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(SK) Pohybová výkonnosť a telesné zloženie starších žien v závislosti od frekvencie ich pohybovej aktivity

(EN) Physical fitness levels and body composition of elderly women with varying frequencies of physical activity

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SÚHRN/ABSTRAKT (ABSTRAKT V SLOVENČINE NA 250 SLOV)

Východisko: Cieľom štúdie bolo posúdiť rozdiely v pohybovej výkonnosti a zložení tela medzi staršími ženami s rôznou frekvenciou pohybovej aktivity (PA).
Súbor: Prieskumné súbory tvorilo N=70 starších žien, rozdelených do dvoch skupín: skupina s vyššou frekvenciou (TJ – účastníčky oddielu TJ Slávia UPJŠ Košice, n=30, M=74 rokov, cvičiace 2×60 minút/týždeň) a skupina s nižšou frekvenciou (U3 – študentky Univerzity tretieho veku UPJŠ v Košiciach, n=40, M=70 rokov, cvičiace 1×90 minút/dva týždne).
Metódy: Zloženie tela bolo merané metódou bioelektrickej impedancie (BIA) pomocou prístroja InBody 230, so zameraním na telesný tuk (kg, %) a kostrové svaly (kg). Funkčná zdatnosť bola hodnotená štyrmi testami z batérie Senior Fitness Test (SFT) merajúcimi silu dolných a horných končatín, aeróbnu vytrvalosť a dynamickú rovnováhu. Doplnkové údaje o PA a kvalite života boli získané dotazníkom.
Výsledky: Z dotazníka sme zistili, že účastníčky nemajú diagnostikované závažné ochorenia, ktoré by im bránili v aktívnej účasti na PA a účasti na testovaní. Subjektívne hodnotenie kvality života bolo vyššie v skupine TJ v porovnaní so skupinou U3. Medzi skupinami boli identifikované signifikantné rozdiely vo vybraných položkách Senior Fitness Testu a to v prospech skupiny TJ v porovnaní so skupinou U3. Tieto rozdiely sa týkali úrovne sily dolných končatín, sily horných končatín a aeróbnej vytrvalosti.
Závery: Pre budúci výskum odporúčame urobiť merania na začiatku a na konci pohybového programu a overiť výsledky pre tieto cieľové skupiny. Budúce štúdie by mali zohľadniť aj vplyv stravovacích návykov na zloženie tela starších žien, aby bolo možné vytvoriť komplexnejšie odporúčania pre podporu zdravého starnutia.

SUMMARY/ABSTRACT (ENGLISH VERSION)

Starting point: The aim of this study was to examine differences in physical fitness levels and body composition between groups of elderly women with varying frequencies of physical activity. **Group:** The sample comprised 70 elderly women divided into two groups: (a) higher frequency (TJ group; n = 30; mean age = 74 years), who engaged in moderate-intensity exercise for 60 minutes twice per week; and (b) lower frequency (U3 group; n = 40; mean age = 70 years), who engaged in moderate-intensity exercise for 90 minutes once every two weeks.
Methods: Body composition was assessed using bioelectrical impedance analysis (BIA) with the InBody 230 device, yielding measures of body fat and skeletal muscle mass (kg). Physical fitness was evaluated using four tests from the Senior Fitness Test (SFT) battery, assessing upper and lower limb strength, aerobic capacity, and dynamic balance. Additional data on physical activity levels and quality of life were collected via questionnaire.
Results: Questionnaire responses indicated that participants had no major diseases that would prevent their participation. The TJ group reported higher subjective well-being than the U3 group. Correspondingly, the TJ group demonstrated significantly better performance in the SFT compared to the U3 group, particularly in upper and lower limb strength and aerobic capacity tests. These findings support the hypothesis that higher-frequency physical activity is associated with enhanced physical fitness in elderly women.

KEY WORDS

staršie ženy, frekvencia cvičenia, bioelektrická impedancia, Senior Fitness Test.

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Conclusions: Future studies should incorporate pre- and post-intervention assessments following structured fitness programs, alongside evaluations of nutritional habits, to establish comprehensive recommendations for healthy aging.

