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The Level of Selected Determinants of Female Pupils' Lifestyle of Secondary Schools in Relation to Their Health

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Abstract. Submission presents a partial objective and tasks with the intention on selected determinants of female pupils' lifestyle of secondary schools in relation to their health. Monitored group consisted of secondary school female pupils at the age of 18.1 years from the vicinity of L. Mikuláš. Selected and monitored indicators of somatic nature were determined by standard procedures and methodology based on general and school practice. Lifestyle questions were based on a standardized questionnaire. Results indicate, that there is a significant ($p < 0.01$) absence of sport activities with higher intensity in female pupils' lifestyle, which can, together with inadequate diet, participate in higher body weight ($p < 0.05$) and its other indicators (BMI and WHR). Listed partial discoveries are included in the grant: VEGA no. 1/0376/14 Intervention as physical activity as health prevention of Slovak population.

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Keywords: adulthood; physical activity; health; lifestyle.

Introduction

One of the main tasks, which every man has to deal with during life, is healthcare. Unlike the past, nowadays, we put greater emphasis on personal responsibility of individuals for their own health, as well as the health of people entrusted to their care. Health is a category, whose protection is also embodied in legislation. In Slovak Republic it is Act No. 355/2007 Coll. on the protection, promotion and development of public health. Definitions of the terms are stated in general provisions of this act. While in the past, health was determined mainly by the influence of biological patterns, nowadays, it is becoming more determined by social factors. Health cannot be obtained as genetically given unchangeable state. Genetic base is just a biological potential, which can develop in a positive or a negative direction (Bendíková, 2014).

The health state and level of healthcare is determined by various factors (Šimonek, 2005; WHO, 2010):

- ✓ **Lifestyle**, which participates in health with 49 – 53 %.
- ✓ **The environment** with 17 – 20 % share on the health state.
- ✓ **Health care**, which has 8 – 10 % share on the health state.
- ✓ **Genetics** with 18 – 22 % share on the health state and its development.

In this context, it is important to miss out, that there are information about healthy lifestyle "attacking" us from each side. On the one hand, technical progress with its conveniences improve human life and beneficially affect the active life expectancy, on the other hand, deteriorate lifestyle, which shows the relationship between mortality and unhealthy lifestyle, including lack of physical activity. Physical activity shows tight connections in relation to the quality of life, lifestyle and health. Nevertheless, lifestyle, which lacks movement, has become all-society problem not only of adults, but also children and youths (Soos et al., 2010). It follows from the above, that the prevalence of civilization diseases and hypokinetic lifestyle is currently reflected on men's health (Hruškovič, 2004; Kayserová, 2004; Bunc, 2008; Zadarko, Barabasz, Junger, 2010, Zadarko, 2011; Kostencka, 2007a,b,c). Above stated also confirm numerous epidemiological studies abroad (Bailey, Martin, 1994; Armstrong, Simons - Morton, 1994; Welk - Blair, 2000; Lee, Paffenbarger, 2001; Tanasescu et al., 2002; Hemmingson, Ekelund, 2007; Pastucha et al., 2010; Bartik, 2005; Bartik, 2009), which in recent years pointed out, that hypokinesia affects the occurrence of long-term noninfectious diseases, especially:

- ✓ cardio-vascular diseases,
- ✓ metabolic diseases (metabolism),
- ✓ endocrine diseases,
- ✓ skeleton and muscular systems disorders,
- ✓ impairments of the respiratory system.

Occurrence of obesity (BMI > 30) in men and women has a rising tendency in some countries of the world (table 1). Moderate obesity (BMI 25 – 30), however, in many European countries and in the USA affects one third up to half of adults population, and it is necessary to look for its causes earlier. Increase compared to the 1980s is up to 50 % and alarming is also the increase of obesity occurrence in children at the age of 6 – 15 years (Brettschneider, 2007).

Table 1: Occurrence of obesity in selected countries (BMI > 30)

Country	Men %	Women %
Slovakia	19	14
USA	20	20
Japan	8	3
Russia	11	28
South Africa	8	44
Kuwait	22	44
Greece	27	18

Obesity epidemic of children and youths is also visible in Slovakia. Researches show, that approximately 18 % of children suffer from overweight, about 7 – 10 % is obese and situation is getting worse. Severe obesity is associated with a 12-fold increase of mortality of 15 – 35 years old persons when compared with thin persons (National Audit Office 2001). Slovak project MONIKA in 2002 found out, that from 68 767 people 57.4 % of people at the age of 15 – 64 years old suffer from overweight and obesity (Bendíková, 2012).

