chair, positioned towards the edge of the seat on the side of the dominant arm, with her feet resting on the floor. The subject held her arm pressed against her trunk (stabilising the position and preventing movement in the shoulder joint), her elbow straight, her wrist in the 0 position, and a dumbbell in her dominant hand, placed parallel to the patient's thigh (forearm in the 0 position). At the "start" command, the subject flexed her elbow while simultaneously supinating the forearm, and then returned to the starting position. The movement was performed through the full range of motion: full extension → full flexion → full extension. Scoring in this test was based on the number of full rotational movements of the forearm performed within 30 seconds. If the forearm was in mid-motion in the final second, it was counted as a full movement. The following normative values were adopted: 60-64 years – 13-19 repetitions; 65-69 years – 12-18 repetitions; 70-74 years – 12-17 repetitions [17].
- **2-Minute Step test –** used to assess aerobic capacity. The subject stood against a wall marked with a minimum knee lift height and, upon the "go" signal, began to walk (not run!) in place as quickly as possible. The subject had to raise her knees to the marked height. If the right or left knee did not reach this height, the subject had to repeat the movement, but the time was not stopped. Scoring in this test was based on the number of full steps taken within two minutes. The following normative values were adopted: 60-64 years – 75-107 steps; 65-69 years – 73-107 steps; 70-74 years – 68-101 steps [17].
- **Chair Sit-and-Reach test** – used to assess the flexibility of the lower body muscles (especially the hamstrings). The subject sat on a chair with the point where the thigh meets the buttock at the front edge of the chair. One leg was slightly abducted at the hip joint, flexed at the hip and knee joints, with the foot resting on the floor. The other leg was straightened along the body axis, with the heel of the foot resting on the floor (the foot was in dorsal flexion at approximately 90° – neutral position). The upper limbs were extended forwards, the elbows were straight, and the arms were placed one on top of the other (the palm of one hand resting on the back of the other). The subject slowly flexed the hip joints and tried to touch the toes with her fingers. If, during the task, the subject began to flex the knee joint of the tested (straight) leg, she was required to slowly return to a position in which the knee joint was straight. The maximum range of motion of reaching to the toes was maintained for two seconds, and only one limb was assessed. The distance between the tip of the middle finger and the toe of the shoe or the tip of the big toe, rounded to the nearest 0.5 cm, was scored. The following normative values were adopted: 60-64 years – from -1.3 to +12.7 cm; 65-69 years – from -1.3 to +11.4 cm; 70-74 years – from -2.5 to +10.2 cm [17].
- **Back Scratch test** – used to assess the flexibility of the upper body (arms). The subject stood upright and attempted to clasp her hands behind her back, reaching with one hand from above (over the shoulder) and the other from below. The hands were placed on the back so that the middle fingers were as close to each other as possible. The score for this test was the distance between the tips of the middle fingers, rounded to the nearest 0.5 cm. The normative values were: 60-

64 years – from -7.6 to +3.8 cm; 65-69 years – from -8.9 to +3.8 cm; 70-74 years – from -10.2 to +2.5 cm [17].

- **8-Foot Timed Up-and-Go test** – used to assess agility and dynamic balance. The subject sat in the middle of a chair, with her back straight, feet resting on the ground (one foot could be slightly moved forward and the trunk slightly bent), and her hands resting on her thighs. At the "go" command, the subject stood up and walked as quickly as possible towards the cone, circled it, returned to the chair, and sat down. Scoring in this test was based on the number of seconds needed to complete the task (the better time from two attempts). The following normative values were adopted: 60-64 years – 4.4-6.0 seconds; 65-69 years – 4.8-6.4 seconds; 70-74 years – 4.9-7.1 seconds [17].

Statistical methods

Statistical analysis of the collected data was carried out using the Statistica ver. 13 statistical package and a Microsoft Office Excel spreadsheet. Arithmetic means and standard deviations were used to describe quantitative variables. The Kruskal-Wallis ANOVA test was applied to compare the studied groups. To assess correlations between variables, Spearman's correlation coefficient was used due to the non-normality of the distributions regarding the analysed variables. In all of the performed tests, the assumed level of statistical significance was $p<0.05$.

