

## Influence of leisure-time physical activity on quality of life of Ukrainian students

IULIIA PAVLOVA<sup>1</sup>, BOGDAN VYNOGRADSKYI<sup>2</sup>, TETIANA KURCHABA<sup>3</sup>, DMYTRO ZIKRACH<sup>4</sup>

<sup>1,2,3</sup>Lviv State University of Physical Culture, Lviv, UKRAINE

<sup>4</sup>Ivan Franko National University of Lviv, Lviv, UKRAINE

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### Abstract.

The understanding of mechanisms that are need for formation of high quality of life and the role of healthy life style in person's well-being are necessary for the creation of effective prevention programs. The aim of the study was to determine the influence of leisure-time physical activity on the quality of life of healthy persons. Sample consists of 514 young people (46.7 % female, age –  $19.8 \pm 1.5$  years). Participants were the students in Lviv State University of Physical Culture, Lviv National University of Veterinary Medicine and Biotechnologies, Ivan Franko National University of Lviv, Lviv State University of Life Safety. Surveys (SF-36, IPAQ) were used for data collection. The duration of vigorous-intensity physical activity in leisure time was  $0.6 \pm 0.4$  hour /week for female students,  $1.2 \pm 0.7$  hour/ week for male students; the duration of moderate-intensity physical activity was  $4.3 \pm 1.0$  and  $3.1 \pm 0.9$  hour/ week for females and males respectively. It was shown the positive effect of leisure-time physical activity on the physical and mental component of the quality of life of young adults. Females with higher level of leisure-time physical activity had higher quality of life ( $p < 0.01$ ) according Physical-Role Scale, General Health Scale, Social Activity Scale and Role-Emotional Scale. The statistically significant differences ( $p < 0.01$ ; Physical Functioning Scale, Vitality Scale, and Mental Health Scale) were observed for males with minimal and maximal duration of physical activity.

**Keywords:** physical activity, leisure time, quality of life.

### Introduction.

Life quality is a complex concept that has been developing in various scientific fields. Some of the definitions suggested in a scientific literature are particularly general (Cook & Harman, 2008; Felce & Perry, 1995; Ferrans & Powers, 1985; Singer, Martin & Kelner, 1999). Life quality is determined as awareness of general well-being, satisfaction or dissatisfaction with own lives or as a feeling of happiness/ unhappiness, etc. J. Rejeski and S. Mihalko drew attention to the complexity of these definitions and even characterized them as umbrella-type (Rejeski & Mihalko, 2001). According to World Health Organization position, the quality of life is tightly associated with health as the state of absolute physical, mental and social well-being ("The World Health Organization quality of life assessment", 1995). The health-related quality of life (HRQOL) is one of the most important life quality parts' that is related to different compounds of health, personal experiences and beliefs (Pavlova, 2015; Prystupa & Pavlova, 2015). Furthermore the subjective assessment of own comfort, physical and mental capacity, ability to participate in different social activities is recognized (Cella, 1994; Felce & Perry, 1995; Ferrans & Powers, 1985; Veenhoven, 2000; Ware & Sherbourne, 1992).

Despite the ongoing use of the definition, there is no clear scientific study on the factors that affect on the personal well-being. The evaluation and ranking of these factors are not completed, also the indicators for the quantitative assessment of quality of life are poorly developed. In clinical practice, the evaluation of quality of life allows to understand the patient's priorities, to facilitate his/ her communication with medical personnel and respectively to determinate the changes during treatment and rehabilitation. By this mean, it can be argued that the assessment of quality of life has significant role to play in establishing an educational and health services for persons with acute diseases or chronic conditions. But this in turn is accompanied with number of contradictions, including the need to develop an evaluation system and the lack of approbated and validated methods for Ukrainian population. Also the investigation of life quality requires not only the identification of factors associated with well-being, but also explanation why some stabilizing mechanisms are called neutral or negative feedback.

The investigation of relationships between health behavior and quality of life has significant economic importance since can predict the financial resources available to support treatment efforts and the rehabilitation. The better understanding of mechanisms that are need for formation of high life quality and the role of healthy life style are necessary for the creation of effective prevention programs.

