The interaction of physical activity and quality of life of adolescents

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Abstract:

The article highlights the interaction of areas of quality of life and different levels of physical activity in a week in adolescents. The survey covered pupils from secondary schools from Slovakia (n=149) who were divided into four groups according to the level of the sport performance. Quality of life was monitored through a modified questionnaire SQUALA and frequency of physical activity in a week in hours. Data are presented in descriptive characteristics (n, M, SD). Statistical significance of differences, respectively relations are considering by nonparametric methods at the level of significance (W, U: $p < 0.05$, respectively. r_s $p < 0.20^*$ $p < 0.10^{**}$).

Results did not show differences between groups of adolescents with various sporting level of sport performance in the level of quality of life, respectively its individual areas. We find the differences only in the subjective perception of importance and satisfaction with the areas of physical well-being and spirituality ($p < 0.05$). The overall number of interactions between quality of life and frequency of physical activity in a week very is very low. Positive interaction between physical activity and physical well-being (r_s : .239*) are found only in adolescents who are registered athletes with a frequency of physical activity in a week, M: 10.774 hrs, SD: 4.425. Negative interaction are predominantly observed in the group of passive athletes in satisfaction with the areas of physical (r_s : -.396*), psychosocial (r_s : -.310*) and spiritual well-being (r_s : -.400**). A negative correlation between physical activity in a week is found in education (r_s : -.327**) and leisure time (r_s : -.268*) for registered athletes.

The results correspond to results of authors about reduction of well-being with the quality of life during early adolescence. They highlight the importance of influencing the quality of life through increased physical activity in a week, but mainly to create optimal conditions and possibilities for improving the quality of life in the social environment of adolescents.

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Key Words: Physical activity, quality of life, adolescence, interaction

Introduction

Developmental period of adolescence lasts from about 13-15 to 20-22 years. This period is characterized by the onset and culmination of physical and sexual maturation. By completion of physical development at the age of about 25 years adolescents become socially and emotionally mature personalities. According to Vágnerová (2000) adolescence is divided into pubescence period (between 11th and 15th year of age) and adolescence period (between 15 and 20 years of age). According to Macek (2003) adolescence is divided into three phases: early adolescence (10-13 years), middle adolescence (14-16 years), and late adolescence (17-22 years).

The period of adolescence is characterized by the gradual release of relations with parents and preference of relations with peers. Emotional and sexual life develops very intensively, however at the beginning adolescent is socially and morally not matured enough; he seeks security, does not trust any authority, and has a tendency to take risks. This period is also characterized by rebellion, idealism and dramatic world of conflicting tendencies. Later there appear and extend the abilities of abstract thinking, attitudes, beliefs, and mental life consolidate. This leads to the development of self-confidence, self-esteem, independence, integration of personality. At the end of adolescence mature individual reaches the peak of intelligence and cognitive abilities (Macek, 2003).

The Quality of life is closely related to the different stages of development. The quality of life is perceived differently in adolescence and in adulthood or retirement period (Videmšek et al., 2009). Some of the common features that affect satisfaction or dissatisfaction with life, however, can be found in all stages of development (Sejčová, 2006). The evaluation of life satisfaction depends on personal comparisons of one's own criteria and perceived life circumstances (Valois et al., 2002). As reported by Sýkorová & Blatný (2008), overall

life satisfaction in adolescents is associated with different variables, and environmental and demographic variables, socioeconomic status, temperament variables and personality. Life satisfaction is determined more by positive orientation of mental health, which defines psychological wellbeing as the absence of psychopathology symptoms (Valois et al., 2002).

The studies of satisfaction with the quality of life in adolescents were monitored in relation to the frequency of leisure activities (Gilman 2001), gender (Hall-Lande, 2007), risky and violent behavior, risky sexual behavior, use of alcohol, tobacco, drugs, etc. (Züllig et al., 2001, Valois et al., 2002). The results point to the lack of work experience of adolescents in the spheres of communication, stress management, decision making, problem solving and goal setting. The adolescents with poor experience can compensate their own dissatisfaction by risky sexual behavior, and symptoms of depression may also occur in a higher rate. After the age of 15, girls reported depressive symptoms and depression two times higher than boys (Hall-Lande, 2007). It turns out that boys are more satisfied with life than girls are (Sýkorová & Blatný, 2008).

