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Lifestyle among Children and Youth***



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Under patronage and guarantee:

doc. PaedDr. E. Bendíková, PhD. and doc. Mgr. V. Biloveský, PhD.

Aim of the Conference:

Presentation of knowledge in the field of health
and physical activity among children and youth.

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Program of Conference:

9:00 - 9:15	Presentation of participants
9:30	Official opening of conference doc. PaedDr. E. Bendíková, PhD.
9:30 - 12:30	Invited lectures
12:45 -13:45	Lunch
14:00 – 18:00	Section 1 Motion, motion programs, health and lifestyle of children and youth Section 2 Workshop
18:00	Closing ceremony

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PREFACE

The motion is a manifestation of life, an expression of existence of human beings, as well as bearer of communication with oneself and surroundings. It is an axiom that has been known for centuries, seen in various forms of existence of the Universe, which can be seen by every human being.

The issue about hypokinesia, health and lifestyle are at the beginning of our millennium one of the most attractive problems of modern society in relation to diseases of civilization. It is discussed at different levels of social life and mentioned in all aspects, especially areas of philosophy, psychology, sociology, medicine, economy and sports. Health, motion and lifestyle form a triad of factors, which has originated through the development of human beings, thus gradually develop new theories, methods and different views on the effectiveness and importance of the motion of human beings' health. Many features might be found in works of ancient thinkers. Even from Antiquity is well-known term "kalokagathia", which means interplay of mental and physical strength. About physical activity, Hippocrates and Galen attributed great importance, as well as the teacher of nations Jan Amos Comenius, who compared motion to air and life to fire.

For all of us, in terms of health it is important throughout the life to create space for regular physical activities, programs within the exercise regimen to maintain physical fitness and motion performance. Current trends of education and training are led to a deeper influencing of mental, physical, intellectual and personal development of human beings and to respect human being as a specific individual. Within the context of transformation of aims of education, attention is drawn to importance of systematic and permanent development of key competencies (such as capabilities for further education, work, life, family, leisure time and for solving various and complex situations at work and in life). What is more, education based on human beings is focused on issue of caring about own health. Complex and dynamic interactions of somatic, psychological and social health symptoms are a reflection of complex social and personal impacts. Active approach toward health, life and culture competence is duty of whole society, as well as individuals. Many subjects catch relevant issues, problems and topics about health and health promotion. It is essential that future teachers and trainers have to acquire necessary quantum of theoretical knowledge and practical skills, which are based on complexity of health care. After acquiring all information and knowledge, they need to pass it all to their students.

Nowadays, there are many current global, European and national topics about health promotion, which upgrade national, European and worldwide (WHO, The Cooper Institute) recommendations and documents for the improvement of healthcare and its determinants.

Health education is undoubtedly one of the defining aims and outcomes of educational actions, which positively correlate with responsibility, expected value preferences and desirable attitudes toward lifestyle. Moreover, it is focused on health as the highest value of existence of human beings.

doc. PaedDr. Elena Bendíková, PhD.

DETERMINATION OF THE SUITABLE PULSE RATE FOR THE DEVELOPMENT OF THE CIRCULATORY SYSTEM DURING PHYSICAL EDUCATION CLASSES

Ferenc Ihász¹, Tibor Király¹, Kevin J. Finn²

¹University of West Hungary faculty of Apáczai Csere János, Hungary

²University of Northern Iowa, Cedar Falls, IA, USA

Abstract

A child is physically active by nature. Physical activity is a joy and an essential part of child's daily life. If only all that physical activity could be stored and used for later years. Unfortunately this is not happening due natural biological development. The current trend is also leading us all into more sedentary lifestyle at younger and younger age.

A society, and amongst a school, should be the place where every child could experience a joy of exercise and could be motivated for more healthy lifestyle. Health concerns and problems due inactivity are getting more and more common in children, thus all efforts encouraging children into physically active living are welcomed.

A total of (n=721) children; (n_b=344);(n_g=377) attend the 10 different schools in the classes from 1-6 grade levels. We have analysed at what range of intensity was reached by the major part of the examined 122 PE classes. Experiments were made by using the measuring gauges type Polar Sport Tester, Accurex Plus HRM and Polar Vantage NV. These devices contain an arm watch as receiver, and a transmitter which can be placed on the chest where they do not disturb during motion. The transmitter feels the heart signal and sends an electrical impulse to the circuit of the impulse monitor unit where each heart cycle is registered.

The purpose of this paper to analyze the heart rate target during the different motion types of PE classes.

