ORIGINAL ARTICLE

UDC: 613.98:613.71/.73
https://doi.org/10.2298/VSP160329336T

Quality of life and depression in elderly persons engaged in physical activities

Kvalitet života i depresija starih osoba koje se bave fizičkom aktivnošću

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Abstract

Backgroung/Aim. Since the number of elderly persons is gradually increasing worldwide, there is a need to identify the factors that affect the quality of healthy ageing. On the other hand, depression is the most common psychiatric disorder in the elderly and one of the most serious health problems that modern society is facing. Considering the importance of physical activity for healthy ageing, the question is whether there are differences in quality of life and depression in the elderly in relation to the certain characteristics of physical activities practicing. **Methods**. Differences in the quality of life and occurrence of depression in elderly were examined in relation to duration of a single training session and frequency of physical activities per week. This non-experimental, descriptive and comparative cross-sectional study involved a total of 188 persons aged 65–84 years, where 90 persons are engaged in a physical activity while 98 persons are not. The Older People's Quality of Life Questionnaire and the Geriatric Depression Scale were used. **Results.** Statistically significant difference was found in the following domains of quality of life: health, social relationships and psychological and emotional well-being as well as in the total score of quality of life and in the occurrence of depression. The highest values of quality of life and the lowest level of depression manifestation were observed in the group of persons whose single training session lasted for 60 minutes, and in the group of persons engaged in a physical activity twice a week. **Conclusion.** The main finding indicates that the differences in the duration of a single training session and the frequency of physical activities per week reflect on the overall quality of life, individual domains of quality of life and the occurrence of depression in the elderly persons.

Key words:
aged; aged, 80 and over; quality of life; depression; motor activity; surveys and questionnaires.

Apstrakt

Uvod/Cilj. S obzirom na to da se poslednjih decenija broj starih osoba u svetu postepeno povećava, postoji potreba za pronalaženjem faktora koji utiču na kvalitet zdravog starenja. S druge strane, depresija je najčešći psihijatrijski poremećaj kod starih osoba i jedan od najozbiljnijih zdravstvenih problema sa kojima se savremeno društvo suočava. Razmatrajući značaj fizičke aktivnosti za zdravo starenje, postavlja se pitanje da li postoje razlike u kvalitetu života i pojavi depresije kod starih osoba u odnosu na određene karakteristike bavljenja fizičkim aktivnostima. **Metode**. Razlike u kvalitetu života i pojavi depresije kod starih osoba su ispitane u odnosu na trajanje pojedinačnog treninga i učestalost bavljenja fizičkim aktivnostima na nedeljnom nivou. U ovoj neeksperimentalnoj, deskriptivnoj i komparativnoj studiji poprečnog preseka učestvovalo je 188 osoba starosti od 65 do 84 godina života, i to 90 osoba koje se bave i 98 osoba koje se ne bave fizičkom aktivnošću. Primenjene su Skala kvaliteta života starih ljudi i Gerijatrijska skala depresije. **Rezultati**. Statistički značajna razlika uočena je u sledećim domenima kvaliteta života: zdravlje, socijalni odnosi i psihičko i emocionalno blagostanje, kao i u ukupnom skoru kvaliteta života i pojavi depresije. Najviše vrednosti kvaliteta života i najniži stepen ispoljavanja depresije zabeleženi su u grupi osoba čiji pojedinačni trening trajao je 60 minuta ili koji su vežbali dva puta nedeljno. **Zaključak.** Glavni nalaz ove studije pokazuje da se razlike u trajanju pojedinačnog treninga i u učestalosti bavljenja fizičkim aktivnostima na nedeljnom nivou odražavaju na ukupan kvalitet života, na pojedine domene kvaliteta života i na pojavu depresije kod starijih osoba.

Ključne reči:
stare osobe; stare osobe, 80 i više godina; kvalitet života; depresija; motorna aktivnost; ankete i upitnici.

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Introduction

The number of elderly persons is gradually increasing, as well as their relative share in total world population; therefore, the recognition of the factors that are important for successful ageing is of the crucial concern for society [1, 2]. Relationship between healthy ageing and quality of life and mental health are the subject of many studies [3–5].