Psychologists have found that people dedicated to physical exercise regularly at least three times a week as compared to individuals who do not perform any activities, are more satisfied with their lives. During physical activities certain substances such as endorphin (brings elation, a feeling of calm, pleasant feeling of relaxation, improves the quality of sleep and sexual desire) and serotonin (fabric hormone affecting blood coagulation, which raises the temperature of the hypothalamus and stimulates the - bottom part of the midbrain) which act as desired harmless "drug" enhancing a person's mood, are released in the body. Human body is shaped by regular physical activity physical fitness of a man improves, while creating the habit of correct body posture. Physical activity brings joy and enhances self-esteem of man. It is also an important means of disease prevention and stress relief. Especially air exercises work as active antidepressant because the body produces melatonin - an antidepressant hormone (Havranová, 2001).

Škoda et al. (2007) in their research has highlighted the factors affecting the quality of life of 14-16 years old adolescents. They reported health and relationships with family and friends among the most important factors considered by adolescents. The slightest importance is attributed to activities outside the home and property of objects. By Sejčová (2006) maturing adolescents consider family, health and love as the most important part of their lives. Interviewed adolescents were largely satisfied with the quality of life and most with the relationships and their performance. On the other hand, they are least satisfied with the social quality of life and quality of environment. Teens are mostly satisfied with their current life, they feel happy and are focused on the values like love, happiness, health, education, wisdom, peace, and less on money, success and prosperity. Ocetková (2007) recommends in her researches to focus on spheres of physical well-being, psychosocial well-being, spiritual well-being, material well-being, education, leisure, appearance and property affairs, respectively orientation on the future. Sýkorová & Blatný (2008) used a shortened version of the questionnaire by Ocetková for adults and adapted it to the pediatric and adolescent population.

Similar research methods were applied to specific groups of adolescents, university students, adults and teachers. In the works by Brožáni (2012); Brožáni & Bradáčová (2012); Brožáni & Špániková (2013), Brožáni and Maťašová (2014), Brožáni & Žiškova (2014), Gülsah, (2011), Dos Santos (2015), Pašková (2010) positive relationships between frequency of physical activity during the week and different spheres of quality of life were demonstrated in a group of adolescents, college students, kindergarten and primary schools teachers who realized physical activity 3-6 times a week. Physical activities with lower, respectively higher frequency in a week did not show significant relationships with different spheres of the quality of life.

We focus on students in middle adolescence in this paper. The aim was to highlight the interaction between the quality of life and different levels of physical activity in a week by pupils - adolescents. As one of major factors that should affect mentioned causality in relation to the results is also level of sport performance. We were dealing with questions: What is the level of physical activity in a week and the quality of life in adolescents? What are the differences in individual quality of life in terms of importance and satisfaction? What is the relationship between physical activity in a week and individual quality of life?

Material & methods

A questionnaire survey was distributed among 149 respondents with different sport performance level and quality of life on three secondary schools in Nitra. The average age of the total group was 15.55 years with a standard deviation of 0.65. After the redistribution of the groups with level of sports performance were not found statistically significant differences in terms of age. The research group was divided into four groups according to the subjective assessment of the level of sport performance:

- A. Passive athletes - do not seek physical activity, attend mandatory sports activities,
- B. Occasional athletes - search for physical activity, unorganized physical activity
- C. Active athletes - regular organized physical activity,
- D. Registered athletes - the frequency of training, competition, national and global level.