It is important to point out, that there are two types of obesity according to the area, where there is excessive fat in the body (Galajda, 2007):

- a) Obesity of the upper part of the body, also known as abdominal, android, male or central obesity.
- b) Obesity of the lower part of the body, also known as gluteal-femoral, gynoid, feminine or peripheral obesity.

The main objective of the project IDEA was monitoring of abdominal obesity in wider population groups in the world and in Slovakia in 2005. Abdominal obesity (defined as a waist measurement > 102 cm in men and > 88cm in women) represents an important marker for a metabolic syndrome and is proven to be an important risk factor of serious cardiovascular events. So far, this obesity was not systematically monitored in Slovak conditions. Alarming, particularly in women, is connection of abdominal obesity with cardiovascular diseases, arterial hypertension and diabetes mellitus (Dukát et al., 2006).

7th nationwide anthropometric survey, which took place in 2011 under the auspices of the Public Health Authority of the Slovak Republic in cooperation with the Institute of Hygiene of Faculty of Medicine of the Comenius University in Bratislava, which listed 18 114 children and youths (9 073 boys and 9 041 girls) at the age of 7 – 18 years, points out the following facts in relation to the body weight.

In comparison with 2001 there was, almost in all monitored age groups of boys and girls with the exception of 16 year old girls, statistically significant increase of the average body weight in boys ranging from 1.6 – 5 kg and in girls 0.6 – 3.4 kg. There is a high growth in guys at the age of 10 – 15 years, when we still record growth acceleration, but significantly higher values (about 2.9 – 3.8 kg) are also at the age of 16 – 18 years when the height stagnates or more precisely, is lower compared to 2001. While in 2001 18 year old boys were heavier on average by 0.6 kg than in 1991, in 2011 they were, compared to year 2001, heavier by 3.8 kg. The average weight of 18 year old girls is higher compared to 2001 by 1.7 kg. Between two previous decades (1991 and 2001) the difference at the 18th year of life was statistically insignificant, only 0.15 kg.

During last measurements there were not recorded any intersexual differences in the body weight of boys and girls in terms of higher values in girls during puberty. In all age groups boys were heavier or more precisely in the 10th year of life they had the same average weight. Boys are on average heavier than girls by 14.8 kg at the 18th year of life (UVZ SR, 2007).

Ministry of Education of the Slovak Republic points out the fact, that up to 70 % of schoolable children and youths spend four hours of their free time on computers, the Internet, watching television or entertainment with mobile phones. Authors such as Junger (2000), Šimonek, Fofková (2006), Peráčková (2008) support these statements. Ministry warns, that only every third pupil does regular organized physical activity.

It follows from the above, that deficit of the physical sporting activities in movement regime of children and youths is a presumption for the increase of excessive body weight and childhood obesity (Helm, 2001; Brock et al., 2009), whose result is frustration from physical appearance, reduced acceptance by peers, rejection, isolation, mockery, which are manifested in socialization, which negatively affects mental health and quality of life (Medeková, 2010). Excessive body weight and obesity in childhood increase probability of their continuation in maturity, which increases the risk of other health problems.

Aim. To extent knowledge from the area of selected lifestyle determinants of secondary-school students in relation to selected health factors and thus contribute to solving the issue, which has currently ascending tendency in children and youths and demonstrates itself in later age.

Materials and methods

Monitored group consisted of 116 female pupils of fourth grade of secondary schools in L. Mikuláš, whose average age was 18, 1 years. Primary characteristics of the monitored group is in a Table 2 with average values.

Table 2: Characteristics of the group (n = 116)

File	n	Decimal age	Body height/cm	Body weight/kg	Body mass index
Girls	116	±18,3	168,2	60,4	23,9

Somatic measuring of the monitored group was made after the agreement within preventive examination in a private ambulance of general practitioner in L. Mikuláš. Research was conducted between January – March 2014. For the examination of selected determinants of physical development we used standard methods to identify: body height, body weight, waist measurement, hips measurement, where to examine the proportionality we used weight-height index (Body Mass Index/BMI) (table 3), WHR index (Waist to Hip Ratio) and weight OMRON Body Composition.