The concept of quality of life refers to the overall well-being within a society. It is the perception of the individual's position in life, expectations, standards and concerns [6]. There are many definitions of this term and they include social, cultural and environmental individuality into consideration [7]. In older population, quality of life is used to describe a number of results that clinicians consider important in the life of elderly [8].

Mental health is another important indicator of healthy ageing. Depression is widespread among the elderly, thus representing the most frequent psychiatric disease and one of the most serious health problems which modern society faces with [9, 10]. Some authors believe that the occurrence of depression in late period of life can actually represent a precursor to dementia, increased risk of suicide or morbidity [11, 12].

Promoting physical and mental functioning and independence in the elderly population represents a key strategy for healthy ageing. Therefore, physical activity may be one of the means of maintaining or improving a quality of life in elderly persons [13]. The need for programs, containing a combination of aerobic, muscle strength, flexibility, and balance training, is highlighted in order to get a stronger influence of physical activity during the old age [14].

Despite numerous studies that have related physical activities and quality of life in elderly [7, 15, 16] and the reduced occurrence of depression [17, 18], the need for finding the best aspects and characteristics of a physical activity still continue to exist. Valuable data could be obtained by perceiving a physical activity through its own characteristics (number of training sessions within a week, duration of a training session, the type of a physical activity, regular training, etc). These data could improve both planning and implementation of physical activity for the ageing population. Recognizing the importance of physical activity for healthy ageing, the question is whether there are differences in quality of life and occurrence of depression between the elderly persons engaged in a physical activity and elderly persons not engaged in a physical activity, but also whether there are differences in relation to the certain characteristics of physical activities practice.

Therefore, the aim of this study was to examine the differences in the overall quality of life, individual domains of quality of life and the occurrence of depression between the elderly persons not engaged in a physical activity and elderly persons engaged in a physical activity in relation to two selected characteristics of the physical activity. The first selected characteristic was the duration of a single training session, and the second one was the frequency of physical activities practice per week. We have assumed that there are differences in quality of life and occurrence of depression among elderly persons related to these characteristics of a physical activity.

Methods

The research was realized in accordance with the terms of the Declaration of Helsinki and with the approval and consent of the Ethics Committee of the Faculty of Sport and Physical Education, University of Belgrade.

Participants

This non-experimental, descriptive and comparative cross-sectional study included 188 participants, aged from 65 to 84 years. General criteria for the inclusion of all participants were as follows: persons over 65 years of age, and the negative history of severe chronic, psychiatric or somatic diseases.

The total sample was initially divided into two groups. The first group (G-PA) consisted of 90 participants who were engaged in a physical activity, at least for the previous six months. There were 62 female and 28 male participants in this group. The second group (G0) included 98 participants who were not engaged in a physical activity. There were 69 female and 29 male participants in this group.

In order to make a complete analysis, G-PA group was subsequently divided by following two criteria. The first criterion involved the duration of a single training session. Therefore, three groups were formed: the first group of participants whose single training lasted for 30 minutes (G30), the second group of participants whose single training lasted for 60 minutes (G60) and the third group of participants whose single training lasted for 90 minutes (G90). The second criterion was related to the number of training sessions per week (frequency). The same sample of participants (G-PA group) was divided into different three groups: the first group of participants who had two training sessions per week (G2), the second group of participants who had three training sessions per week (G3) and the third group of participants who had more than three training sessions per week (G3+). The group of participants not engaged in a physical activity (G0) was not subsequently divided.

The minimum required sample size of 128 participants was computed by using an a priori analysis available through Gpower 3.1 with the effect size set at 0.3, alpha level at 0.05 and power at 0.8. In this regard, a total of 188 participants who had participated in this study was sufficient to examine the differences in quality of life and level of depression in the elderly in relation to selected characteristics of physical activities practicing.

Procedures

The study was conducted during 2015 in several sports and recreation centers in Belgrade, Serbia. Most of the participants from G-PA group were members of different sports and recreational clubs, with licensed instructors, while a smaller number of participants were engaged in a physical

activity individually. Participants engaged in a physical activity were members of the following clubs: the City Center for Physical Culture in Belgrade, University for the Third Age, Yoga Center Belgrade, International Martial Arts Association of Serbia (IMAAS), and the Qigong Association of Serbia. Physical activity of participants included in this study consisted of the following activities: Tai Chi, Qigong, swimming, volleyball, recreational walking and yoga.