1 INTRODUCTION

The growing global epidemic of physical inactivity is accelerating the prevalence of non-communicable diseases in an aging population. Implementing developmental and biomedical perspectives can foster new insights into how and why lifelong physical activity (PA) helps maintain health, extend lifespan, and improve quality of life. PA directs energy towards compensatory processes, thereby slowing the aging process and reducing sensitivity to various forms of chronic diseases. A lack of lifelong PA in individuals may increase the risk of disease and minimise longevity[1].

Current research lacks studies focused on analysing body composition in older women. Sarcopenia, which is naturally associated with aging, combined with excessive body fat mass, leads to the development of sarcopenic obesity. The concept of the so-called "obesity paradox" originates from the fact that body mass index (BMI) may incorrectly classify individuals as overweight, because it does not account for the proportion of fat and lean body mass. Increasing age is associated with a redistribution of body fat, with greater accumulation in the trunk area and particularly in the abdominal region in women. Interventions aimed at improving body composition indicate that older women can increase lean mass and reduce fat stores through strength training, provided they have the necessary knowledge and skills in weight management. Healthy eating habits, characterized by low portions of ultra-processed foods, whose excessive consumption is associated with increased body fat and subsequently a higher risk of sarcopenic obesity related to aging, are also a crucial protective factor[2].

Healthy aging is the process of maintaining and strengthening personal independence, physical, and mental well-being. Adopting a positive attitude, such as engaging in regular PA from an early stage, can influence both the length and quality of life[3,4,5].

Functional fitness and an adequate level of motor skills are significant determinants of the quality of life in older adults[6]. Their maintenance or improvement is one of the key predictors not only of independence and self-sufficiency in daily activities but also of the occurrence of chronic diseases, the risk of falls, hospitalizations, and even mortality. In the context of an aging population, these factors become even more significant, since active and functionally fit older individuals have a higher chance of experiencing old age with greater physical and mental well-being.

Currently, the prevailing view is that aging is an irreversible process. However, we can influence many factors affecting this process, thereby supporting its slowdown. Appropriate PA can slow the rate of this process. It is well known that regular PA helps improve physical and mental health and can reverse some negative effects of chronic diseases, enabling older adults to remain mobile and independent. Despite the highly publicized benefits of PA, older adults do not meet the minimum PA requirements necessary to maintain health[7].

Functional capabilities represent a set of skills and abilities that allow individuals to live in a way they consider invaluable. This includes the ability to meet basic life needs, such as education, decision-making, mobility, forming and maintaining interpersonal relationships, and actively contributing to society[8].

The aging process leads to a gradual decline in functional skills, muscle strength, and bone mass[9]. Aerobic PA, incorporating strength elements, plays a key role in both primary and secondary prevention and in the treatment of cardiovascular diseases and their risk factors. Regular PA with higher frequency and moderate intensity positively affects body composition. It leads to a reduction in fat mass and an increase in muscle mass, enhancing functional fitness, which can positively influence components of metabolic syndrome[8,10,11,12].

With advancing age, there is a natural decline in functional capabilities, including muscle strength, flexibility, and coordination. Research shows that increased body weight is associated with lower physical performance, which may manifest as a reduced ability to manage daily activities. Maintaining an appropriate body weight and regular PA play a crucial role in supporting functional fitness and independence in old age[13,14,15,16,17].

An active lifestyle and movement in senior age is a key component to support overall health. Its significance lies not only in the physical domain but also in the emotional and social domains. Older people who are engaged in regular physical activity tend to be in a better mood, have a more positive life attitude, and participate in social life more often[18].

2 GROUP AND METHODS

The study comprised older women aged 60 years or older without major health limitations. The first group (n = 30) consisted of participants from the club at TJ Slávia UPJŠ Košice. The subjects regularly participated in group physical activity sessions twice a week for 60 minutes. Their average age was 74 years and they participated in a regular moderate-intensity physical activity (PA) program to 120-130 BPM music. The exercise program was comprehensive, including aerobic, strength, coordination, and flexibility exercises.

The second group also comprised older women—students at the University of the Third Age (n = 40) at UPJŠ in Košice—with a mean age of 70 years. They engaged in PA less frequently and were enrolled in the "Seniors in Motion" study program, which included planned and organized PA. The subjects participated in a 12-week exercise program for 90 minutes once in two weeks. In their daily lives, these participants performed physical activities irregularly. Both groups participated in moderate-intensity group exercises (with music background – 120-130 BPM) led by university assistants who specialized in senior physical education.