Key words: *circulatory system, physical education classes, pulse rate*

Introduction

Analysing age-dependent productivity and motion learning levels, a problem has always arisen, how and to what the changes must be compared, during fixation of target body development (motion learning or ability aptitude) levels or simply in characterizing their changes. What degree of change can be considered as suitable, inevitably must be there some positive changes in each child's development phase, or can be blamed our inefficiency for the stagnation?

During the individuals' development process, dynamics of changes in body forms (morphologics) and operation (functionality) are not uniform. People can significantly differ to each other in comparison to their life cycle dates and length, as well as how much it is expressed. In spite of all this, there exist some principles. Principal moments in ontogenetics are accessed on slightly different ways by different researchers, according to their special fields of interest. But they all agree in pointing [1, 2, 3, 4] out the complex characteristic of ontogenesis. Taking it all into consideration, the corresponding independent research fields can be considered as follows:

- cognitive development,
- affective development,
- motoric development.

In the spontaneous development process of all the three fields, determining importance are given to the ripening of control mechanisms, as well as admission and training. This controlling, as common component, suggests that the above differentiation to cognitive, affective and motoric developments can be traced back to the limitations of the complex study of the process. These limitations are mostly set by those who carry out the investigations since a working group organized on interest field (profession type) basis is, in most cases, not able to fulfil research work on some simultaneously existing points of view, or there can be organizational and execution difficulties arisen during the formation of a working team representing more fields of science.

One of the aims of physical education is the development of motoric and physiological efficiency but the increasing effect of motoric development on intellectual and emotional spheres can also not be questioned. This means that development of motoric aptitude is no end in itself but a tool in making it possible for a child to exercise the motion patterns of gymnastics set up from physical (body) culture elements, and to ensure its own healthy development and regeneration at a certain intellectual development level. Through this function, physical education (either at school, or outside) contributes to the improvement of personality, and ensures morphological and functional grounds for consummation of character.

If physical education would like to contribute to personality improvement than the interrelations which bind physical education to personality improvement must be known, and the physiological and psychological effects caused by the motion practice of physical education must clearly be appreciated. It is needed to emphasize that one of the basic, principal manifestation forms of action-ability within personality is human motion and movement, motion actions in which the character of action is given by the process of thinking.

For fulfilment of motion actions, a condition system of physiology type (energetics, cardiovascular regulation, training adaptations), as well as of psychological and pedagogical type is required. Greater relative or absolute accent, different to that of the other, cannot be given to either component regarding theoretical or experimental considerations. Their breakdown or disaggregation is only possible in interest of understandable approach. It is inevitably a complex question since children take part in fulfilment of actions together with their full personality, with the feelings, emotions and distresses.

This means the results of motion-type actions in a wider comprehension cannot be characterized with only a single measurement figure, nor with an individual index or feature. In lots of cases, the most appropriate qualification is circumscription. Performances of the children, of the students, must be qualified both in physical education and sport trainings. This qualification is - in nearly all cases - **a tool of pedagogical character**, and at the same time it always serves in the **pedagogical process** as the basis for the determination of further actions. There are results that can be evaluated both in an objective way and through statistical formulas, while the others only with pedagogical qualification. The most important professional criteria are: objectivity and reliability, in order to achieve that the final result of qualification be independent from the qualifying person.

At school physical education, results from motoric tests (selected carefully and well grounded), in luckier cases changes in test results, present basis *for the qualification of students*.

The intensity values of the studied PE classes

A very important function of the physical education classes that for the interest of the development of the heart-circulation system, it should ensure a load over 60% intensity which causes adaptation. For this reason the pupils have to work without interruption 10-12 min (activity interval) to reach the sufficient impact. To get this effect the major part of PE classes are appropriate after sufficient warm-up. Therefore we have analysed at what range of intensity was reached by the major part of the examined 122 PE classes? The results are shown in Table 1.

Table 1 The effective and desirable intensity and target pulse of PE classes regarding the development of heart-circulation system

Groups examined		Pr	R.P.	Average pulse of major part	Effective I%	Targeted pulse (I=60%)	Target pulse range +/- 10%
Total number of pupils: 721		115	95	156	53 %	164	148-180
Total number of boys: 344		115	94	154	53 %	163	147-179
Total number of girls: 377		114	96	157	54 %	164	148-180
1 st Form	Boy	110	98	155	52 %	164	148-180
	Girl	111	98	152	48 %	165	149-182
2 nd Form	Boy	118	93	153	51 %	164	148-180
	Girl	116	98	159	54 %	168	151-185
3 rd Form	Boy	116	97	156	51 %	167	150-184
	Girl	113	99	160	55 %	167	150-184
4 th Form	Boy	114	94	154	53 %	162	146-178
	Girl	119	95	159	54 %	166	150-183
5 th Form	Boy	113	93	154	55 %	161	145-177
	Girl	114	92	157	56 %	160	144-176
6 th Form	Boy	119	89	154	55 %	160	144-176
	Girl	114	95	158	57 %	163	147-180

We have determined the intensity of the major part of physical trainings on the basis of the measured results. On the basis of the total range, the values by genders and the values cumulated in form level we have experienced, that the intensity of classes varied between 48-57%.