The aim of the study was to determine the influence of physical activity in leisure time on the quality of life of healthy persons.

### Material & methods.

The sample consists of 514 young people (46.7% female, mean age –  $19.8 \pm 1.5$  years).

Participants involved to the study were a 1–3 year students of Lviv State University of Physical Culture, Lviv National University of Veterinary Medicine and Biotechnologies, Ivan Franko National University of Lviv, Lviv State University of Life Safety. Respondents were studied for a bachelor's degree program in "Veterinary Technology" (n = 49), "Food Technology" (n = 84), "Ecology" (n = 34), "Veterinary Medicine" (n = 52), "Foreign Language" (n = 71), "Mechanic and Mathematic" (n = 11), "Physics" (n = 16), "Fire Security" (n = 126), "Physical Education" (n = 51), "Sports" (n = 20).

The students were invited to the survey with a letter describing the study. The questionnaires were completed at home. Two instruments were used for data collection.

The respondents completed the SF-36 survey for the evaluation of health-related quality of life (Feshchenko et al., 2002; Ware & Sherbourn, 1992). This generic measure form summarized 36 questions into 8 subscales:

- 1) Physical Functioning (PF) – indicates the volume of everyday physical activity.
- 2) Role Limitations due to Physical Problems (RP) – determines the problem with work or other daily activities as the result of unsatisfactory physical health.
- 3) General Health Perception (GH) – the general assessment of personal health.
- 4) Vitality (VT) – indicates the level of energy and fatigue.
- 5) Bodily Pain (BP) – identify the intensity of pain and limitation of day activity due to pain.
- 6) Social Functioning (SF) – indicates the limitation of social contacts due to physical or emotional problems.
- 7) Role Limitation due to Emotional Problems (RE) – demonstrate the problem with work or everyday activity through unsatisfactory mental state or depression.
- 8) Mental Health (MH) – indicates major mental health dimensions (anxiety, loss of control, depression).

The respondents were asked to answer questions referring to the last 4 weeks. Summed raw scales scores were transformed to 0–100 scale score (0 point – absolutely low quality of life; 100 points – absolutely high quality of life). Physical component of health related quality of life include the results of Physical Functioning Scale, Role Limitations due to Physical Problems Scale, General Health Perception Scale, and Bodily Pain Scale; Vitality Scale, Social Functioning Scale, Role Limitation due to Emotional Problems Scale, Mental Health Scale belong to mental summary component.

The long self-administrated form of International Physical Activity Questionnaire (IPAQ) was used for investigation of physical activity level ("Guidelines for data processing and analysis of the International Physical Activity Questionnaire", 2005). Outcome measure was total physical activity result at MET-minutes per day, also as data about vigorous and moderate intensity activity according to the set of domains (leisure time, work-related physical activity, transport-related physical activity, domestic and gardening). The long form provided analysis of separate domain-specific scores. According to IPAQ survey, the duration of sitting (passive recreation) was assessed in minutes per day.

The average values were obtained for all physical activity domains in MET-scores (Metabolic Equivalent Task). According to guidelines, the score was calculated by multiplying minutes in each activity by an assigned MET value (walking – 3.0 METs, moderate intensity physical activity – 4.0 METs, and vigorous intensity physical activity – 8.0 METs. Metabolic Equivalent Tasks characterize metabolism during physical activity. One MET is equal the 3.5 ml of oxygen per 1 kg for 1 minute or in caloric equivalent  $1 \text{ kcal} \cdot \text{kg}^{-1} \cdot \text{hr}^{-1}$ .

All participants were informed about the aim of the investigation and received a consultation. The survey was anonymous and all obtained data were protected and have remained confidential. The questionnaires did not contain any personal information about subject identification. Participation was voluntary, all respondents had the right to decline the participation or leave the investigation in any moment.

All statistical analyses were performed using SPSS program (version 20). The characteristics of subject were described with outcomes from surveys and were analyzed by mean value (M), standard deviation (SD). Independent samples were compared with Kruskal-Wallis test. For all conducted analyzes, the level of significance was set at least to  $p < 0.05$ .