Table II. SFT results

SFT	Group A				Group B				Group C			
	$\bar{x}$	Min	Max	SD	$\bar{x}$	Min	Max	SD	$\bar{x}$	Min	Max	SD
30-Second Chair Stand test (number of "stand up/sit down" sequences)	12.7	4.0	30.0	3.8	12.8	7.0	28.0	3.5	13.0	6.0	22.0	2.8
Below the norm	36.6%				25.2%				7.9%			
Comparison between groups	A vs. B = 0.81868 A vs. C = 0.48894 B vs. C = 0.61537											
30-Second Arm Curl test (number of repetitions)	15.6	6.0	39.0	7.9	15.5	10.0	26.0	3.4	15.3	0.0	27.0	3.9
Below the norm	22.6%				9.0%				13.2%			
Comparison between groups	A vs. B = 0.79102 A vs. C = 0.61800 B vs. C = 0.73639											
Chair Sit-and-Reach test (centimetres)	3.4	-26.0	37.0	7.9	3.3	-14.0	27.0	7.6	4.1	-13.0	34.0	7.9
Below the norm	3.2%				8.1%				2.6%			
Comparison between groups	A vs. B = 0.99477 A vs. C = 0.51976 B vs. C = 0.48706											
Back Scratch test (centimetres)	5.1	-25.0	35.0	9.8	4.4	-34.0	40.0	9.7	5.0	-17.0	89.0	13.6
Below the norm	6.5%				4.5%				5.3%			
Comparison between groups	A vs. B = 0.64526 A vs. C = 0.97789 B vs. C = 0.73305											
8-Foot Timed Up-and-Go test (seconds)	6.5	3.5	16.4	1.9	6.0	3.4	12.8	1.6	6.3	1.9	13.5	1.9
Below the norm	57.0%				37.8%				27.6%			
Comparison between groups	A vs. B = 0.03965* A vs. C = 0.42170 B vs. C = 0.42170											
2-Minute Step test (number of steps)	176.7	52.0	268.0	38.6	171.1	54.0	256.0	46.5	166.0	26.0	266.0	48.6
Below the norm	1.1%				5.4%				3.9%			
Comparison between groups	A vs. B = 0.35414 A vs. C = 0.11034 B vs. C = 0.47027											

*significantly different ($p<0.05$)

Results

In the older women under study, the majority of the results obtained for the individual SFT tests were within the American norms. The exception was the 8-Foot Timed Up-and-Go test, for which 57% of the women in Group A performed below the norm.

In the between-group comparisons, statistically significant differences occurred only between groups A and B in the 8-Foot Timed Up-and-Go test. In the remaining tests, no statistically significant differences were noted for the between-group comparisons (table II).

The analysis revealed a statistically significant correlation between BMI and the tests included in the SFT. The exception was the 30-Second Arm Curl test, for which no statistically significant correlations were found. However, the correlation between age and the individual SFT tests did not reveal statistically significant results (table III).

Discussion

The decline in functional ability that occurs with age is a growing problem that impacts the healthcare system and the treatment of a number of conditions [18]. The extent and pace of this phenomenon may vary between individuals, and lower levels of functional ability are associated with the risk of losing functional independence in daily life. Therefore, the motor skills of older adults must be monitored and assessed to implement appropriate programmes and procedures [19,20]. Our research permitted the assessment of functional ability among older women using the Senior Fitness Test and analysis regarding the relationship between BMI and functional ability of the participants. The majority of the obtained SFT results were within the normal range. The age of the participants did not influence the results of the individual tests. For between-group comparisons, statistically significant differences were found in only one of the applied tests: the 8-Foot Timed Up-and-Go test between groups A (60-64 years) and B (65-69 years). There was, however, a correlation between BMI values and the test results. The higher the BMI, the lower was the level of functional fitness among the evaluated senior women.

Zieliński [21] assessed the functional fitness level of 1,017 Polish women and observed that they performed below American standards in four tests, namely: 30-Second Chair Stand, Chair Sit-and-Reach, 2-Minute Step, and 8-Foot Timed Up-and-Go.

Król-Zielińska et al. [22] compared the results obtained by women and men from Poznań with the American standards and found that in the category of women aged 60-69 years, the results in the Arm Curl and the 2-Minute Step tests were similar to the results obtained by the American women, but were lower in the 8-Foot Timed Up-and-Go test, which may indicate lower levels of agility and dynamic balance.