If we consider the average values, then this intensity is suitable, since there are not only circulation systems developing exercises during classes.

Parallel to the facts mentioned in previous sections, these values are similar in every class level and every gender. In different form levels the intensity around 50% reached in the major part of physical trainings is suitable since the development of the circulation system is just one function of the classes. However, to reach a suitable endurance development effect, the 60% loading intensity should be reached in certain parts of the class [5, 6, 7].

On the basis of the pulse data available we have calculated the target pulse which obtains the development of the circulation system for the total number of pupils, by genders and forms. The values calculated can be found in the column indicated as "Targeted pulse".

These values between 160-168 beats $\times$ min⁻¹ – as for the base pulses – are slightly different from each other by forms and genders, and at the same time gives the informative medium value for targeted pulse of the desirable loading intensity. We can speak only about medium value, because the initial values required for the calculation had also a high relative deviation. If we consider that the relative deviations of the initial relative rest pulse and pulse reserve required for the calculation of the targeted pulse were over 10%, then we can state that we can spread the scope of the targeted pulse values to a deviation range of -/+10%.

Thus at least 10 minutes at 144-185 beats $\times$ min⁻¹ heart rate is required for the development of the cardio-vascular system in the given heterogeneous classes in order to achieve the goals related to the improvement of this capability.

This extent of deviation is allowable because the individual pupils act with different efficiency in the constant loading activity intervals. On efficiency in this case we mean that at which oxygen uptake level the different pupils react during adaptation for loading. Since the improvement of this value is the task in the development of the heart-circulation system, therefore we have to concentrate on this physiological value even if we have not got direct data on it.

For the time being, all we know about this factor is that according to the data measured under laboratory conditions with steady loading (at least for 10 minutes) at target pulse of 140 beats $\times$ min⁻¹ a 12 year-old healthy child is working with 68 % of the maximum oxygen input, while at target pulse of 160 beats $\times$ min⁻¹ it is 77 % of the maximum oxygen input. These two limit values actually agree to the target pulse range recommended by us (between 144 and 185 beats $\times$ min⁻¹).

Based on the average values it seems that the reviewed physical trainings will achieve their goals if the steady load is ensured for an adequately long time. However based on our tests we cannot precisely identify whether the cardio-vascular system has really been loaded for at least 10 minutes continually. If not, this should be considered by the PE teachers later on. Unfortunately we can see from the results of the research that the intensity values of 721 pupils tested in the course of 112 PE classes have significant scattering. According to our theoretical training studies the load of the cardio-vascular system has to be regularly and continually exerted in order to achieve the improving effect. But the values mentioned above show that due to organising and motivation errors this goal has not been consistently achieved in the course of the PE classes.

Therefore it is important to draw the attention to that the cardio-vascular system improvement has to be integrated into each PE class, even if in addition to this there is other skill developing or just motion training tasks to be performed. Primarily this means an organising task for the teacher.

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RECREATIONAL ACTIVITIES IN THE DIFFERENT KIND OF GENERATION IN CONNECTION WITH PHYSICAL ACTIVITY

Judit Lakó Herpainé¹, Zsuzsanna Balogh Olvasztóné²

¹Eszterházy Károly College, Department of Physical Education and Sports, Eger, Hungary,

²Faculty of Child and Adult Education at the University of Debrecen,
Hajdúböszörmény, Hungary

Abstract

In our paper we write about the role of certain factors responsible for physical and mental health, paying particular attention to the relationship between the family - particularly the grandparents - and physical education. Nowadays, dealing with grandparents and involving them in the upbringing of their grandchildren - and in all fields of life - is an important task for the families. Despite the negative changes, the smallest community of society still plays a basic role in the formation of habits, way of life and values. Undoubtedly, the family is a biological, social and emotional community, uniting several generations and it provides such examples and patterns, the effects of which are difficult to complement or cannot be corrected at all. As the study concerned quite a lot fields and issues, in this particular essay we wish to introduce only a part of the research, detailing the issues of the relationship of two generations: that of grandparents and grandchildren. The topic was chosen because it concerns a less studied subject, not to mention the changes in the grandparents' roles as a result of the recent changes and specifications of modern age. The study was carried out in Hungary, in the North-Hungarian region, among 10-14-year-old children, their parents and grandparents. There was a questionnaire survey for 509 children, 509-509 parents (mother, father) and 509 grandparents. 50 children, 50 parents and 50 grandparents were interviewed in structured forms. We were able to prove an impact system according to which grandparents have a crucial role in today's Hungarian family structure and in the complicated and difficult employment scheme of the parents. Our study proves it evidently that according to the respondents in the relationship of grandparents and grandchildren the stress is on the quality of time spent together, i.e. on their content and emotional values. The key drivers of their relationship are love and respect.

