

Impact of physical activity on quality of life in Czech older adults

(scientific paper)

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Abstract: *The present study was conducted to evaluate the relation between the subjective perception of quality of life and the level of physical activity and its frequency in elderly people. The study recruited 58 elderly volunteers aged 65–89 years (23 male, 35 female). All subjects were in good health without medical treatment and living independently. We used the questionnaire Subjective Quality of Life Analysis – SQUALA and The International Physical Activity Questionnaire – IPAQ-short. The present work showed positive increase in the subjective perception of the life quality with realization of physical activity twice a week and more.*

Keywords: *active ageing, elderly, IPAQ, SQUALA*

1 Introduction

In recent years, there has been much convincing evidence of the positive impact of regular physical activity (PA) on health and the related quality of life (QOL) of older people. It has been scientifically proven that regular PA helps to lead an independent life as it reduces the risk of falls and fractures; the symptoms of anxiety, depression; overall reduce the risk of premature death and health constraints as a consequence of heart disease, diabetes, osteoarthritis and some types of cancer (Nelson et al, 2007; U. S. Department of Health and Human Services, 1996). Despite these facts, older people still belong to the least active age group within the society (Guthold et al., 2008). We consider different factors as the main attributes of QOL, but all experts agree on one of them and it is autonomy. The model of QOL for the older people of Sarvimäki and Stenbock-Hult (2000) lists next to autonomy such elements as the sense of well-being, meaning and value. Heun et al. (1999) extends the research to a confirmed list of predictors that positively affect the level of satisfaction in old age: good health, lack

of depression, marriage, independent living, social involvement, and the absence of alcoholism. The decline in the QOL of older people is often associated with a loss of autonomy. Older people themselves usually base their life philosophy on life optimism, the presence of the significant others, and their own activity. PA is indicated as the main stimulus for increasing older people's self-sufficiency and autonomy. Due to these findings, the paper presented is dealing with the evaluation of the QOL of the elderly in relation to the amount of the PA performed and its frequency.

Aims

The main aim of the study is to evaluate the relation between the subjective perception of QOL and the level of PA and its frequency in elderly people. Subsequent goals are:

- (a) To present the gathered data from IPAQ-short questionnaire dealing with realization of PA.
- (b) To evaluate the subjectively perceived QOL by results from SQUALA questionnaire.
- (c) To evaluate the suitability of the questionnaires used for field research.

2 Material and Methods

Research sample

Participants were voluntaries recruited at municipal clubs located at Brno region and at the Czech Tourist Club. The exclusion criteria were age under 60, being institutionalized, suffering from a physical or mental illness that would have limited their ability to respond to the questionnaires. A total of 58 subjects, 23 male (39.7%) and 35 (60.3%) females aged 60–89 years old were included in this study.

All data gathering was done personally face to face, each participant was instructed about the goals, the methods of research, the way in which the results were processed and interpreted and, in particular, about ensuring anonymity. The study was performed according to the principles established in the Declaration of Helsinki and approved by the Ethical Committee of the Faculty of Physical Culture Palacký University Olomouc. Written informed consent was obtained from all participants.

Physical activity

The level of PA done by participants was assessed by validated self-reported the International Physical Activity Questionnaire (IPAQ-short questionnaire) (Craig et al., 2003). The short form of the IPAQ questionnaire covers three specific activities. These are walking, moderate-intensity activities and vigorous intensity activity level, frequency (measured in days per week) and duration (time per day) are collected separately for each specific type of activity. In addition to the measure of intensity of

the PA carried out, the IPAQ-short questionnaire also obtains general demographic data from the respondents (gender, age, education, occupation, residence, height, and weight /BMI calculation/, habits, smoking, lifestyle, dog ownership, and participation in organized PA lessons).

This questionnaire identifies the movement activity and inactivity realized in the last seven days and categorizes individuals as inactive, minimally active and HEPA active (health enhancing physical activity; a high active category). The criteria used follows the current findings that 30 minutes of moderate exercise activity performed in most days during the week has a key preventive role in cardiovascular disease, type 2 diabetes, obesity, and some cancers.