Table 3: BMI and classification of the body weight according to the WHO (Fábryová, 2006)

	Class of obesity	BMI (kg/m ²)	The risk of associated diseases
Underweight		< 18.5	
Normal		18.5 – 24.9	Average
Overweight		25.0 – 29.9	Increased
Obesity	I.	30.0 – 34.9	Moderately increased
	II.	35.0 – 39.9	High
Extreme obesity	III.	≥ 40	Very high

Our qualitative and quantitative data was processed by frequency analysis and chi-squared test (1 %; $p < 0.01$ and 5 %; $p < 0.05$ level of significance), with which we monitored the significance of differences between levels of monitored factors, as well as the answers to selected questions of a standardised questionnaire (CINDI). Simultaneously, we processed data in a graphic form, we used methods of logical analysis, synthesis, as well as mental actions to interpret the results.

Research results and discussion. Based on partial objective and tasks, we present a part of results, which are a subject of a further scientific monitoring and processing. Stated results cannot be generalized, but it is necessary to understand them in overall context as informative and initial considering the lifestyle of adolescents. Obesity in combination with hypokinesia is considered to be a significant risk factor, which negatively impacts on morbidity and life expectancy. In this combination the effect of the risk factors is multiply increased. From the BMI evaluation in female pupils we came to the following (table 4).

Table 4: The BMI evaluation in female pupils (n = 116)

Classification of the body weight	underweight	normal weight	overweight	obesity
(n = 116)	6 %	47 %**	39 %*	8 %

Legend: BMI (Body Mass Index), **the level of significance $p < 0.01$,
* $p < 0.05$

The basic indicator monitors the current population, but more than 39 % (Chi = 6,009; $p < 0.05$) female pupils are overweight and 8% are overweight. Normal value of the BMI was found in 47 % (Chi = 8,138; $p < 0.01$) and underweight was found in 6 % of female pupils. The level of WHR (Waist to Hip Ratio) based on the measurements of external parameters in female pupils represents table 5, where we found, that up to 73 % (Chi = 11,633; $p < 0.01$) female pupils have peripheral, 12 % balanced, 9 % central and 6 % risk distribution of fat. The value of the visceral fat by weighing machine OMRON BODY Composition pointed out, that in 13 % there is moderately increased risk of visceral fat from the overall number of monitored group in the area of abdomen, hands and lower limbs.

Table 5: WHR evaluation in female pupils (n = 116)

Types/n	Kind of fat distribution			
	peripheral	balanced	central	risk
values	< 0.75	0.76 – 0.8	0.81 – 0.85	>0.86
(n = 116)	73 %**	12 %	9 %	6 %
Σ	100 %			

Legend: WHR (Waist to Hip Ratio), **the level of significance $p < 0.01$

Health not only influences the amount of excessive fat, but also its distribution in the organism. Obese individuals, who have excessive fat stored around the abdomen area (visceral type of obesity), have a greater risk of developing health complications than those, who have fat stored on hips and buttocks. Adipose tissue of men and women with abdominal and visceral obesity is characterized by large fat cells, increased activity of lipoprotein lipase (a key regulator of fat accumulation), increased lipolytic activity and low antilipolytic insulin effect. Interesting thing is, that the amount of visceral fat is not dependent on the amount of subcutaneous fat in the body, which means, that even in the case, that the man does not suffer from an excessive fat, visceral fat may furtive threaten human health (Hainer, 2004; Lisá, 2004). Kuzmová (2003) adds, that the excessive amount of fat in the body is created whenever there is an inequality between energy intake and expenditure. The largest energy expenditure represents the basal metabolism rate (around 75 % of the overall energy expenditure), less energy is consumed during various forms of physical activity (about 10 - 15 %), during heat formation after food intake (also 10 - 15 %) and under the effect of several stimuli (stress, cold, etc.). Even 1 % unbalance in the energy balance will cause one kilogram of weight growth within a year. Whereas adipose tissue contains about 75 % fat, which is the main storage form of energy, obese individuals have approximately 30 000 kJ (7 000 kcal) in each kilogram of excessive weight. There are several causes leading to the energy unbalance and apparently they are combined variously in obese people. Also Galajda (2007) points out the risk of developing cardiovascular diseases as a result of increased WHR. Bendíková (2011) adds, that this state is likely to be caused by wrong lifestyle and the proportion of individual components (diet, drinking habits, exercise, relaxation, stress, sleep, etc.). We assume, that higher body weight in female students is connected with a lower volume of physical activities with higher intensity in their movement regime.