Key words: recreational activity, sports, family, three generations

Introduction

This study focuses on the role of certain factors responsible for physical and mental health, paying particular attention to the issues of physical exercise and body culture. During the theoretic and practical research of the topic we tried to map the physical training and sport-related activities, the characteristic features of the way of thinking and the causal factors influencing these in the case of 509 families, *including three generations*, with the help of an empirical study. The exemplary and value forming role of different generations within the family was a highlighted part during the study. The examination of the connection between *grandchildren and grandparents* from the above mentioned aspect was also important as this kind of connection has a lot of new content and formal specialities in the light of the

changes in our time. Below we provide a brief overview of this study, emphasising some experience and results of the empirical research we regard considerable.

Life potentials and limits: contradictions of civilisation

The issue of preserving physical and mental health has become a lot different in the centre of interest prior to that, having different aspects and contexts, in consequence of the results yet at the same time inevitable dangers and risk factors of modern age. Due to the achievements of civilisation, the limits of active life have been extended, life expectancy has become longer, thus creating an encouraging reality for everyone. Besides the results and possibilities, we have to live together with the harm of modern age, including the factors threatening our lives and health in many ways. New epidemics, diseases and pathogens, the menacing results of environment protection constitute only one group of the factors indicating danger. The way of life of the man of our time, often having a distorted ideal of man and life, the dead ends while escaping from the life full of stress and challenges can rush the realisation of their biological potentials into danger. It is a tragic fact that such harm and negative effects appear very often as early as in childhood and adolescence, more and more youngsters are concerned by the *delicate off-balance of physical and mental health*. We have statistics about the health state of the adult age group, showing rather alarming symptoms as well, thus rushing the possibility of a healthily lived old age and biological potentials into danger. Fortunately, science can help us to orientate in the multi-factorial cause group which defines health, life expectancy and the quality of life, to be able to see more clearly the joint impact system of our genetic, social, environmental and lifestyle characteristics, thus the relationships of our individual possibilities and responsibility. Modern technology and mass media have a significant role in this kind of orientation and in applying the available possibilities.

The role of the family in the educational process related to body culture, physical culture

The family as a determining community transmitting values, has a decisive role in creating and forming a health-conscious lifestyle, as well. Undoubtedly, the family is a biological, social and emotional community uniting several generations and it provides such examples and patterns the effects of which are difficult to complement or cannot be corrected at all. Despite the negative changes, the smallest community of society still *plays a basic role in the formation of habits, way of life and values*. The behavioural, consuming and lifestyle habits experienced in the family have a decisive influence on the sensitivity, the attitude to the world and the value judgement of the children brought up there. The family has several psychic and physical health preserving functions in the attitude to health of youngsters.

The family has a primary role to help what to choose as it provides a spiritual, moral, mental and physical environment for our body, soul and spirit to be able to develop both in short and long terms. Recently, the role of the family has undergone constant changes which affected not only the operation of the family but also its values (Kuijsten 1996, Rácz 2005, Szretykó 2002). The transformation of the family has an impact on the individual's relationship to the family, its strength, intensity, socialisation, sense of security and social support (Kopp & Skrabski 2001, Poortinga, 2006). The quality of our life depends largely on the relationship with ourselves and others and on our connection with the environment. Knowledge *brought from home*, the unperceived, hidden way of acquisition and learning without teaching forms most of our adult knowledge, the significant part of which is acquired *outside the institutional learning places*.

Parental social support and the quality of the relationship with parents can change in adolescence, yet the importance of bonding remains. The acceptance of the values represented by parents can be a measure of family cohesion, which can also contribute to the successful social adaptation, apparent in the attitude to healthy and harmful addictions (Pampel & Aguilar 2008, Unger et al. 2002). The demand for regular physical activity can be evolved as a result of attractive family patterns and proper school education at a rather early stage in life. It is mostly the family and the school which decide where we can find the healthy lifestyle and physical activity in the values of the child.