Modified questionnaire according to Dragomerická et al. (2006), Zannotti - Pringuey (1992) and Ocetková (2007) included selected parts from the SQUALA questionnaire. The parts of SQUALA questionnaire were evaluated from the point of view of different spheres as follows (Sýkorová & Blatný, 2008):

- 1st: sphere of physical well-being - health, sleep, solution of everyday activities, do not have problems
 2nd: sphere of psychosocial well-being - family, personal relationships, intimate relationships, hobbies, safety
 3rd: sphere of spiritual well-being - justice, freedom, beauty and art, truth
 4th: sphere of material well-being - money, good food
 5th: education - to be educated, to go to school
 6th: leisure time - possibility to spend your free time, have plenty of things for fun
 7th: appearance and ownership of things - look good, to dress nicely, have things that I like
 8th: orientation to the future - to have children and jobs in the future that will entertain me

The questionnaire is divided into 2 parts. The first part defines spheres from objective aspect: "how it is important to you ..." and the second from the subjective viewpoint: "how you are satisfied with ...". Both items are assessed on a 5-point scale (1 very important; 2 important; 3 medium important; 4 unimportant; 5 completely unimportant) depending on the importance of each item for their life. In the second part concerning satisfaction the scales are: 1 very satisfied; 2 satisfied; 3s medium satisfied; 4 dissatisfied; 5 very dissatisfied.

Satisfaction with the focus on the future of the monitored adolescents is not evaluated with respect to age.

For the presentation of data, basic descriptive statistics (frequency N, arithmetical mean M, standard deviation SD) was used. Statistical significance of differences between importance and satisfaction in the quality of life of dependent groups we assessed by Wilcoxon test and differences of independent groups was assessed using Mann-Whitney U-test. For finding the interaction between criteria "frequency of physical activity in a week" and "areas of quality of life" Spearman's correlation coefficient (r_s) was used. To assess the statistical significance of differences we used the level of significance $p < 0.05$ and relations $p < 0.20$. The data were processed in MS Excel and SPSS.

Results and discussion

Physical activity in a week is differentiated between the groups of adolescents with different level of sport performance (Table 1 and 2). The same level of hour physical activity in a week was recorded only in adolescents who report the level of sport performance as a passive athlete and occasional athlete ($p = 0.138$). Adolescents indicating passive and occasional with level of sport performance participate in physical activities an average of M: 3.778 SD: 1.70 hours and M: 4.891 SD: 3.01 hours in a week. High frequency of physical activity in a week were demonstrated by the group of adolescents who place a level of sport performance as active athletes (M: 8.067 hours SD: 3.792) and registered athletes (M: 10.774 hours SD: 4.425). Among groups active and registered athletes respectively passive athlete or occasional athlete were huge differences in physical activity ($p < 0.01$). Reported results were the same even after deduction of compulsory physical education classes.

The quality of life in a group of adolescents with different levels of sport performance is from the point of individual quality of life at the same level. The only difference was demonstrated in the spiritual well-being ($p < 0.05$) which attach occasional athlete greater importance (M: 4.182 SD .510) as registered athletes (M: 3.863 SD: .667).

Table 1 Comparison of physical activity in a week and the quality of life between groups of students with different level of sport performance.

		Sports performance							
		A Passive (n=18)		B Occasional (n=55)		C Active (n=45)		D Registered (n=31)	
Indicators		M	SD	M	SD	M	SD	M	SD
Age		16,000	,907	15,400	,564	15,556	,624	15,548	,568
Physical activity a week [h]		3,778	1,700	4,891	3,010	8,067	3,792	10,774	4,425
Physical activity a week without school physical education [h]		1,778	1,700	2,891	3,010	6,022	3,793	8,645	4,168
How important for you ...	Physical well-being	4,044	1,224	4,196	,537	4,387	,345	4,258	,462
	Psychosocial well-being	3,589	,767	3,778	,402	3,784	,412	3,749	,550
	Spiritual well-being	3,833	,924	4,182	,510	3,983	,602	3,863	,667
	Material well-being	3,778	1,060	3,764	,804	3,944	,827	3,935	,716
	Education	3,722	1,114	3,800	,797	3,844	,729	3,565	1,023
	Leisure time	3,889	1,037	3,991	,825	4,089	,748	4,000	,764
	Appearance and Property affairs	3,963	,928	3,721	,845	3,593	,787	3,656	,854
	Focusing on the future	4,167	1,015	4,118	,720	4,189	,725	4,387	,667
	Physical well-being	3,789	,525	3,833	,488	3,800	,595	3,871	,494
How are you satisfied ...	Psychosocial well-being	3,828	,470	3,793	,500	3,809	,448	3,697	,525
	Spiritual well-being	2,667	,712	2,982	,633	2,950	,667	2,968	,611
	Material well-being	3,500	,594	3,536	,706	3,444	,867	3,806	,803
	Education	3,444	,784	3,691	,670	3,600	,773	3,435	,804
	Leisure time	4,000	,707	3,882	,751	3,778	,719	3,726	,805
	Appearance and Property affairs	3,593	,919	3,788	,630	3,992	,463	3,925	,749