We also refer to the connection with reproduction, where we found out, that women with lower WHR have less infertile cycles as well as less irregular menstrual cycles. Women with lower WHR have more regular menstrual cycle and less anovulation cycles than women with higher WHR (Singh, Singh, 2006). At the same time, they have optimal level of sex hormones and higher pH of the mucus endocervical, which helps penetration of sperms. This means, that the level of estrogens and progesterones in a fertile phase of menstrual cycle in these women is generally higher than in women with high WHR. It follows from the above, that increased rates of BMI and WHR have a relation to fertility and regularity of menstrual cycle (Rokyta, 2000). WHR value is also in a relation to women's sexual behaviour.

On question considering satisfaction with figure, 36 % ($p < 0.05$) of female pupils responded, that they are satisfied, 49 % (Chi = 9,765; $p < 0.01$) said no, 9 % said just partially and 6 % do not know (table 6). Unsatisfied, in relation to the figure, are mainly with their eating habits and

content, which lacks regularity of smaller portions, drinking habits, sufficiency of fruits and vegetables at the expense of eating in fast foods, which is tasty and high caloric. Eating in fast foods has become an image matter for young people.

Table 6: Satisfaction with a figure (n = 116)

Answer/n	yes	no	partially	I do not know
(n = 116)	36 %*	49 %**	9 %	6 %

Legend: **the level of significance $p < 0.01$; $p < 0.05$

Table 7 shows the current rating of female pupils' health state, where we found the following. 43 % of girls stated, that they have minor health problems, which are in connection with painful menstruation, headaches or with skeleton and muscular systems.

Table 7: Evaluation of girls' health state (n = 116)

Current girls' health state				
Evaluation/n	I am healthy and in a good shape	I am healthy, but not in a good shape	I have minor health problems	I have serious health problems
(n=116)	19 %	21 %	43 % **	7 %

Legend: **the level of significance $p < 0.01$

This finding is significant at the 1 % significance level ($\chi^2 = 7,633$; $p < 0.01$). 21 % of female pupils stated, that they are healthy, but are not in a good shape, while only 19 % of them stated, they are in a good shape and are feeling healthy. From quantitative indicators "Daily and weekly regime" of female pupils we found the following representation of living factors, which are a part of their lifestyle (table 8). Fact, that results from ascertained data is, that passive lifestyle of female pupils is twofold higher compared to the active lifestyle. While the overall movement (including hygiene, going to school and back, movement at school and home environment) represents at average only 4 – 5 hours a day. Lost time represents 4.0 – 5.5 hours a day. It represents 28 – 38.5 hours of lost time within a week. This means, that female pupils are not able to properly organize and adjust daily and weekly regime (or motion), economize time and use possibilities to develop personality in relation to health, whom they, on average, dedicate 1 hour of active relaxation.

Table 8: Everyday activities of female pupils' lifestyle (n = 116)

Daily and weekly regime		
Daily regime time	Activity	Weekly regime time
6.0 – 7.5 h	sleep	42 – 52.5 h
0.5 – 1 h	hygiene	3.5 – 7 h
0.5 – 1 h	way to and from school	3.5 – 7 h
7 – 8.5 h	school	35 – 42.5 h
1 – 1.5 h	nutrition	7 – 10.5 h
0.5 -1 h	education	3.5 – 7 h
2 – 3.5 h	friends	14 – 24.5 h
1 h	active relaxation	7 – 7 h
1.5 h	EGA	7.5 – 8.5 h
4.0 – 5.5 h	lost time	28 – 38.5 h
24 hours		168 hours

Legend: EGA - educational gymnastic activity.

From physical activities female pupils are devoted to recreational swimming, skiing, cycling and volleyball. They prefer aesthetic forms of exercise enhanced by music (various forms of aerobics), with the aspect of formation of the body culture and movement expression. There is an emotional component (motive) as a specific character and a significant stimulating value of the movement.