The study by Ignasiak et al. [13] involved 5,367 participants, including 4,164 women aged 60 to 93. Basic anthropometric characteristics and physical fitness were measured using the Senior Fitness Test. The following results were obtained: mean values individual SFT tests significantly decrease with age. The greatest deficits were noted in dynamic balance, with a decline of 69% in men and 62% in women. A significantly higher rate of decline in aerobic capacity occurred in men (43%) compared in women (36.9%). A significantly lower rate of decline occurred in lower and upper body muscle strength, not exceeding 30%.

Table III. Correlations

Correlations		Correlation value	P
BMI vs.	30-Second Chair Stand test	-0.162	0.007*
	30-Second Arm Curl test	-0.061	0.309
	Chair Sit-and-Reach test	-0.203	0.001*
	Back Scratch test	0.127	0.034*
	8-Foot Timed Up-and-Go test	0.241	< 0.001*
	2-Minute Step test	-0.157	0.008*
Age vs.	30-Second Chair Stand test	0.053	0.379
	30-Second Arm Curl test	-0.041	0.493
	Chair Sit-and-Reach test	0.056	0.351
	Back Scratch test	-0.046	0.445
	8-Foot Timed Up-and-Go test	-0.078	0.195
	2-Minute Step test	-0.091	0.126

*significantly different (p<0.05)

In our research, the majority of the test results fell within the American norms. The lowest score was achieved by the elderly women in the 8-Foot Timed Up-and--Go test. More than half of the youngest women in the study achieved results below the norm. Performing this test requires an appropriate level of complex coordination, agility and dynamic balance, which are crucial in minimising the risk of falls–the greatest of threats to older adults.

In our research, no differences were found in the mean values of individual SFT tests between age groups.

Body mass index (BMI) is an anthropometric indicator of nutritional status, dependent on factors such as diet and physical activity levels. Older adults are more vulnerable to nutritional deficiencies than other population groups, including malnutrition and excess body mass (overweight and obesity), increasing health risks, comprising those related to the development of metabolic syndrome and reduced quality of life [23-26].

Gacek et al. [12] examined the relationship between BMI and functional fitness indices among 120 women aged 60-84. Normal-weight women scored higher in lower and upper body flexibility tests than obese women. Women with a normal BMI also scored higher in endurance tests than overweight women.

Due to the fact that physical fitness is a function of physical activity, the results suggest higher levels of physical activity carried out by women of normal weight compared to their obese peers. The importance of somatic and health indicators for the physical fitness level of seniors has been confirmed in the study [27].

The role of physical activity in human life has been emphasized in many research projects, indicating its significance in the prevention of various diseases, reducing the parameters of physiological aging and increasing the level of functional fitness among older individuals [19,28].

In the study by Nawrocka et al. [29], 61 women aged 60-75 were included, and their physical activity and functional fitness were assessed using the SFT. Women who met physical activity recommendations achieved significantly better results in the test trials. Adherence to physical activity guidelines was associated with better functional fitness among older women.

In the study by Pierre et al. [30], the authors examined 1,155 individuals aged between 55 and 74. One-third of the older adults surveyed did not meet the World Health Organization's (WHO) recommendations for physical activity levels, particularly among women. The results of this study indicate significant associations between health indicators, especially overweight and obesity, and physical activity levels and sedentary lifestyles in older adults. Individuals who meet WHO recommendations for physical activity and spend less than seven hours sitting are characterised by the best health indicators.

In our research, a relationship was demonstrated between BMI and functional fitness, indicating lower functional fitness among women with excess body mass compared to those with a normal BMI. Regarding the correlation between BMI and functional fitness tests, the described trends indicate significantly lower scores in overweight women and concern the following tests: 30-Second Chair Stand, Chair Sit-and-Reach, Back Scratch, 8-Foot Timed Up-and-Go and 2-Minute Step.

The present study has certain limitations. Only women participated in the study. Further research is warranted that would include older men, who have shorter lifespans than women but are characterised by higher levels of physical activity. The study participants comprised older women who lead a sedentary lifestyle. Future studies should encompass women who engage in regular physical activity, and their diet should also be taken into account. Therefore, further research is necessary to determine the level of physical activity in seniors and its impact on functional capacity.

Conclusions

The majority of the SFT results fell within the norm, indicating a healthy level of functional fitness among senior women from the Małopolska region. Significant correlations were found between the BMI and functional fitness of the older women under study - the higher the BMI, the lower the women's functional fitness.

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Conflict of interest
None

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