The exercise programs aimed to develop and maintain key functional skills (strength, endurance, balance, flexibility, and coordination) and were performed to music at 120–130 beats per minute (BPM). The study took place at the end of the summer semester in 2024, with single assessments of body composition and functional tests conducted in both groups.

Participants completed a questionnaire on health status and physical activity[19] to gather detailed information about the groups. This provided data on age, health, PA frequency and intensity over the past three months, and subjective quality of life. We included only relevant items for our research objectives in this study. Qualified instructors supervised the measurements. Both groups received detailed information about the procedures beforehand. Inclusion criteria were age > 60 years and written informed consent. The collected data allowed comparison of average body composition scores and functional skill levels between the two groups.

After subjects had completed the questionnaire, we measured height (cm) and body composition using bioelectrical impedance analysis (BIA) with the InBody 230 device, which evaluates 23 parameters. The examined somatic indicators included body mass (kg)—BM, body mass index (kg/m²)—BMI, body fat mass (kg)—BFM, body fat percentage (%)—BFP, and skeletal muscle mass —SMM.

The measurement accuracy depends heavily on standardized protocols to ensure BIA validity[20]. Despite challenges, BIA is still recommended for applied research. Studies show strong correlations for fat tissue proportion[21,22,23,24] and active body mass[25]. Thus, BIA is considered reliable for assessing body fat and muscle mass, especially in older women.

Several studies report a high degree of correlation between the fat tissue percentage[21,22,23,24] and the proportion of active body mass[25] in relation to overall body composition. Based on the conclusions of these authors, the bioelectrical impedance analysis (BIA) method can be considered a reliable tool for diagnosing body fat and active body mass, particularly in monitoring older women.

The Senior Fitness Test battery[26] was used for the measurements selecting four tests: Chair Stand Test (lower limb strength), Arm Curl Test (upper limb strength), 2-Minute Step Test (aerobic endurance), and 8-Foot Up-and-Go Test (dynamic balance).

Five participants from the U3 group withdrew from the measurements due to personal or health reasons, resulting in a final sample size of 35 for motor tests.

This work is part of the "Seniors in Motion" research at the Institute of Physical Education and Sport, UPJŠ, approved by the UPJŠ Ethics Committee in Košice (No. 1/2024).

2.1 DATA PROCESSING METHODS

Empirical data were analysed using basic statistical methods: arithmetic mean, median, and standard deviation. Normality was tested with the Shapiro-Wilk test. For normally distributed variables, unpaired t tests were used to compare the differences between the TJ and U3 groups. Pearson correlation coefficients were used to measure relationships between BMI and other somatic or motor indicators. Significance was set at $p < 0.05$. Analyses were performed with Tibco Statistica 14.1.0 and Excel 2019. The results were logically organised and analysed and presented in tables.

3 STARTING POINT, OBJECTIVE, TASKS

The aim of this study was to examine differences in physical fitness levels and body composition between groups of elderly women with varying frequencies of physical activity. To achieve this aim, we formulated the following scientific questions:

1. What is the health status and quality of life level in the two examined groups, TJ and U3?
2. What differences exist between the TJ and U3 groups in terms of body weight, body height, and body mass index (BMI)?
3. What is the relationship between body mass index (BMI) and body fat mass (BFM) expressed in kilograms, body fat percentage (BFP), and skeletal muscle mass (SMM) in the TJ and U3 groups?
4. Are there statistically significant differences in the level of physical fitness between the TJ and U3 groups in tests assessing lower and upper limb strength, aerobic endurance, and dynamic balance?
5. Is there a relationship between BMI and performance in tests evaluating lower and upper limb strength, endurance, and balance in both groups?
6. How do the average scores of older women from the TJ and U3 groups in tests of lower limb strength and dynamic balance compared to the reference norms for the 70–74 age category, according to Rikli and Jones[26], and the results of studies by Nemček et al.[6] and Nemček[27]?

4 RESULTS

The survey showed that the participants were not diagnosed with major health issues that would prevent them from actively participating in physical activity (PA) or testing. This fact is significant, as physical health is a key factor influencing the ability to regularly engage in PA, especially in older age[28,29]. In addition to organised group exercises, the respondents reported irregular walks and household chores in the questionnaire, which they regarded as supplementary exercise. We found that the subjective quality of life was scored higher in the TJ compared to U3.