In terms of weekly frequency (table 9) we point out the fact, that female pupils do sports activities irregularly in 34 % (Chi = 5,893; $p < 0.05$), once a week it is 16 %, twice a week it is 13 % and three times and more a week only 8 % of respondents. Interesting finding was, that only 29 % of respondents do not do sports activities at all.

The most frequented reasons, which prevent female pupils from sports activities are: lack of free time, school preparation, cushiness and weak will to overcome physical inactivity. Many of them would be interested, however, they often do not know how to and where to participate in regular physical activities. We can perceive stated facts from several points of view, which can become the subject of various debates.

Table 9: Frequency of female pupils' physical activity a week (n = 116)

Frequency of PA	I do not do PA	I do PA regularly	once a week	twice a week	3 times a week
n = 116	29 %	34 %*	16 %	13 %	8 %

Legend: PA – physical activity, *the level of significance $p < 0.05$

Monitoring the degree of integration into doing sports activities in term of previous educational gymnastic activity we found, that female pupils, who in the past did sports activities, exercise more regularly (21 %) than women who did not do any educational gymnastic activity (27 %).

The intensity of the sports activity is in 58 % ($p < 0.01$) low, while 33 % represents medium intensity value and in 9 % the intensity of sports activities is high. Stated intensity, as well as the frequency, is related to female pupils, who do sports at a representative level in the alpine skiing.

Doing sports activities is closely related to the question: In which organisational forms do female pupils sports activities most likely (table 10). Only 2 % of female pupils stated, that they do sports activities by themselves and another 2 % with parents because of the time illimitability and commitment, content and intensity, while 29 % of female pupils prefer organized collectives and 38 % (Chi = 5,999; $p < 0.05$) stated they exercise with friends.

Table 10: Way of realization of female pupils' sports activity (n = 116)

Way of PA	herself	organized collective	with family	with friends	I do not exercise
n = 116	2 %	29 %	2 %	38 %*	29 %

Legend: PA – physical activity, *the level of significance $p < 0.05$

Leisure time, as one of the phenomena of active relaxation in human lifestyle, plays an important role in term of its utilization and personal realization. It is also connected with motivation, which determines an individual for certain objectives, orientation and certain activities by provoking the individual to act in accordance with the aspiration. Even adolescents do not act in sports sphere of recreational nature spontaneously without motives (Ewiaková, 2003). If we start from the fact of the hypokinetic way of life as the expression of the current form of interests, then knowledge of the interest preferences of female pupils is a presumption to realization and regulation of interests, so they become a positive element in the structure of the living values.

From the risk factors, that dominantly appear in female pupils' way of life, prevails the lack of physical activity of educational gymnastic and sports character in 56 % (Chi = 8,932; $p < 0.01$). It

also includes stress situations (21 %), but also incorrect eating habits (37 %, Chi = 5,990; $p < 0.05$), which can be manifested, as we know, in the form of anorexia, or bulimia. According to Šimonek (2005) BMI determined by us in girls is at the limit of a norm. Questionable remains also the use of alcoholic beverages and smoking, which stated 5 % girls. Questionable also remains whether they stated their real state.

Dominant are, in term of health care, also physical activity and nutrition, which are not significant, but also massages or relaxation. We would like to point out, that girls are also devoted to active relaxation and its positive effects on health, but they also pay attention to psychical health (Chi = 7,666; $p < 0.01$), which is probably related to a higher number of stress factors during the day and week in a working and family environment.

Conclusion

Utilization of sports and recreational activities in order to improve health and shape is insufficient in the monitored group, which was confirmed significantly. At the same time, findings significantly point out on low intensity ($p < 0.01$) of realized sports activities and their irregularity to a greater extent, as well as a higher volume of lost time at the expense of its utilization in favour of physical and mental health by active relaxation. Monitored factors of body development point out, in about one third of female pupils, increased body weight, they also have minor health problems. Peripheral distribution of fat ($p < 0.01$) in a monitored group was observed in 73 % of female pupils. They also expressed dissatisfaction with their figure. Which means, that stated has aesthetic and health dimension and impact.

It results from these findings, that everybody should find time for optimal physical activity, three times a week for at least an hour. The content of activities should be various physical programs or exercises of aerobic character, with compensating, stimulating and regenerative functions in relation to the physical and mental health.

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