The study was conducted in two phases. In the first phase of this study, through the cooperation with the aforementioned sports and recreational clubs, an initial triage was conducted. A total of 194 persons was included. On the basis of the outcomes of regular annual preventive medical examinations, 64 persons were excluded from the further procedure due to their compromised health status. Out of the remaining 130 persons, 90 persons accepted to participate in the study and they were included in the G-PA group. In the second phase of this study, G0 group was formed by using snowball sampling [19]. This group consisted of retired persons not engaged in a physical activity. For the purpose of forming this group, 200 questionnaires were distributed. In order to avoid statistically significant differences between initial groups according to gender and age of the participants, 98 questionnaires were taken into consideration. Participants from both groups responded to questions individually by filling in written forms and circling the number next to the question or the proposition (yes/no) during one session that took no more than 20 minutes. The assistance of the first author was available all the time.

Measures

The Older People's Quality of Life Questionnaire (OPQOL) was used [20] for assessment of the quality of life of elderly, while Geriatric Depression Scale (GDS) was used for assessment of depression [21].

The original version of OPQOL consists of 35 items. It has a five-point scale (from very good to very bad). The scoring scale is ranked from 35 to 175. A higher score indicates a greater number of positive responses on the test. The questionnaire covers the following areas: life overall, health, social relationships and participation, independence, control over life, freedom, home and neighbourhood, psychological and emotional well-being, financial circumstances, leisure, activities and religion as well as total score of quality of life (i.e. K-scor). In this study, the Serbian version of OPQOL was used. Its validity and reliability have been tested on 497 subjects [22]. Reliability of the scale in this study, expressed through Cronbach's α coefficients, is 0.87.

GDS is designed as a self-assessment tool, and it is used for the detection of depression in the elderly. On a scale of 30 questions (longer version), a score of 11 and more, indicates the existence of depression with 84% sensitivity and 95% specificity. Answers are dichotomous (yes/no). Reliability of the scale in this study, expressed through Cronbach's α coefficients, is 0.89.

The questionnaire designed for this study was used to collect general information and characteristics of the participants. The questionnaire contained questions related to age, gender, previous engagement in a physical activity, the time period of exercising, the duration of a single training session, the number of weekly training sessions and the type of a physical activity practiced.

Statistics

First, descriptive statistics was calculated, within which absolute frequency, percentage, mean, median, standard deviation and interquartile range were used. In order to test the uniformity of the group in relation to age, *t*-test for independent samples was used, whereas χ^2 test was used for the uniformity of groups in relation to gender. Cronbach's coefficient alpha was calculated in the part of the preliminary analysis. Morover, prior to all further statistical analysis, Kolmogorov-Smirnov test was performed in order to test the normality of data distribution. Since the data was not normally distributed, nonparametric statistical techniques were performed. Kruskal-Wallis H-test was used in order to detect whether there was a statistically significant difference between the groups (i.e. G0, G30, G60 and G90; i.e. G0, G2, G3 and G3+) in the quality of life domains and level of depression. When the aforementioned test had showed statistical significance, Mann-Whitney *U*-test was subsequently applied in order to further examine differences between groups for each domain and level of depression. Tests for detection of differences were applied on the median values. For all statistical analysis, α level was set at 0.05. The effect size was expressed by *r* coefficient. Analysis and data processing were performed using Statistical Package for the Social Sciences for Windows (SPSS version 21.0).

Results

The study included a total of 188 participants, 131 women and 57 men. Within the G-PA group, 10 (11.1%) of participants were engaged in a physical activity from six months to one year, 7.8% of participants were engaged in a physical activity from one to two years, whereas the largest percentage of participants (81.1%) was practicing a physical activity for more than two years. In relation to the type of a physical activity, by examining the distribution, it was observed that 26.7% was engaged in recreational walking, 13.3% in swimming, 11.1% in volleyball, 17.7% in Tai Chi, 16.6% in Qigong, and 14.4% in yoga.

Characteristics of participants according to their age and gender are presented in Table 1. There was no statistical difference between all groups in relation to age of participants ($p > 0.09$). In addition, there was no statistical difference between the initially formed groups in relation to gender, as well ($\chi^2 = 0.01$; $p = 0.95$).