Based on the IPAQ-short questionnaire, the energy output (MET-minutes/week) of each participant was calculated.

According to the PA levels, the participants were divided into three categories:

- Inactive: those individuals who do not meet criteria for categories minimally active or HEPA active;
- Minimally active: 3 or more days of vigorous activity of at least 20 minutes per day; or 5 or more days of moderate-intensity activity or walking of at least 30 minutes per day; or 5 or more days of any combination of walking, moderate-intensity or vigorous intensity activities achieving a minimum of at least 600 MET-min/week;
- HEPA active: vigorous-intensity activity on at least 3 days achieving a minimum of at least 1500 MET-minutes/week; or 7 or more days of any combination of walking, moderate-intensity or vigorous intensity activities achieving a minimum of at least 3000 MET-minutes/week.

Quality of life

For the data gathering on QOL, the SQUALA questionnaire (Subjective Quality of Life Analysis) was used (Dragomirecká et al., 2006). Authors of questionnaire (Dragomirecká & Škoda, 1997) understand the quality of life as overall perception of the satisfaction or dissatisfaction of an individual throughout his life, while satisfaction with different aspects has varying importance. The original French version of the questionnaire contained 23 items pertaining to the external and internal realities of everyday life. We use the standardized Czech version of the questionnaire SQUALA (Dragomirecka et al., 2006), which is reduced in two items (politics and religious beliefs). The results of the current 21 areas are expressed in the form of partial scores and overall score of quality of life and as five dimensions (see Table 1). The partial score of individual areas is given by the product of the importance score which is rated by the respondent on a five-point scale from 0 = insignificant to 4 = necessary and a score of satisfaction, which is scored on scale 1 = very disappointed to 5 = completely satisfied. Partial scoring is displayed as a QLF profile, the overall

score is the sum of all partial scores. The domains are (1) abstract values, (2) health, (3) close relationships, (4) leisure time and (5) basic needs (Dragomirecka et al., 2006). The SQUALA questionnaire is widely used in medical, social, pedagogical or psychological fields in the Czech Republic.

Table 1: SQUALA – summary of dimensions and items

Dimensions	Items
SQUALA 1 (SQ1) Abstract values	Feeling of safety, Equity, Freedom, Beauty and Art, Truth
SQUALA 2 (SQ2) Health	Health, Physical Self-sufficiency, Wellbeing, Self-care
SQUALA 3 (SQ3) Close relationships	Family relationships, Love, Sexual life
SQUALA 4 (SQ4) Leisure time	Sleeping, Relationships, Relaxation/resting, Hobbies
SQUALA 5 (SQ5) Basic needs	Environment/living condition, Money, Food

Statistical analysis

Descriptive values are shown as mean, mode, median, frequency, standard deviation, minimum, maximum, coefficient of variation, skewness and kurtosis. Analysis of Variance (ANOVA) and post-hoc Scheffe's test were performed to analyse data. All analysis were performed using the StatSoft CR s r. o. STATISTICA 12.0 and values of $p < 0.05$ were considered to be statistically significant.

3 Results

The structure of the interpretation of the results is analogous to the goals set in our research. Firstly, we present the data obtained from the IPAQ-short questionnaire. Secondly, the descriptive statistics of the whole research in the SQUALA questionnaire based on partial scores and dimensions is presented and the last section consists of evaluation of the influence of the PA level and frequency on subjective perception of the QOL.

Data collected with IPAQ-short questionnaire are shown in Table 2.