The mean age of the older women in the TJ group was 4 years higher than in the U3 group, and their body weight was also slightly lower compared to U3 (Tab. 1). This is a positive indicator regarding a higher age category. Bahat et al.[30] point out that slightly higher body weight, not obesity, may be a sign of a better nutritional status and preserved muscle mass, which supports vitality and overall fitness. Conversely, low body weight may indicate a risk of malnutrition and health problems.

Tab 1. Comparison of selected somatic characteristics between the TJ and U3 groups

Variable	TJ (M ± SD)	U3 (M ± SD)	t value	p
Age	73.87 ± 5.24	70.20 ± 3,80	3.39	0.001 **
H (cm)	161.37 ± 6.13	164.04 ± 6,41	1.76	0.083
BM (kg)	63.24 ± 8.54	70.61 ± 11,74	2.91	0.005 **
BMI (kg/m²)	24.32 ± 3.33	26.28 ± 4,55	1.99	0.050

Note: M = mean, SD = standard deviation, * - significant at 0.05, ** - significant at 0.01, H - Height (cm), BM – Body mas (kg), BMI - Body mass index

In terms of body fat percentage (BFP), we find that the average BFP value of 32% in the TJ set with a higher exercise frequency is in the lower overweight range, and the average value of 36% in the U3 set with a low exercise frequency is close to the obesity threshold. The percentage difference in BFP values suggests that regular PA of the TJ group with higher exercise frequency might have a positive impact on maintaining healthier body composition in older age. Our study results support findings that a more active lifestyle can help to mitigate undesirable changes in body composition associated with aging, thereby reducing the risk of obesity and related health issues.

Correlations between BMI, fat mass in kilograms, percentage fat, and percentage skeletal muscle were statistically significant at the 0.05 level of statistical significance. However, in the TJ group, no significant correlation was observed with skeletal muscle mass (Tab. 2).

Tab 2. Correlation coefficients between BMI and selected body composition parameters in the TJ (N=30) and U3 (N=40) groups

Group	TJ		U3	
Variable	r	p	r	p
BFM (kg)	0.953	< 0.001 **	0.904	< 0.001 **
BFP (%)	0.878	< 0.001 **	0.682	< 0.001 **
SMM (kg)	0.125	n. s.	0.372	0.017 *

Note: r = r = Pearson correlation coefficient, p = significance level, * - significant at 0.05, ** - significant at 0.01, n.s. = not significant, BFM - Body Fat Mass (kg), BFP - Body Fat Percentage (%), SMM - Skeletal Muscle Mass - (kg).

Body mass composition measurements showed statistically significant differences in favour of the higher exercise frequency group in BFM (Body Fat Mass), body fat (kg), and percentage body fat BFP (Body Fat Percentage) of total Body mass. The U3 group scored lower in each aforementioned variable, which suggests that regular and frequent PA can favourably influence body composition parameters in older women. When comparing the proportion of fat tissue to total body mass, the TJ group exhibited the lowest percentage of body fat (BFP). This finding might indicate that regular participation in physical activities at least twice a week contributes to fat mass reduction (Tab. 3).

Tab 3. Results of t-tests for body composition parameters between TJ (N=30) and U3 (N=40) groups

Variable	M TJ	M U3	t-value	p	SD TJ	SD U3	F	p
BFM (kg)	20.83	26.17	2.8669	0.0055*	6.97	8.19	1.37	0.3790
BFP (%)	32.37	36.43	2.5489	0.0130*	6.69	6.55	1.04	0.8898
SMM (kg)	22.95	24.46	1.9145	0.0597	2.52	3.72	2.19	0.0313

Note: M- mean, SD = standard deviation, F- comparison of variance, t value – comparison of means, * - significant at 0.05, BFM - Body Fat Mass (kg), BFP - Body Fat Percentage (%), SMM - Skeletal Muscle Mass - (kg).

An interesting finding is that the measurements showed lower average SMM (Skeletal Muscle Mass) in the TJ group compared to U3 showed lower average SMM (Skeletal Muscle Mass). Both groups had the same exercise intensity. This result suggests that frequency alone may not be sufficient to increase SMM if adequate intensity is not met. We assume that to achieve a significant increase in SMM in the TJ group, a slight increase in intensity and training content would be necessary.