The difference between groups in relation to the division according to the duration of a single training session was examined first. Applying the Kruskal-Wallis test, differences were confirmed in the quality of life domains and the total score on the depression scale among the four groups examined. Statistically significant difference was found in K-

Table 1

Socio-demographic characteristics of participants – age and gender

Group	Age (years)	Sex	
		male	female
Initial			
G-PA (*n* = 90)	67.8 (5.99)	28 (31.1%)	62 (68.9%)
G0 (*n* = 98)	69.15 (6.97)	29 (29.6%)	69 (70.4%)
DUR			
G30 (n = 29)	68.14 (1.10)	10	19
G60 (n = 47)	67.13 (0.92)	13	34
G90 (n = 14)	66.00 (1.40)	5	9
WT			
G2 (n = 35)	66.29 (1.01)	5	30
G3 (n = 27)	66.37 (1.10)	11	16
G3+ (n = 28)	69.39 (1.12)	12	16

***all data are shown as mean (SD) or as n (%).**
G-PA – group engaged in a physical activity; G0 – group not engaged in a physical activity; G30 – group whose training lasted for 30 min; G60 – group whose training lasted for 60 min; G90 – group whose training lasted for 90 min; G2 – group that had 2 training sessions per week; G3 – group that had 3 training sessions per week; G3+ – group that had more than 3 training sessions per week; DUR – duration of a single training session; WT – weekly training schedule.

score ($\chi^2 = 12.9$; $p < 0.01$), as well as in the following domains: health ($\chi^2 = 13.6$; $p < 0.01$), Social relationships and participation ($\chi^2 = 23.3$; $p < 0.01$) and psychological and emotional well-being ($\chi^2 = 10.8$; $p = 0.013$). In other domains, no statistically significant differences were found: life overall ($\chi^2 = 2.37$; $p = 0.500$), independence, control over life, freedom ($\chi^2 = 4.37$; $p = 0.224$), home and neighborhood ($\chi^2 = 3.67$; $p = 0.299$), financial circumstances ($\chi^2 = 5.31$; $p = 0.151$), and leisure, activities and religion ($\chi^2 = 1.46$; $p = 0.692$).

Subsequently, using the Mann-Whitney *U*-test, differences among the four groups were found. In most cases it was showed that the group G0 was statistically different from both subgroups G30 and G60. Detailed results are presented in Table 2.

Table 2

Median values and the differences between groups in relation to the duration of a single training session in different domains of quality of life

Domain	Mann-Whitney						Descriptive statistics		
	Group	Group to compare	*U*	*z*	*p*	*r*	Group	Median	IQR
K-score	G0	vs. G30	955.0	-2.68	0.012	0.24	G0	127.5	14.5
		vs. G60	1607.0	-2.94	0.000	0.24	G30	132.0	20.5
		vs. G90	539.5	-1.29	0.203	0.12	G60	135.0	12.0
	G30	vs. G60	633.0	-0.50	0.604	0.06	G90	131.5	19.0
		vs. G90	179.0	-0.62	0.534	0.09			
	G60	vs. G90	311.5	-0.30	0.764	0.07			
Health	G0	vs. G30	1070.0	-2.05	0.040	0.18	G0	13.0	2.0
		vs. G60	1535.0	-3.29	0.000	0.27	G30	13.0	3.5
		vs. G90	468.5	-1.94	0.051	0.18	G60	14.0	3.0
	G30	vs. G60	625.5	-0.61	0.544	0.07	G90	13.5	3.0
		vs. G90	186.0	-0.45	0.654	0.09			
	G60	vs. G90	325.0	-0.70	0.944	0.06			
Social relationships and participation	G0	vs. G30	804.5	-3.55	0.000	0.32	G0	26.0	6.0
		vs. G60	1368.0	-3.96	0.000	0.33	G30	28.0	4.5
		vs. G90	449.5	-2.09	0.049	0.20	G60	28.0	4.0
	G30	vs. G60	636.5	-0.48	0.628	0.03	G90	28.0	10.3
		vs. G90	196.5	-0.17	0.865	0.03			
	G60	vs. G90	315.0	-0.24	0.809	0.10			
Psychological and emotional well-being	G0	vs. G30	934.5	-2.84	0.000	0.25	G0	16.0	4.0
		vs. G60	1797.0	-2.17	0.037	0.18	G30	18.0	4.0
		vs. G90	519.5	-1.49	0.144	0.14	G60	17.0	3.0
	G30	vs. G60	599.0	-0.89	0.371	0.09	G90	18.0	3.0
		vs. G90	181.5	-0.57	0.571	0.10			
	G60	vs. G90	324.5	-0.80	0.938	0.09			