### Results.

In Table 1, the detailed characteristics of physical activity parameters are shown. In total the duration of domestic and gardening activities, transport-related activity, leisure time physical activity were analyzed. It was found that males spend more time on vigorous physical work at home, vigorous-intensity physical training, and cycling than females. Females were mostly engaged in domestic and gardening physical activity and leisure-time physical activity of moderate intensity. Also, they spent more time than males on passive recreation.

Table 1.

## Level and characteristics of physical activity among students

Physical Activity domains	Males, n = 274, M (SD)	Females n = 240, M (SD)
Domestic and gardening activities: vigorous-intensity domestic and gardening activities, hour/ week*	6.3 (2.3)	1.9 (2.0)
moderate-intensity domestic and gardening activities, hour/ week*	2.1 (1.2)	4.3 (0.7)
Transport-related physical activity: cycling, hour/ week*	1.7 (0.9)	0.9 (0.6)
Leisure time physical activities, hour/ week		
walking, hour/ week*	8.7 (1.6)	6.5 (1.8)
moderate-intensity activity, hour/ week*	3.1 (0.9)	4.3 (1.0)
vigorous-intensity activity, hour/ week*	1.2 (0.7)	0.6 (0.4)
Passive recreation, hour/ week*	7.2 (1.3)	8.9 (1.5)

Note. “\*” – statistically significant difference ( $p < 0.01$ ) between the average values of males and females.

Figure 1 shows the duration of leisure time physical activity and subjective assessment of health-related quality of life. Totally females and males had low indexes of physical activity of vigorous and moderate intensity. The duration of vigorous-intensity physical activity for females was 0.6 hour /week, for males – 1.2 hour/ week. Females had higher than males means of moderate physical activity in leisure time. The duration of moderate-intensity physical activity was 4.3 and 3.1 hour/ week for females and males respectively.

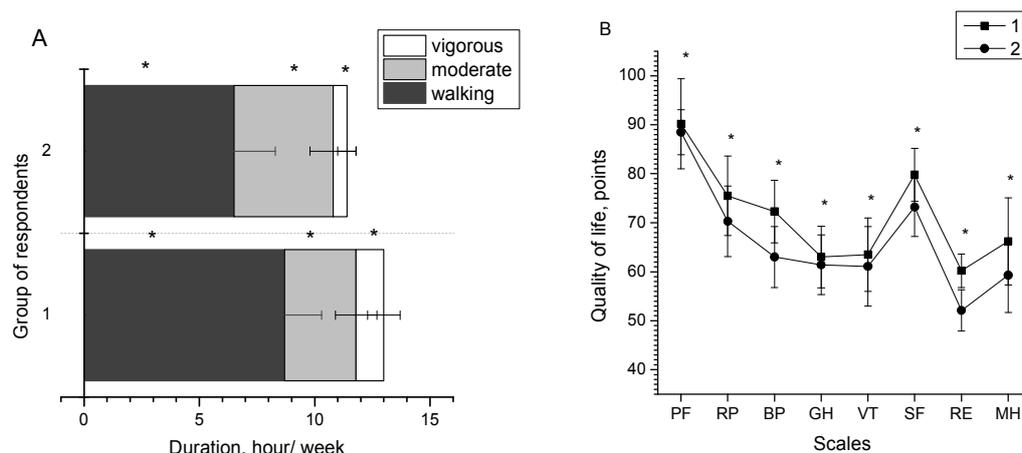


Figure 1. Leisure time physical activity (A) and health-related quality of life (B) of adults. 1 – males, 2 – females.

“\*” – statistically significant difference ( $p < 0.01$ ) between the means of males and females.

The quality of life of males was higher than females. The differences between appropriate averages were 1.6–9.3 points. Quality of life was low according scales that characterized the overall assessment of health (63.0 points for males, 61.4 points for females), mental state (66.2 points for males, 59.3 points for females), the vitality level (63.5 points for males, 61.4 for females), the ability to manage with daily negative events and to maintain a positive mood (60.2 points for males, 59.3 for females).