The child can acquire the different behavioural forms during the social learning started within the family, with the help of the educational activity of parents or other relations, or by miming them (Földesiné et al. 2010). This way the child can learn, acquire the elements of those activities and lifestyle which are necessary for a healthy physical and mental life. The appearance of these health preserving factors can stay with the child throughout their life. Such *health care activity* is, among others, the regular physical training, doing some kind of sport, very often taken up because of family patterns. According to Földesiné, *sport socialisation*, very often, is *not a one-way process*, the child may also be the one who involves the parents – in some cases even the grandparents – in the sport activities. This way can be gradual, starting from the role of the escort, through the common support till the sport activity done together. It can happen that the above mentioned activities appear simultaneously in the life of the family.

Above it was emphasised that a health conscious behaviour can be evolved only as a coordinated result of different formal and informal impact systems. The family has a primary, prioritised role in this educational progress, too.

The *significance and role of grandparents*, whose educational activity we must not forget about, must be mentioned here. In every field of educational activity – such as in the fields of values related to a healthy lifestyle and body culture as well –, there is a grandparent in the background who has a totally different relationship with the grandchildren, thus being able to form them in a completely different way. Definitely, education within the family is not a one-way process, although the upbringing of children is in the centre. Yet, *grandchildren also shape the views, attitudes and personalities of parents and grandparents*, thus their attitude to body culture.

In our empirical study, some partial results of which will be shown in the last part of this essay, special attention was paid to the role of grandparents within the family, the effects of the grandparents' body culture and sport-related values on the parents and grandchildren.

Higher average age also results in the grandparents' being active workers on the labour market for a longer period of time. The disadvantage of this is that on account of their work activities grandparents can provide less help for their children and grandchildren. The advantage at the same time is that besides mental and physical help, grandparents can also contribute financially to the younger generation's starting of life (Hablicsek 1997).

The changes in the structure and position of the family have created new challenges for grandparents. Nowadays women's position on the labour market has also changed, achieving professional success and the importance of a career have become a priority for many. Others have taken over the role of the breadwinner as very often husbands cannot find any employment. The number of single-parent families is increasing year by year, which results in a lot of single mothers and fathers needing help and support.

The instability of families, the increasing number of divorces, the uncertainty of cohabitation and unemployment altogether raise insecurity. The role of grandparents is appreciated in these hard times as besides mental aid they can support their children and grandchildren in everyday problems, they represent a safe background in their lives.

In today's accelerated world, in the weekday rush they provide great help as they can be mobilised, activated, *grandparents are always there to be relied on*. Grandparents help out in situations when there is a need to take grandchildren home from kindergarten or school, they also help in the housework and in some less fortunate situations they even have to play some elements of the role of the mother, unburdening their children by doing so. Nowadays, besides the physical and mental help, families need the grandparents' financial support as well, as numerous families live below the poverty line. There are almost 500 000 unemployed in Hungary, many of them having families, sometimes with three or more children (Központi Statisztikai Hivatal, 2013). Those families where both parents work cannot be secure totally either, as in most cases the requirements of workplaces can be met only by doing overtime unpaid, which happens again at the expense of family life.

Grandparents do these tasks to help and support their children and grandchildren not because they are forced to do so. They think it is their duty. *Being useful and important gives their everyday life a kind of prospect and sense* to forget about their problems, hardships and illnesses. The joy of altruistic help and the fact that they can be present actively in their children's and grandchildren's life gives them new strength in everyday life. Grandchildren can gain special experience during the common activities, programmes and conversations with their grandparents. Parents would not be able to provide them with these because of their age, the different educational role they have with their children and even because of their philosophy of life. The changes in the structure, function and roles of the family, the syndromes of the crisis and its reasons are one of the most important and complex questions in the fields of sociology, education, religion, and a lot more, as they concern the whole society, each generation. Problems in the operation of the family can have consequences which are not easy to rectify. A more detailed analysis of this issue was elaborated as a part of our empirical study, related to the relationship of grandparents and grandchildren.

To study the interrelationship of grandparents and grandchildren, forming each other, is an exciting task: in every field of education and value mediation, and also regarding all aspects of a healthy lifestyle. Being teachers of physical education and culture mediators ourselves, the issues related to sport and physical activity are especially important and inspiring for us.

Characteristics of the way of thinking related to physical activity of grandparents and grandchildren in the light of an empirical study.

Aim

The importance of a healthy lifestyle, body culture, recreation and sport should be a basic need for a civilised, cultivated person throughout his life. The objective of our study is to reveal those *characteristics and tendencies* which appear in the lifestyles of families, paying particular attention to *body culture*, including sports. In addition, we studied *how the different generations affect each other* with their behaviour and attitude, *what values* they mediate, how they influence each other's views in connection with a healthy lifestyle and physical exercise. We wanted to answer the question how the formal and informal possibilities of life-long learning appear in the life of the family members, what main *motives*

it has, what knowledge and values children, parents and grandparents transmit to each other in the field of body culture.