K score – overall Older People's Quality of Life (OPQOL) scale score, G0 – group not engaged in a physical activity; G30 – group whose training lasted for 30 min; G60 – group whose training lasted for 60 min; G90 – group whose training lasted for 90 min; IQR – interquartile range.

Moreover, the difference between the groups divided in relation to the number of training sessions per week was analyzed. Applying the Kruskal-Wallis test, differences were found in the quality of life domains and the total score on the depression scale among the four studied groups. As in the previous comparison, statistically significant difference was determined in the K-score ($\chi^2 = 14.2$; $p < 0.01$), as well as in the following domains: health ($\chi^2 = 16.0$; $p < 0.01$), social relationships and participation ($\chi^2 = 23.2$; $p < 0.01$), psychological and emotional well-being ($\chi^2 = 10.3$; $p = 0.016$) and leisure, activities and religion ($\chi^2 = 11.0$; $p = 0.012$). No statistically significant differences were confirmed in other examined domains: life overall ($\chi^2 = 4.48$; $p = 0.214$), independence, control over life, freedom ($\chi^2 = 6.20$; $p = 0.102$), home and neighbourhood ($\chi^2 = 2,93$; $p = 0.403$), financial circumstances ($\chi^2 = 5.71$; $p = 0.127$).

Differences were detected among the four groups following the subsequent application of Mann-Whitney *U*-test. In most cases it was confirmed that the G0 group was statistically different from both G2 and G3 subgroups. Detailed results are shown in Table 3.

Furthermore, differences were noticed in the total GDS score (i.e. G-score). It was found that there were statistically significant differences between groups divided according to the duration of a single training ($\chi^2 = 47.3$, $p < 0.01$) and the number of training sessions per week ($\chi^2 = 46.3$, $p < 0.01$).

Differences were detected among the four groups following the subsequent application of Mann-Whitney *U*-test. In most cases it was confirmed that the G-score of the group of participants not engaged in a physical activity (G0) was statistically different from the G-score of all other groups. Detailed results are shown in Table 4.

Discussion

In this study, differences in the quality of life and the occurrence of depression in the elderly in relation to the duration of a single training session and frequency of physical activities per week were examined. Statistically significant differences were determined in both examined characteristics of physical activities practice.

Table 3

Median values and the differences between groups in relation to the number of training sessions per week in different domains of quality of life

Domain	Group	Mann-Whitney					Descriptive statistics		
		Group to compare	*U*	*z*	*p*	*r*	Group	Median	IQR
K-score	G0	vs. G2	1069.5	-3.30	0.000	0.29	G0	127.5	14.5
		vs. G3	989.0	-2.01	0.047	0.18	G2	138.0	22.0
		vs. G3+	1043.0	-1.93	0.053	0.17	G3	135.0	11.0
	G2	vs. G3	385.0	-1.24	0.214	0.16	G3+	132.0	14.0
		vs. G3+	382.5	-1.49	0.137	0.20			
	G3	vs. G3+	369.5	-1.43	0.886	0.18			
Health	G0	vs. G2	997.0	-3.72	0.000	0.32	G0	13.0	2.0
		vs. G3	1058.5	-1.61	0.112	0.14	G2	14.0	3.0
		vs. G3+	1018.0	-2.11	0.031	0.19	G3	13.0	4.0
	G2	vs. G3	359.0	-1.63	0.102	0.21	G3+	14.0	3.0
		vs. G3+	396.5	-1.31	0.189	0.18			
	G3	vs. G3+	359.0	-0.33	0.744	0.04			
Social relationships and participation	G0	vs. G2	1021.5	-3.50	0.000	0.31	G0	26.0	6.0
		vs. G3	792.5	-3.19	0.000	0.29	G2	29.0	5.0
		vs. G3+	808.0	-3.32	0.000	0.30	G3	28.0	4.0
	G2	vs. G3	460.5	-0.17	0.864	0.02	G3+	28.0	4.0
		vs. G3+	481.0	-0.13	0.900	0.02			
	G3	vs. G3+	369.0	-0.15	0.879	0.02			
Psychological and emotional well-being	G0	vs. G2	1181.0	-2.77	0.011	0.24	G0	16.0	4.0
		vs. G3	1000.0	-1.96	0.048	0.18	G2	18.0	3.0
		vs. G3+	1070.0	-1.80	0.073	0.16	G3	18.0	4.0
	G2	vs. G3	459.5	-0.19	0.851	0.02	G3+	17.0	3.0
		vs. G3+	449.0	-0.58	0.563	0.08			
	G3	vs. G3+	359.0	-0.32	0.746	0.04			
Leisure, activities and religion	G0	vs. G2	1269.0	-2.30	0.020	0.20	G0	9.5	4.0
		vs. G3	1259.5	-0.38	0.701	0.03	G2	11.0	3.0
		vs. G3+	1151.0	-1.31	0.195	0.12	G3	9.0	3.0
	G2	vs. G3	305.5	-2.39	0.017	0.30	G3+	10.0	3.8
		vs. G3+	238.0	-3.53	0.000	0.48			
	G3	vs. G3+	353.0	-0.42	0.671	0.05			