The life quality of respondents with the different level of physical activity was analyzed (Figure 2). Higher physical activity level at leisure time was associated with significantly better quality of life. We found that increases in physical activity at leisure time rises the results of Physical Functioning parameters. This suggests that respondents with higher physical activity in leisure time show a better daily physical activity and work capacity, a physical functionality, and performance.

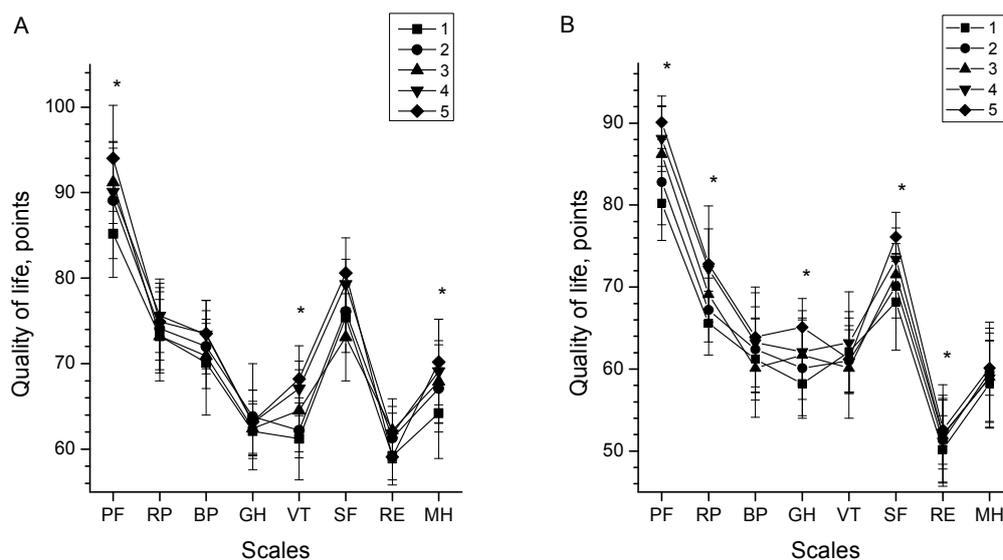


Figure 2. Health-related quality of life of students with different duration of leisure-time physical activity. A – males, B – females.

1 – the duration of physical activity in leisure time was 0–2.5 hour/ week; 2 – 2.5–5 hour/ week; 3 – 5–7.5 hour/ week; 4 – 7.5–10 hour/ week; 5 –  $\geq 10.0$  hour/ week.

“\*” – statistically significant difference between the data of respondents with minimal and maximal physical activity level in leisure time ( $p < 0.01$ )

For females higher level of leisure time physical activity was associated with higher scores on Physical-Role Scale, General Health Scale, Social Activity Scale and Role-Emotional Scale. Compared with less active persons, being physical active was associated not only with improving the physical component of life quality but also with the different type of daily activity, in particular, social activity. The social relations were not limited due to unsatisfactory emotional or physical state.

The increasing of physical activity in leisure time affected positively on vitality and mood of males. Statistically significant differences were identified between the values of Vitality Scale and Mental Health Scale received for the persons with minimal and maximal duration of leisure-time physical activity.

## Discussion.

The nutrition, stable, positive mood, physical activity and the productive free time are the main components of the optimal health. Nowadays physical activity is crucial in providing of health and quality of life. The low level of physical activity is the main cause of leading lifestyle-related chronic conditions (Goldstein et al., 2011; Pollock, 2000). Physical activity is the biological need of human, but should be taken into account the psychological and social aspects of this activity.

In the era of rapid technological development, physical activity has important role as the natural way to prevent the chronic diseases. Physical recreation integrates the various forms of physical activity that are realized voluntarily in leisure time. It is an important part of wellness – such style of life that helps to achieve a high level of well-being. The complex effect of leisure time physical activity on quality of life can be explained by positive influence on cardiovascular and respiratory systems, increasing strength and endurance, stimulation of endorphins secretion (O’Donovan et al., 2010; Stubbe et al., 2007; Woodruff & Conway, 1992).