In body composition measurements, the U3 group comprised 40 older women, and in the SFT tests, five people withdrew from the measurements for personal and health reasons.

Tab 4. Comparison of functional skills test results between U3 (N=35) and TJ (N=30) groups

Test	M U3	M TJ	t-value	p	SD. U3	SD TJ	F	p
ChST (rep.)	15.09	17.83	3.1168	0.0028*	3.31	3.79	1.32	0.4403
ACT (rep.)	21.17	24.53	3.0699	0.0032*	4.91	3.72	1.74	0.1318
ST2min (rep.)	88.26	103.73	4.7205	0.0000*	15.34	10.06	2.33	0.0228*
FAGT (sec.)	5.81	6.08	1.0315	0.3063	1.16	0.86	1.83	0.1000

Note: M- mean, SD = standard deviation, F- comparison of variance, t value – comparison of means, * - significant at 0.05, rep. – repetitions, sec. – seconds, ChST - Chair Stand Test, ACT - Arm Curl Test, ST2min - 2-minute Step Test, FAGT - 8-Foot Up-and-Go Test

We recorded statistically significant differences between the groups in three functional skill tests. In the 2-minute step test, which measures the number of knee lifts during marching in place for 2 minutes, women in the TJ group achieved significantly better results. Further significant differences were found in the chair stand test and arm curl test. Conversely, average results in the dynamic balance test (8-Foot Up-And-Go) were slightly better in the U3 group with lower PA frequency, but these differences were not statistically significant. We observed that higher PA frequency in older women might be associated with better results in three tests compared to women with lower physical activity frequency. Test results which measured lower and upper body strength, as well as aerobic endurance, confirmed our assumptions about better fitness levels in seniors with higher PA frequency (Tab. 4).

Tab 5. Correlation coefficients between BMI and selected functional skill tests in the TJ (N = 30) and U3 (N = 35) groups

Variable	N	ChST	ACT	ST2min	FAGT
BMI (TJ)	30	-0.323	-0.134	-0.102	0.358
BMI (U3)	35	-0.084	0.081	0.043	0.101

Note: BMI - Body mass index [kg/m2], ChST - Chair Stand Test, ACT - Arm Curl Test, ST2min - 2-minute Step Test, FAGT - 8-Foot Up-and-Go Test

We analysed relationships between BMI and functional skill test results in both groups (Tab. 5). Despite efforts to identify relationships between BMI and physical performance, the correlation coefficients proved statistically insignificant in both groups. This suggests that in our groups, BMI does not influence the level of assessed functional skills. The results suggest that factors affecting functional skills may be more complex, and BMI scores may not be an indicator of physical fitness or functional performance.

Tab 6. Comparison of performance achieved by TJ and U3 groups (mean value - M) in two tests with existing norms for women aged 70 – 74 years

Test	Norms - Rikli, & Jones[26]	Nemček[27]	TJ	U3
Chair stand test (rep.)	10-15	16	18	15
8-foot up-and-go test (sec.)	7.1 – 5.2	5.5	6.1	5.8

Note: rep. – repetitions, sec. - seconds, ChST - Chair Stand, FAGT - 8-Foot Up-and-Go

Older women from the TJ group scored above average in repetitions in the chair-stand test, while the U3 group scored only average in this variable (Table 6). The 8-Foot Up-and-Go test evaluates the level of several functional skills, in particular dynamic balance, and shows that increasing age results in a decline in this skill. In Nemček[27], the youngest seniors (60 – 64) recorded an average score of 4.7 sec., while the oldest seniors (80-89) scored 9.5 sec. In our study, women from the TJ group had a result of 6.1 seconds in the dynamic balance test, while the U3 group had a slightly better average performance of 5.8 seconds (Tab. 6).

5 DISCUSSION

Advancing age is characterized by changes in body composition, resulting in the redistribution of body fat, particularly in the trunk and abdominal area. Recent studies classify overweight as 32% to 36% body fat, while 37% to 42% of body fat is defined as obesity. It is essential to note that the exact reference values may vary depending on measurement techniques, population samples, and different health conditions[2].