We find common features among groups of athletes when assessing individual quality of life in terms of importance and satisfaction (Fig. 1-4). All groups of the athletes - adolescents attach the same level of

importance and satisfaction in most areas of quality of life. The differences between importance and satisfaction are only in the areas of spiritual and physical well-being. All groups of the athletes reported lower levels of satisfaction with spiritual well-being ($p < 0.01$) compared with the level of importance of what they emphasize to it. Less satisfaction than the importance with physical well-being present the groups occasional, active and registered athletes ($p < 0.01$).

Table 2 The statistical significance of differences in physical activity in a week and the quality of life between groups of students with different level of sport performance.

		p value for Mann Whitney U-test $p < 0,05^*$; $p < 0,01^{**}$					
Indicators		A<>B	A<>C	A<>D	B<>C	B<>D	C<>D
Physical activity a week		,138	0,000**	0,000**	0,000**	0,000**	0,006**
Physical activity a week without school physical education [h]		,138	0,000**	0,000**	0,000**	0,000**	0,005**
How important for you ...	Physical well-being	,314	,660	,374	,118	,748	,259
	Psychosocial well-being	,460	,423	,454	,958	,752	,771
	Spiritual well-being	,187	,872	,786	,062	0,016*	,539
	Material well-being	,687	,704	,767	,250	,307	,923
	Education	,974	,994	,563	,705	,374	,279
	Leisure time	,830	,569	,907	,679	,873	,551
	Appearance and Property affairs	,375	,175	,257	,388	,614	,877
	Focusing on the future	,464	,718	,638	,649	,095	,228
How are you satisfied ...	Physical well-being	,650	,806	,777	,814	,852	,919
	Psychosocial well-being	,686	,754	,377	,792	,468	,356
	Spiritual well-being	,116	,176	,176	,712	,806	,802
	Material well-being	,633	,768	,169	,429	,162	,074
	Education	,144	,380	,907	,603	,078	,282
	Leisure time	,747	,339	,232	,405	,281	,698
	Appearance and Property affairs	,433	,083	,199	,121	,333	,796
	Focusing on the future

Fig. 1 Comparison of quality of life in terms of importance and satisfaction with passive athletes (D - difference of averages; p value for the Wilcoxon test).

Fig. 2 Comparison of quality of life in terms of importance and satisfaction with occasional athletes (D - difference of averages; p value for the Wilcoxon test).

Fig. 3 Comparison of individual quality of life in terms of importance and satisfaction with active athletes (D - difference of averages; p value for the Wilcoxon test).

Fig. 4 Comparison of individual quality of life in terms of importance and satisfaction among registered athletes (D - difference of averages; p value for the Wilcoxon test).

Correlation analysis of physical activity in a week and subjective evaluation of satisfaction with individual areas of quality of life highlighted the differentiated interactions in groups of adolescents with different level of sport performance (table 3).

We find the most relationships between the frequency of physical activity in a week and areas of quality of life (in a positive or negative sense) in passive and registered athletes. Significant relationships between physical activity and areas of quality of life in a week were not observed in the group of occasional athletes.