Methods

The study was carried out in Hungary, in the North-Hungarian region, among 10–14 year-old children, their parents and grandparents. There was a questionnaire survey for *509 children, 509–509 parents (mother, father) and 509 grandparents. 50 children, 50 parents and 50 grandparents were interviewed in structured forms.* We found it important to know the family connections in the questionnaires of the three generations, to be able to reveal the correlations, thus the coherent questionnaires were given the same number when coding, and the four interviewees were distinguished by different letters. The lifestyle, values, characteristics of way of life, free-time activities, the relation of children, parents and grandparents to physical training, the affecting factors of environment and education were examined with the questionnaire survey. Within the framework of structured interviews, we had the possibility of completing the above mentioned aspects with personal opinions, views and thoughts. Since the study concerned quite a lot of fields and issues, in this particular essay we wish to introduce only a part of the research, detailing the issues of the *relationship of two generations: that of grandparents and grandchildren.*

Results and discussion

The age distribution of the respondent grandparents concerning their sex is formed as follows: 1.3% (5 persons) of grandmothers (371 persons) are between 40–49 years old, 18.6% (69 persons) of them are between 50–59, 52.6% (195 persons) are between 60–69 years old, 25.1% of them (93 persons) are between 70–79, while 2.4% of them (9 persons) are over 80. This means that more than half of the grandmothers are in their sixties, and more than a quarter of the sample is made up by the grandmothers being 70 years old.

In the case of grandfathers (115 persons) the age distribution is as follows: 11.7% of them (32 persons) are between 50–59 years old, 47.9% (45 persons) are between 60–69, 37.2% (35 persons) are between 70–79 and 3.2% (3 persons) are over 80 years old. It can be stated that almost 50% of them are sexagenarians and more than 40% of them are older. 23 persons did not answer the question (Figure 1).

58.3% of the interviewed grandchildren are girls (294) and 41.7% of them are boys (210). 5 persons did not answer the question. The respondent grandchildren are 5–8 grade primary school pupils. 12.6% of them are 10 years old, 14.5% are 11, 24.8% are 12 years old, while 23.4% of them are 13 and 24.8% are 14-year-old pupils (Figure 2).

16.6% of grandmothers, i.e. 61 persons do a certain type of physical training or hobby requiring a regular physical activity while it is true for almost every third (26.9%; 25 persons). A similar tendency can be observed in the case of grandfathers, as most of those who do regular physical activity now, did some kind of sport when they were at school (83.3%; 15 persons). This ratio is 71.4% (10 persons) among those who do physical activity only occasionally, yet 41.4% (12 persons) among those not pursuing any kind of sport.

There is a significant correlation between grandfathers doing regular physical activity regarding their doing sport at school and for whom they find it important to do exercise ($p < 0.05$).

55.2% of those not doing sport, 28.6% of those doing sport occasionally (4 persons) and 16.7% of those doing sport regularly (3 persons) did not pursue any sport at school. Those who did sport at school yet now do not do regular physical activity are four times as many (12 persons) as those who did not pursue any sport at school yet now do some kind of physical activity (3 persons). These figures point to the fact that it is more characteristic to change a way of life rich in physical exercise established in childhood to a less active lifestyle than the other way round.

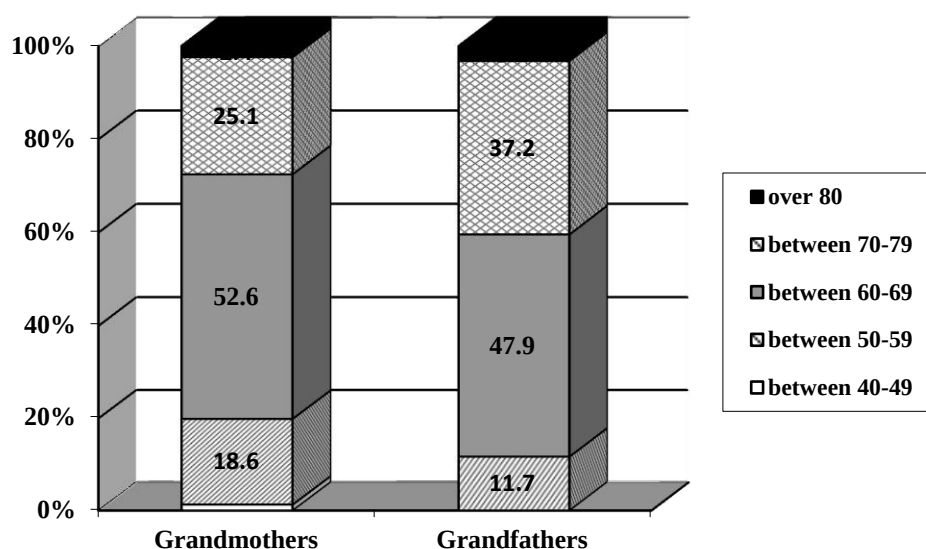


Figure 1 Age distribution of grandmothers and grandfathers (%)