K score – overall Older People's Quality of Life (OPQOL) scale score; G0 – group not engaged in a physical activity;G2 – group who had 2 training sessions per week; G3 – group who had 3 training sessions per week; G3+ – group who had more than 3 training sessions per week; IQR – interquartile range.

Table 4

Median values and the differences between groups in relation to the duration of a single training and the number of training sessions per week according to overall depression score

Domain	Mann-Whitney						Description		
	Group	Group to compare	*U*	*z*	*p*	*r*	Group	Median	IQR
G-score – duration of a training session	G0	*vs*. G30	526.5	-5.15	0.000	0.46	G0	7.0	7.3
		vs. G60	1084.5	-5.16	0.000	0.43	G30	2.0	4.5
		vs. G90	275.5	-3.62	0.000	0.34	G60	3.0	4.0
	G30	*vs*. G60	566.5	-1.24	0.214	0.14	G90	1.0	7.0
		vs. G90	195.5	-0.20	0.842	0.03			
	G60	*vs*. G90	267.0	-1.07	0.283	0.14			
G-score – number of training sessions per week	G0	*vs*. G2	792.0	-4.73	0.000	0.41	G0	7.0	7.3
		vs. G3	557.0	-4.61	0.000	0.41	G2	3.0	6.0
		vs. G3+	537.5	-4.91	0.000	0.44	G3	2.0	4.0
	G2	*vs*. G3	467.5	-0.07	0.943	0.01	G3+	3.0	4.5
		vs. G3+	466.0	-0.34	0.736	0.04			
	G3	*vs*. G3+	371.0	-0.12	0.905	0.02			

G-score – overall GDS score; G0 – group not engaged in a physical activity; G30 – group whose training lasted for 30 min; G60 – group whose training lasted for 60 min; G90 – G90- group whose training lasted for 90 min; G2 – group who had 2 training sessions per week; G3 – group who had 3 training sessions per week; G3+ – group who had more than 3 training sessions per week; IQR – interquartile range.

Positive relation between physical activity and health status was examined in previous studies, especially in the population of elderly persons [8]. However, numerous studies has generally been focused on persons with various chronic conditions (cancer, cardiovascular diseases, diabetes, osteoporosis, neurodegenerative diseases). On the other hand, only few studies dealt with physically active healthy ageing population, that is a population of elderly engaged in physical activities with no diagnosed chronic or infectious disease [23]. Positive relationship between certain characteristics of physical activities (i.e. frequency, duration, level) and quality of life was confirmed in several population-based cross-sectional studies [23–25]. In addition, in a longidutinal study published by Choi et al. [13] positive correlation between the intensity of physical activity and quality of life of elderly women was found. Moreover, an improvement of different domains of quality of life is associated to participation in physical activity in both longitudinal and cross-sectional studies [15, 26]. Finally, it should be highlighted that low-to-moderate intensity of physical activities may have stronger associations with quality of life in comparison to vigorous intensity, especially when performed on daily basis [8].