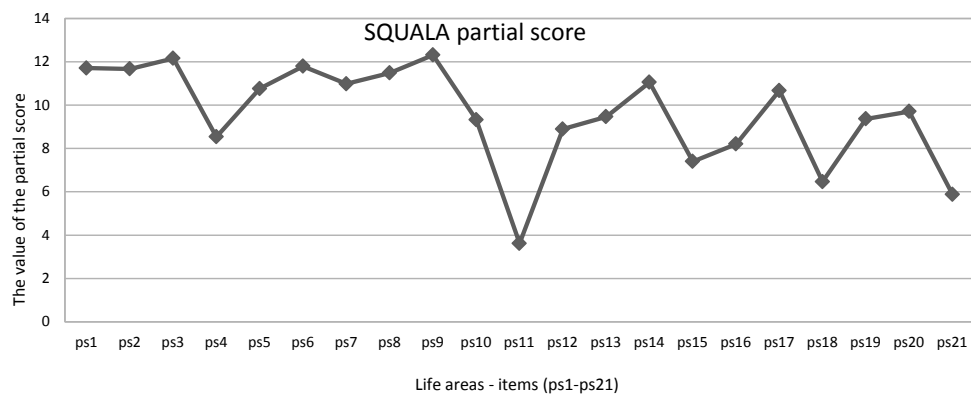
Table 2: Analysis of IPAQ

	Categories	Number of participants (%); N=58
PA Frequency	0 – No PA	13 (22.41%)
	1 – Once a week	21 (36.21%)
	2 – Twice a week	13 (22.41%)
	3 – Three times and/or more a week	11 (18.97%)
PA level	Inactive	16 (27.59%)
	Minimally active	24 (41.38%)
	HEPA active	18 (31.03)

Notes: PA frequency indicates the number of days of the week in which participants were engaged/ not engaged in intense or moderate PA.

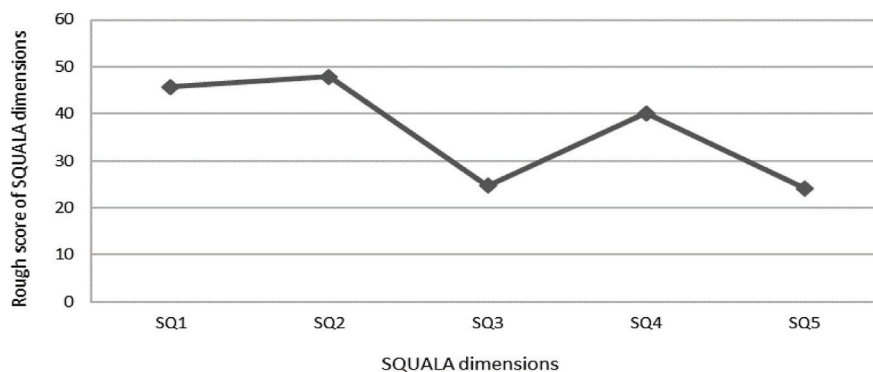
Analysis of SQUALA questionnaire: The graph of partial scores (Figure 1) clearly shows the lowest rated area ps11 (3.62) „sexual life“. The average maximum values of the partial scores are already more balanced, the highest value of the item ps9 „take care of itself“ (12.31) followed by ps3 „mental well-being“ (12.16). Others, high importance and satisfaction, are attributed to areas of ps1 „health“, ps2 „physical self-sufficiency“, ps6 „family relationships“, ps8 „children“ and ps14 „safety“. The SQUALA dimensions scores (Figure 2) shows as the highest dimension SQ2 „health“ (47.84), the attribution of a very low value to the SQ3 dimension „close relationships“ (24.74) is unexpected. One possible cause may be the fact that the SQ3 dimension includes, among other things, the ps11 „sexual life“, whose rank was the lowest. Respondents expressed the least satisfaction with the SQ5 dimension „basic needs“.