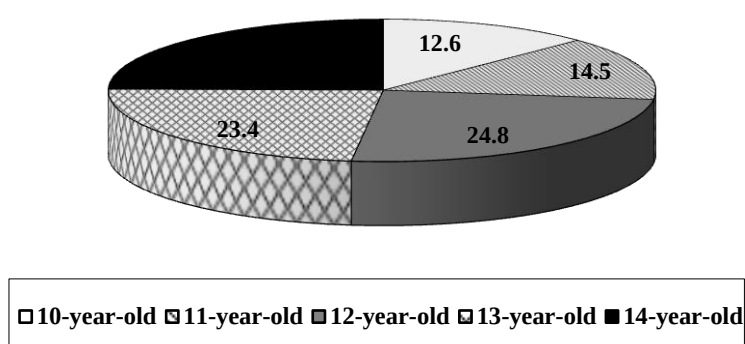


Figure 2 Age distribution of grandchildren (%)

In the light of the results, the hypothesis that the number of all our habits and activities created during our life does not increase in old age but on the contrary, in most cases, certain activities are done less frequently, has been proven.

Such occurrences as serious illnesses in the life of the individual may help to realise what health protecting activities had been neglected earlier in life. This realisation can generate a change in our lifestyle, even in old age. The significance of the habits we developed in our child- and adulthood can be appreciated and it explains why those who had not done regular physical activity in their former periods of life find it difficult to change the old habits and take up something new. However, it is good news that there are a few among the respondents who have changed their habits of child- and adulthood and *integrated regular physical activity into their way of life*.

From the data shown above it can be seen that in the case of the interviewed older generation regular physical or sport activity have not been incorporated in their life activities, for even 50–60 years ago, in their childhood, they were not preferred activities. In addition, the economic, social and technological changes that have occurred since then have generated the possibility of complementing a sedentary way of life with physical training. It does not mean that the elderly would not need regular physical activity, as it can be a significant factor of improving the quality of their lives, starting it at any age, but it is a lot more difficult for them to create a kind of inner demand for among the activities of their childhood and youth, regular physical training had a less dominant role.

On the other hand, grandchildren do regular physical training not only within the framework of every day PE lessons but they can choose from several free time and competitive sport activities. Nowadays, as a result of our sedentary way of life, pursuing sports has become more appreciated. We use a certain type of technical equipment for almost every task, which makes it easier to complete it but at the same time we can lose the possibility of activating our body using our physical strength. The issue of physical inactivity is one of the most problematic ones and it is difficult to cure since the sedentary way of life has a negative influence on other factors of our quality of life, besides the physical-mental problems.

22.3% (113 persons) of the interviewed grandchildren of our survey claimed not to do any regular physical training, yet 77.7% of the respondents (396 persons) go to sports clubs to do some sports as members or with their families and friends. Concerning the frequency of the activity, it can be stated that only *204 persons (40%)* do regular exercise (at least three times a week) of those declaring themselves to be sportsmen. It is welcome that nearly 78% of the respondents do exercise on a weekly basis, but on the other hand, it is a bit disappointing that only 40% of them do sport activities regularly enough. If one does exercise every day, later it may become an inevitable part of their lifestyle. Yet if physical activity is not regular and intensive enough in childhood, there is not much to expect as getting older.

The frequency of children, parents and grandparents doing sport was examined by a three-dimensional cross table. Respondents were divided into three categories on the basis of the frequency of doing sport (both for mothers and fathers) and the data of more than 400 families were compared this way.

Regarding the three generations, it can be stated that in the case of 10 children out of 443 the mother and the respondent grandparent do physical exercise regularly. Examining the responses of fathers, this number is 9 out of 405. Significant correlation can be found only in the case of parents not doing sport, as among them the number of grandparents and children not doing regular or occasional exercise is significantly higher.

Our study focuses on the relationship of grandparents and grandchildren to sport and what value transmission role it can have for them.

The question might arise how those grandparents think about the role and place of sport and the function it has in the lives of their families, their children and grandchildren and in their own who are inactive in terms of physical training.

Similarly to parents, there is significant difference in the case of grandparents in terms of how regularly they do sport and for whom they find doing regular exercise to be important: for each family member, children and grandchildren, only grandchildren or none of them.