The research in the field of body composition´s reference values is alarming. Borrud et al.[31] reported an average of 42.4% of body fat in American women aged 60 to 79, which is classified as obesity. Similarly, Brown[2] reports an average of 39.1% of body fat in older women, which also indicates obesity. Our results indicate a significantly different pattern, depending on the PA frequency rather than age. Older women in the TJ group (mean age: 74) had, on average, 32% of body fat, whereas the U3 group (mean age: 70) had 36% of body fat. These scores are lower compared to the referential values in Brown[2] and Borrud et al.[31].

Brown[2] reported a mean skeletal muscle mass (SMM) of 22.5 ± 2.7 kg in women aged 75 years. Our findings indicate that the TJ group had a mean SMM of 23.0 ± 2.5 kg with a body fat percentage (BFP) of 32.37 ± 6.7%, whereas in the U3 group, values were 24.5 ± 3.7 kg and 36.4%, respectively.

Similarly, Gába et al.[32] examined women with a mean age of 72 years, reporting SMM of 23.85 ± 3.6 kg—comparable to our TJ group values and BFP of 38.76%, approximating the body fat levels observed in our U3 group. These data suggest an inverse relationship between age and SMM, where skeletal muscle mass declines with advancing age, consistent with evidence of age-related sarcopenia.

Research from other countries indicates that older Slovak women tend to score similarly to women from central and western Europe in body composition profiles. Advancing age is associated with a gradual rise in body fat percentage and a decline in skeletal muscle mass characteristic of sarcopenia. Studies from the Czech Republic, Germany, and the United States report that mean body fat percentage (BFP) among women aged ≥70 years ranges from 35–42%, accompanied by significant declines in skeletal muscle mass, particularly in the lower limbs, which is associated with reduced functional performance[32,33,34].

Regional lifestyle variations, dietary practices, and cultural factors can account for a number of the differences observed between these studies and other research. Older women in countries with a higher level of PA and a higher percentage of protein consumption and fibre tend to report better scores in skeletal muscle mass and body fat percentage. Data from the Slovak and Czech Republics indicate that women engaged in regular PA interventions report similar scores in body composition parameters as their peers abroad. These findings confirm the overall significance of PA for healthy aging[32,34,35].

We can state that, despite existing regional differences, the trend of the rising percentage of body fat and decline in the levels of skeletal muscle mass with advancing age is a global phenomenon. Targeted resistance and aerobic interventions aimed at improving body composition in older women are relevant not only in Slovakia but also in the international context.

Standards for Slovakia were published in Nemček et al.[6] who tested individual performances in specific functional skills among older women. The authors compared participants with existing standards according to age categories using the Senior Fitness Test[26]. This battery consists of six performance-oriented tests designed to measure functional fitness in the older population. We the Chair Stand Test and 8-Foot Up-and-Go Test, which were also carried out in Nemček et al.[6] and Nemček[27]. The authors compared the average values of individual functional tests with existing norms according to age. Assessing lower limb strength in relation to PA level, they found that the average score in different groups of older women was higher in women who exercised regularly. Their findings confirm the positive effect of regular PA on maintaining and improving lower limb strength even in old age (over 70 years), similar to what we want to present in our study.

In accordance with World Health Organization (WHO) guidelines[36], a sedentary lifestyle should be replaced with any form of physical activity, including low-intensity activities due to their health benefits. To mitigate the adverse effects of a prolonged sedentary lifestyle, older adults should exceed minimum recommendations regarding moderate-to-vigorous physical activity to enhance functional skills, which play a key role in maintaining independence and self-sufficiency in daily living. Reduced strength, endurance, balance, or flexibility directly impairs quality of life and elevates the risk of an injury[37].

Lacroix et al.[38] and Sherrington et al.[39] highlight the role of professional guidance in preventing falls and improving functional fitness in older adults. These findings support our recommendations that training programs for older adults should involve PA intervention under the guidance of a professional in the field, which may be a key factor in developing balance, muscle strength, and overall mobility.

6 CONCLUSIONS

We found that older women in the TJ group perceive exercise as less demanding and rate their quality of life at a higher level compared to senior women in the U3 group. The older women in the TJ group scored higher in three out of four measured functional skill tests. The smallest differences were observed in dynamic balance, where both groups' results were almost identical.

In the relationship between BMI and physical performance level, the detected correlation coefficients in both examined groups did not prove statistically significant. This result suggests that body mass index in our groups likely does not have a direct or significant influence on the level of assessed functional skills.