According to World Health Organization guidelines children and youth should be engaged in physical and sports activities for 30 minutes at least 3 times a week. Adults in UK should aim to take part in everyday 30–60 minute physical trainings, in particular, muscle strengthening activity and exercises on flexibility should be at least 2–3 times a week (Krawański, 2003). According to requirements of American College of Sports Medicine, the physical trainings of an endurance character (running, swimming, cycling) should be three times a week for 20–60 minutes and strength character 2 times a week (Pate et al., 1995). A daily 60-minute walking or domestic/gardening activities are advised by Canadian scientists (Pate et al., 1995). This activity can be replaced with 20–30 minutes aerobic exercises, running, swimming etc. Japanese researchers consider that for optimal physical activity is necessary to use 1 200–2 000 calories daily, or to do 10 000–15 000 steps (Pate et al., 1995).

The quantity and quality of time spending on recreation can be important for improving of physical and mental well-being. Overall, full-time workers spend 15 hours a day on eating, sleeping, communication with friends and family, watching TV, sports, etc. This index is 14.4 hours for Australia, 14.8 hours – for the UK, 15 hours – for Hungary, 14.9 hours – for Greece, 14.3 hours – for Canada and the US, 15.0 hours – for Japan (<http://www.oecdbetterlifeindex.org>).

On the example of different population groups it was shown that physical activity program are focused

mainly on improving of physical health (Imayama et al., 2011; Kerksick et al., 2009; King et al., 2000). The tight correlation between physical activity level and physical health have mainly been demonstrated in scientific works (Cook & Harman, 2008; Imayama et al., 2011; Pollock et al., 2000; Prystupa & Pavlova, 2015; Singer, Martin & Kelner, 1999; Stubbe et al., 2007). Few empirical studies, however, have investigated the importance of social relationships for high quality of life, the beneficial effect of physical trainings on mental and social health.

The mental diseases have the impact on the decreasing quality of life and nowadays remain the most common causes of disability. The one of every fourth people in the world had at least one mental health disorder. These statistics are particularly critical in the view of a strong relationship between physical and mental illness (Cook & Harman, 2008; Luppino et al., 2010). In general, physical training and sports have positive influence on mental component quality of life. However, only physical activity in leisure time that is pleasant to the participant can prevent the emotional burnout and depression, improve sleep and social communication (Blumenthal et al., 1999; McAuley et al., 2008). Instead, domesticating or gardening physical activity or work-related physical activity have not such therapeutic function (Stubbe et al., 2007).

At the biological level the positive influence of physical activity on mental health can be explained by increasing of mRNA and proteins in brain cells and optimal work of neurotransmitters (Kramer, Erickson, Colcombe, 2006). These processes show that physical activity affects the neurochemical ability to remember, think logically, concentrate, learn more effectively, etc. (Kramer, Erickson & Colcombe, 2006). This contributes the study performance, high academic achievement. There is no definitive evidence that physical and sports activities increase the intellectual level significantly, but the processes at the cellular level (the increasing of protein synthesis) are directly related to learning, memorizing, thinking, and decision-making.

Leisure-time physical activity is important for the formation of social relationship, can help in socialization and adaptation to the rules, and standards of social behavior, in the overcoming of the gaps between different social groups. Physical training helps to increase the level of social activity, to integrate into existing social networks, that generally has a positive influence on the quality of life (Berkman & Glass, 2000). Young adults that are involved in individual or team sport or are engaged in a different type of physical training in wellness and fitness center have the better health, mood, and relationships.

### Conclusions.

It was shown the positive effect of leisure-time physical activity on the quality of life of young adults. The better quality of life were observed for both male and female with higher physical activity level. Statistically significant differences were identified for Physical Functioning Scale (males and females), Vitality Scale (males), Mental Health Scale (males), Role Limitations due to Physical Problems Scale (females), General Health Scale (females), and Social Functioning Scale (females).

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