Figure 1: *The partial scores of SQUALA questionnaire*



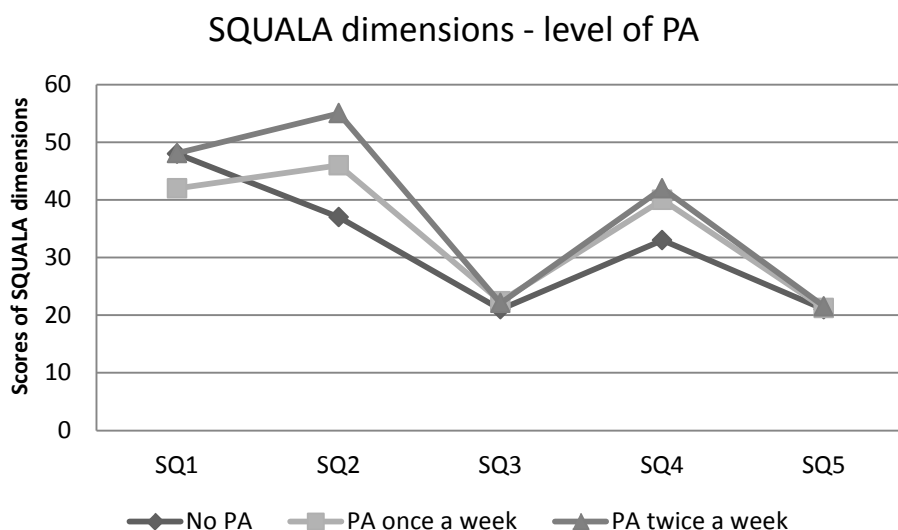
Notes: SQ1 – Abstract values, SQ2 – Health, SQ3 – Close relationships, SQ4 – Leisure time, SQ5 – Basic needs

Figure 2: *The dimensions of SQUALA questionnaire*



The relation between the subjective perception of the QOL and the level of PA and its frequency: According to the calculated energy output level (MET-minutes/week), participants were divided into three categories: inactive, minimally active and HEPA active (Table 2). Figure 3 shows scoring of each SQUALA dimension depending on the PA level. All respondents similarly, regardless of the level of PA, rated the dimensions Abstract values (SQ1) and Close relationships (SQ3). For the Leisure time (SQ4) and Basic needs (SQ5) dimensions, the differences in the evaluation of the groups of respondents categorized as minimally active or HEPA active are diminished. Participants inactive feel less satisfied in their leisure time (SQ4) and basic needs (SQ5). The HEPA active participants evaluate at the health dimension the highest (SQ2) and close relationships the lowest (SQ3). The participants minimally active find the abstract values (SQ1) as the most satisfactory dimension and basic needs (SQ5) as the lowest. The Scheffe's test showed statistically significant difference between participants minimally active and HEPA active in dimensions Health (SQ2) and Leisure time (SQ4) at $p \leq 0.01$. With increasing PA level, the satisfaction with Health dimension increases and increasing intensity of PA also corresponds with the subjective evaluation of increased satisfaction with the respondents' leisure time. A statistically significant difference was seen both in the results of group inactive and group minimally active as well as group HEPA active.

Figure 3: *The SQUALA dimensions in inactive, minimally active and HEPA active groups*



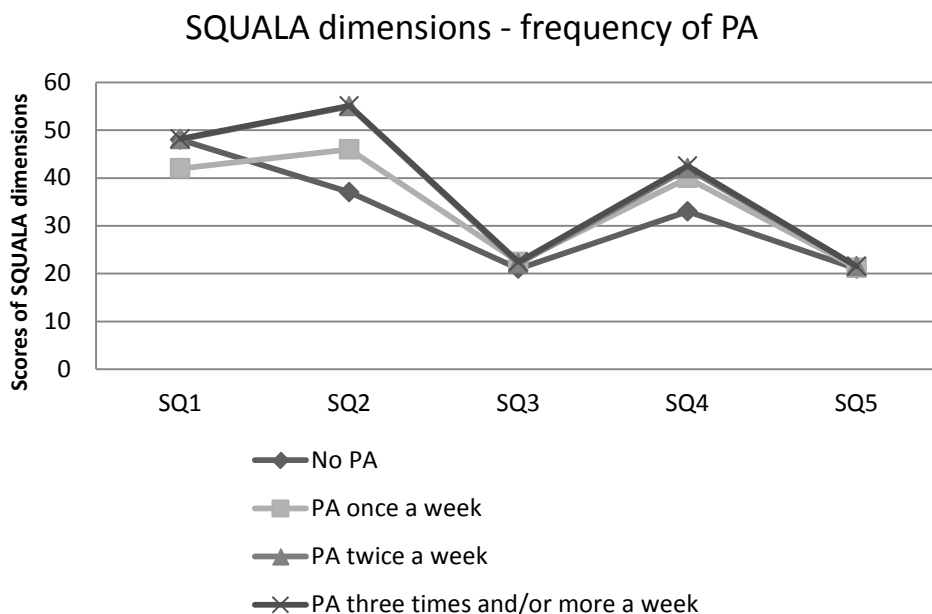
Influence of PA frequency on the subjective perception of the quality of life SQUALA: After the distribution of the research group according to the PA frequency, we