Positive interactions of physical activity in a week are found to **physical well-being** (health, sleep, realizing of daily activities, do not have problems) for registered athletes ($p < 0.20$) and negative interactions turn from passive athletes - adolescents ($p < 0.20$). For occasional and active athletes were not demonstrated statistically significant relationships between physical activity in a week and physical well-being.

Negative interactions of physical activity in a week with **psychosocial well-being** (family, interpersonal relationships, intimate relationships, hobbies, safety) and **spiritual well-being** (justice, freedom, beauty, art, truth) are found in passive athletes ($p < 0.10$). We found negative correlation in active athletes in physical activity in a week with the material well-being ($p < 0.20$).

Negative interaction in the field of **education** ($p < 0.10$) and **leisure time** ($p < 0.20$) with physical activity in a week were shown in adolescents registered in the group of registered athletes. Interactions between physical activity and the area of appearance and property affairs claims have not been proven.

The results of correlation analysis confirmed the negative interaction of inactivity with some areas of quality of life. We find similar results in the works. Negative respectively no interactions with areas of quality of life were found in the groups of adolescents (Brožáni, 2012b; Brožáni & Bradáčová, 2014; Kalinková et al., 2015) and university students (Brožáni, 2012a; Brožáni & Špániková, 2013) who do not seek physical activity respectively they realize them in very low frequency in a week. Positive interactions of physical activity with the areas of quality of life we find from time to time in groups of high or top performance athletes.

It appears that adolescence is highly turbulent and unstable period concerning satisfaction with the quality of life. It is influenced by several factors mentioned above. We can say that they include the frequency of physical activity in a week and the type of secondary school. On the other hand the period of late adolescence and adulthood (Pašková 2010; Brožáni & Maťašová, 2014; Brožáni & Žiškova, 2014; Kalinková et al., 2015b) are characterized by maturation and the progressive achievement of physical and mental performance. It is also

the most sensitive period of understanding the quality of life and needs of regular physical activity respectively their interconnectedness.

Table 3 Correlations of individual areas of quality of life with groups of students with different levels of sport performance

			Sports performance			
			A Passive	B Occasional	C Active	D Registered
How are you satisfied ...	Physical well-being	r_s	-0,333*	-,054	-,104	0,239*
		p value	,177	,697	,496	,196
	Psychosocial well-being	r_s	-0,493**	-,092	,072	,070
		p value	,038	,506	,639	,710
	Spiritual well-being	r_s	-0,563**	,016	-,175	,024
		p value	,015	,907	,250	,898
	Material well-being	r_s	-,233	-,079	-0,258*	,070
		p value	,352	,567	,087	,707
	Education	r_s	,034	-,003	-,080	-0,327**
		p value	,892	,984	,603	,073
	Leisure time	r_s	-,024	,036	-,171	-0,268*
		p value	,923	,795	,261	,145
	Appearance and Property affairs	r_s	,039	,105	,139	,212
		p value	,878	,447	,363	,252

Spearman correlation coefficient r_s ; $p < 0,20^*$; $p < 0,10^{**}$

Conclusions

At the beginning of the study we asked ourselves three research questions: What is the level of physical activity in a week and the quality of life of students in middle adolescence? What are the differences in individual areas of quality of life in terms of importance and satisfaction? What is the relationship between physical activity in a week and individual areas of quality of life?

The frequency of physical activity in a week in monitored sample was depending on the level of sport performance. The results did not show differences in the level of quality of life in a group of adolescents with different level of sport performance. The number of interactions between quality of life and frequency of physical activity in a week was very low, with higher number of negative interaction.

We found positive interaction between physical activity and physical well-being only in adolescents who are registered athletes with high frequency of physical activity in a week.

Negative interaction is predominantly found in the group of passive athletes in satisfaction with areas of physical, psychosocial and spiritual well-being. The negative relationship of physical activity kept by registered athletes with education and leisure time.

The results correspond to results of authors with decline in well-being quality of life in period of adolescence. They highlight the importance of influencing the quality of life through increased physical activity in a week but mainly to create optimal conditions and possibilities for improving the quality of life in the social environment of adolescents.

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