When comparing the TJ and U3 groups' performance in tests measuring lower limb strength (chair stand test) and dynamic balance against reference norms for women aged 70-74 years[26] and results from Nemček[27] the TJ women performed above average in chair stands, while U3 women reached only average levels for lower limb strength.

These differences highlight regular physical activity as a key factor in maintaining fitness, independence, and possibly a better quality of life in older age. We recommend that program designers for older adults include group exercise sessions at least 2-3 times per week in their physical activity programs.

The differences between our groups might suggest that regular, professionally supervised PA at least twice weekly might significantly improve older adults' subjective quality of life. This positive effect likely stems not only from the exercise but also from the social benefits of group training building personal connections and a sense of community.

Overall, body composition patterns in older adults show that while regional differences exist, the trend of increasing body fat and decreasing muscle mass with age is a global phenomenon. Interventions to improve body composition in older women through resistance training and aerobic exercise are relevant not just in Slovakia, but internationally. Future studies should also consider the impact of dietary habits and socioeconomic status on older women's body composition to develop more comprehensive recommendations for healthy aging.

In conclusion, we can state that PA should be a fundamental part of older adults' lives. Regular and appropriate exercise can significantly contribute to their physical and psychological well-being.

Our research was conducted with a small sample which was not representative, so we interpret the conclusions without generalization. For future research, we suggest conducting a study with a larger and more representative sample. It is also recommended to include a comparative group from nursing homes, which would allow better identification of specifics in different communities. Future research should focus on experimental and longitudinal studies which would provide the opportunity to monitor the development of this subject matter over time and better assess potential causal relationships.

7 ZUSAMMENFASSUNG

Die Ausgangspunkte: das Ziel dieser Studie war es, Unterschiede in der motorischen Leistungsfähigkeit und Körperzusammensetzung zwischen älteren Frauen mit unterschiedlichen Häufigkeiten körperlicher Aktivität (PA) zu untersuchen.
Die Gruppe: die Umfragegruppen bestanden aus N=70 älteren Frauen, unterteilt in zwei Gruppen: eine Gruppe mit höherer Häufigkeit (TJ – Teilnehmer der TJ Slávia-Sektion UPJŠ Košice, n=30, M=74 Jahre, mit 2×60 Minuten/Woche) und eine Gruppe mit geringerer Häufigkeit (U3 – Studierende an der Universität des Dritten Zeitalters UPJŠ in Košice, n=40, M=70 Jahre, mit 1×90 Minuten/zwei Wochen).
Die Methoden: die Körperzusammensetzung wurde mit der Bioelektrischen Impedanz Methode (BIA) und dem InBody 230-Instrument gemessen, wobei der Schwerpunkt auf Körperfett (kg, %) und Skelettmuskeln (kg) lag. Die Funktionsfähigkeit wurde durch vier batteriebetriebene Senior Fitness Test (SFT)-Tests bewertet, die die Kraft der unteren und oberen Gliedmaßen, die aerobe Ausdauer und das dynamische Gleichgewicht maßen. Weitere Daten zu PA und Lebensqualität wurden durch einen Fragebogen gewonnen.
Die Ergebnisse: aus dem Fragebogen stellten wir fest, dass die Teilnehmerinnen keine Diagnose schwerwiegender Krankheiten hatten, die sie daran hindern würden, aktiv an der PA teilzunehmen und an Tests teilzunehmen. Die subjektive Bewertung der Lebensqualität war in der TJ-Gruppe höher als in der U3-Gruppe. Signifikante Unterschiede zwischen den Gruppen wurden in ausgewählten Items des Senior Fitness Tests zugunsten der TJ-Gruppe im Vergleich zur U3-Gruppe festgestellt. Diese Unterschiede betrafen die Stärke der unteren Gliedmaßen, die Kraft der oberen Gliedmaßen und die aerobe Ausdauer.
Die Schlussfolgerungen: für zukünftige Forschung empfehlen wir, zu Beginn und am Ende des Trainingsprogramms Messungen durchzuführen und die Ergebnisse für diese Zielgruppen zu überprüfen. Zukünftige Studien sollten auch die Auswirkungen von Ernährungsgewohnheiten auf die Körperzusammensetzung älterer Frauen berücksichtigen, um umfassendere Empfehlungen zur Förderung eines gesunden Alterns zu entwickeln.

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