obtained four categories: 0 – no PA, 1 – PA once a week, 2 – PA twice a week and 3 – PA three times and/or more a week (Table 2). The data analysis showed that there is a very small difference in the QOL of the participants in category 2 and 3 (participation in PA twice a week and more) and their ratings in all dimensions of SQUALA are among the highest (Figure 4). The participants who belong to category 0 showed the lowest satisfaction with the QOL in all SQUALA dimensions, except dimension Abstract values (SQ1) (feeling of safety, equity, freedom, beauty and art, truth).

We found statistically significant differences in Overall score (QOL_SUM), Health (SQ2) and Leisure time (SQ4) (Scheffe's test; $p \leq 0.05$). In other dimensions of the SQUALA (SQ1 – abstract values, SQ3 – close relationships, SQ5 – basic needs), the statistically significant difference at level $p \leq 0.05$ did not occur.

The values referring to the Health dimension (SQ2) clearly showed that the highest evaluation of the quality of life was perceived by the members from categories 2 and 3, these were most satisfied with their health. The lowest values in the health dimension were found in the participants categorized no PA. In the Health dimension, a statistically significant difference occurred between the categories 1 and 2 and 3 ($p \leq 0.01$). The same situation was shown in the Leisure time dimension (SQ4) at the $p \leq 0.01$.

Figure 4: *Frequency of PA*



4 Discussion

For the data gathering on QOL, the SQUALA questionnaire was used. This tool is understandable and suitable instrument to gather the data and interpret findings in the Czech environment. We have seen a disadvantage in the prevalence of use of instruments created by WHO such as WHOQOL-OLD and WHOQOL-BREF (The WHOQOL Group, 1998; Dragomirecká & Bartoňová, 2006) or SF-36 measure (McHorney, Ware, & Raczek, 1993; Andresen et al, 1999) in the past decade and insufficiency to easily compare the data with other research work. Comparison of results on SQUALA questionnaire and WHOQOL-BREF or OLD (Whoqol Group, 1998) are not available, due to lack of international use. The SF-36 and WHOQOL-BREF comparison with a huge sample $n=11.440$ in Taiwan population sample was done in 2001 by Huang, Wu, & Frangakis (2006). The findings underline the result that questionnaires measure different constructs: the SF-36 measures health-related QOL, while the WHOQOL-BREF measures global QOL. Clinicians and researchers should carefully define their research questions related to reported outcomes and select which instrument they should use.

The level of PA was measured by questionnaire IPAQ-short version (Craig et al., 2003). The pitfall of this method in our research is the participants' age. The IPAQ questionnaire is fine-tuned and verified in Central European conditions only on a sample of the population aged 15–69 (Sigmund, Sigmund, Mitás, Chmelík, Vašíčková & Frömel, 2009). Use in a sample of persons over 60 years old is a pilot, and the results are comparable with precaution. The data collection influence understanding the terms high and moderate intensity PA and decision making which of the PA activity belong to certain level of intensity (with the increase of age and dependency respondents tend to perceive as high intensity PA many of moderate and even low intensity activities) (Prachařová, 2013). Our goal was to re-evaluate the used methods and find an inspiration in sufficient latest research projects.