In this study, regarding the first examined characteristic of a physical activity (i.e. duration of a single training session), differences in several domains of quality of life were noted. Statistically significant differences were observed between the G30 and G60 groups in regards to the G0 groups. In particular, above-mentioned differences were observed in the following domains: K-score, health, social relationships and participation and psychological and emotional well-being (Table 2). Moreover, participants from the G90 group differed significantly from participants from the G0 group in the domain of social relations only. This could be explained by an overload that excessive physical activity represents for the elderly in some ways and that shorter training sessions have greater benefit. The higher scores were noted in the aforementioned domains of quality of life in the group of those participants whose single training sessions had lasted for 30 to 60 minutes. Similar to this result, Capodagilo et al. [27] 2005 comes to the conclusion that a single training session of 30 minutes once during the week is optimal to improve muscle function and functional ability in people ranging from 65 to 75 years.

Regarding the second characteristic of a physical activity examined (i.e. frequency or a number of training sessions per week), statistically significant differences were found between two groups in several domains of quality of life. Specifically, the G2 group was statistically different in both K-score and in the domains of health, social relationships and participation, psychological and emotional well-being when compared to the G0, as well as in the domains of leisure, activities and religion when compared to all observed groups (Table 3). Additionally, the G3 group differed significantly from the G0 group in K-score and in the domains of social relationships and participation and psychological and emotional well-being. Finally, the G3+ group differed significantly in the domains of health and social relationships when compared to the G0 (Table 3). Namely, similar results were reported in other studies that examined the influence of a number of training sessions per week in the elderly. Thus, Holviala et al. [28] 2014, came to the conclusion that training session frequency of twice a week was also optimal for large improvements in maximal strength, walking time, and balance in elderly. In addition, Ferrari et al. [29] 2013, found that among older men twice a week strength and endurance combined training led to similar neuromuscular and cardiovascular adaptations as three times per week.

Similar to other research results [17, 18, 30], the outcome of this study is expected, given that a physical activity is associated with reduced levels of depression occurence in the elderly. Table 4 shows that there is a statistically significant difference in both characteristics examined between the three groups of participants engaged in a physical activity when compared to the group of participants not engaged in a physical activity. Namely, when it comes to the occurrence of depression, the differences were found in both examined characteristics of a physical activity. This finding is essentially encouraging because it shows that it does not matter for how long an individual training session lasts and how many training sessions there are per week. When it comes to the prevention of depression in the elderly, it is important to be engaged in a physical activity.

Summing up the above, our results confirm that there is an association between selected characteristics of physical activities (duration and frequency), on one hand, and several domains of quality of life, as well as a total quality of life, on the other hand. Moreover, these characteristics of physical activities are associated with the occurrence of depression in the elderly persons.

Several limitations should be noted within the framework of this study. The first limitation refers to the initial division of the entire sample. More precisely, the same participants from the G-PA group were divided twice for each observed characteristic. The second limitation refers to the inconsistency of the number of participants within groups. The next limitation refers to the type of a physical activity practiced which was not taken into account. Perhaps the future research should take into account the different participants in regards to each observed characteristic as well as equal distribution of the number of participants within each group. Also, differences related to the type of a physical activity should be examined further.

Conclusion

In order to promote more active ageing, it is important to pay attention to the age-related decline in physical activity of elderly persons, on one hand, and to the confirmed differences in quality of life and the occurrence of depression related to the certain characteristics of physical activity practices. The results of this study suggest that persons who participate in a physical activity for 60 minutes or twice a week have better quality of life than those with no physical activity. More precisely, the most evident differences are in the domains of health and psychological well-being, as well as in the domain of social relations and participation and leisure, activities and religion. When it comes to the occurrence of depression, it can be concluded that being engaged in a physical activity is sufficient and that differences are evident regardless of the duration of a single training session and the frequency of physical activities (number per week).

Acknowledgement

This paper is a part of a Project "The effects of applied physical activity on the locomotor system, metabolic, psycho-social and educational status of the Republic of Serbia population, no III47015, 2011–2016 and it possesses the Ethical license of the Faculty of Sport and Physical Education in Belgrade.

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Received on March 29, 2016.
Revised on May 10, 2016.
Accepted on June 10, 2016.
Online First November, 2016.