The “Healthy People 2010” recommendation (USDHHS, 2000) for intensive PA is walking or moderate PA for at least 30 minutes at least 5 times a week, or intensive PA 20 minutes at least 3 times a week. In our research, a recommendation for an intensive PA was met by 19% of respondents. These findings fully correspond to the results of the Pelclová et al. (2008), where the criterion for intensive PA implementation reached 20.3% of participants at the age of 55–69 years. We attribute our “good” results in HEPA active with sample of respondents aged from 65 to 89 years old to selecting active seniors living independently in their homes, also the QOL satisfaction highly correlated with independency.

The present study showed significant difference between the realized PA and subjective perception of the QOL. Similar conclusions, rewrote as recommendations, were drawn by World Health Organization recommendations (WHO, 2010).

The WHO (2010) compared the impact of PA directly on the subjective perception of health. From our research, we can also generate results focused on SQ2 (health dimension). We find a statistically significant difference between minimally active and HEPA active groups. In terms of frequency, a statistically significant difference occurred in two relations: between individuals performing no PA of moderate and higher intensity (category 0) and those who perform the PA of the respective intensity at least twice a week (category 2). Positive correlation was also seen in the relationship between members of category 0 (without PA of the given intensity) and category 3 (PA 3x and more per week).

If we look back at the relationship between the PA intensity and the subjective perception of the quality of life of the overall SQUALA score (QOL_SUM), we find no significant difference at any of the PA intensity levels, in contrast to the frequency of PA performed. The statistically significant difference was confirmed in the relationship between category 0 (without PA) and those who perform PA twice a week (category 2) or PA three times and/or more a week (category 3).

Similar findings related level and frequency of PA as in dimension Health (SQ2) we can see in Leisure time dimension (SQ4). SQ4 consists of items such as Sleeping, Relationships, Relaxation/resting, and Hobbies. The suggestions to improve adherence in regular placement of PA in daily schedule of the elderly is often connected simply with a suggestion “to find (PA) activities to love to do with others” (Růžička et al., 2013).

5 Conclusion

The main objective of the study was to evaluate the correlation between the level of PA performed and the subjective assessment of the QOL. The PA's level divided the research group into three groups. HEPA active members rated four of the five SQUALA dimensions above the rest of the sample, except the dimension SQ3 (close relationships). On the other hand, the inactive PA members had the opposite effect, in the SQ2, SQ4 and SQ5 scores were the lowest. A statistically significant difference was found in the dimension SQ2 (Health) between members belonging to inactive and HEPA active, and SQ4 (Leisure time) between groups inactive, minimally active and HEPA active.

If we consider a “PA level” as PA frequency in relation to the average values of the overall score (QOL_SUM), the statistically significant difference occurs in two relationships. It occurs between participants performing no activity (category 0) and a) those performing the PA at least twice a week (category 2), and b) those in category 3 (PA three times and/or more a week). The involvement of participants in PA less frequently than twice a week has no effect on perceptions of QOL. On the other

hand, when performing PA twice a week and more frequently, a positive increase in subjective perception of the QOL occurs in the sample examined.

QOL measurements presented by 5 dimensions of SQUALA questionnaire showed the Health dimension (SQ2) as subjectively highest perceived. On the other hand, the subjectively poor QOL dimension was perceived dimension of Close relationships (SQ3), which we assume is affected by the item Sexual life, scored significantly lowest.

Participants in groups 2 and 3 (PA performed twice a week, and three times and/or more a week) according to PA's influence on QOL perception, evaluated all SQUALA (SQ1–SQ5) dimensions higher than other respondents performing PA less frequently. The statistically significant difference between participants performed at least twice a week and categories without PA showed only the dimensions SQ2 (Health), SQ4 (Leisure time) and overall score (QOL_SUM).

The goal for future research is to re-evaluate the used methods and find some inspiration for the creation of a research project with widely used instruments.

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