Among grandmothers and grandfathers the highest rate is of those considering regular physical exercise determining for the three generations. However, among grandmothers those who think that doing sport is necessary only for their children and grandchildren have a higher ratio.

We also wanted to answer the question how sport influenced the grandchildren's performance and characteristics according to grandparents involved in the survey. In the categories of healthy lifestyle (77.7%), performance, achievement, respect of work (69.9%), honesty and respectability (68.4%), self-confidence, proper self-assessment (68.4%), nearly 70% of the respondents said that the sport activity had a significant or very strong effect on their grandchildren.

When examining cooperation with peers (67.7%), values (64.3%) behaviour (62.8%), the ratio of such respondents is over 60%. According to more than half of the respondents the diligence of their grandchildren in learning (53.1%) and their time management (52.5%) were significantly or very strongly influenced by sport (Figure 3).

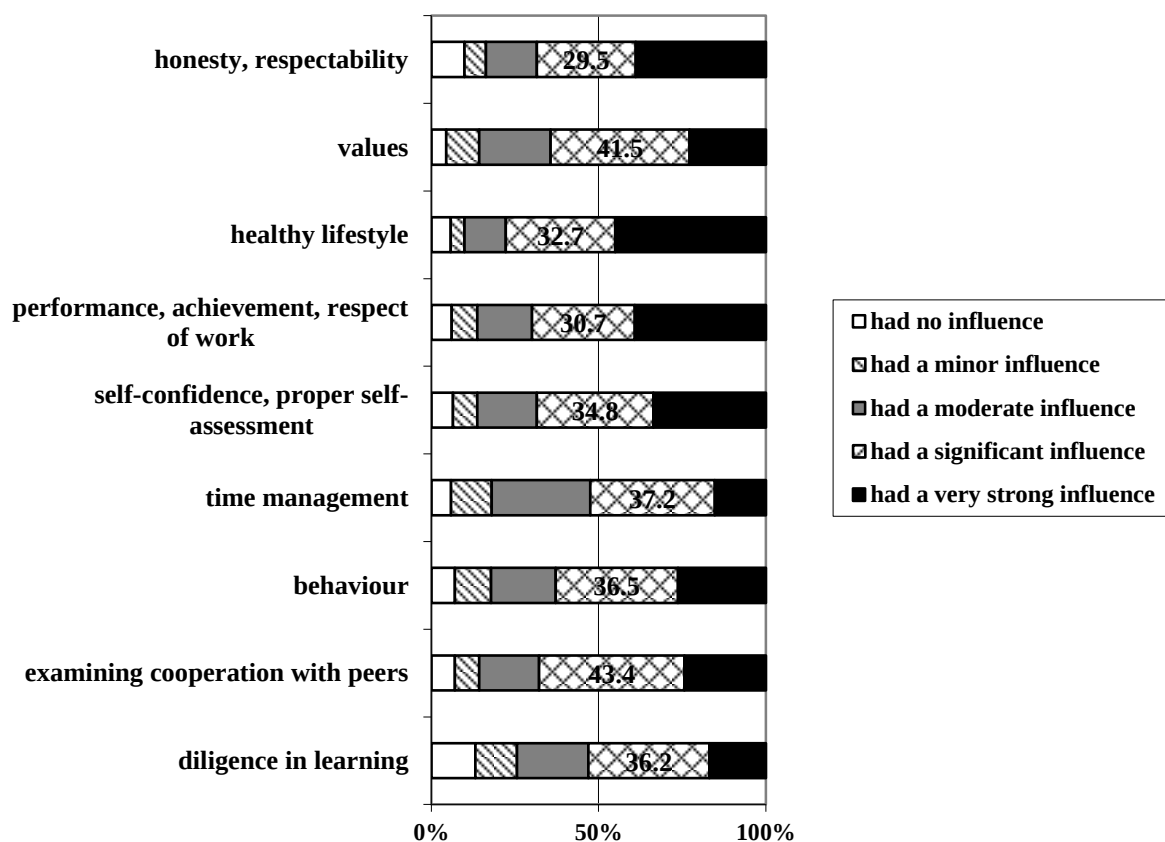


Figure 3 The effect of sport on grandchildren's performance according to grandparents

In the light of the results it can be stated that most grandparents attribute a distinguished role to their grandchildren's relationship to sport and even if they cannot do sport together with grandchildren, can give verbal support and behave in a supportive, affectionate way. Another form of sport support from grandparents is when they cheer on grandchildren's competitions or help the parents to go with grandchildren to trainings. This kind of assistance can provide several opportunities for grandparents to help form their grandchildren's personality, talk about the events of everyday life, pass on the values of their own life. Most often it is the grandmother (the mother of the child's mother) who goes with the grandchild to the trainings and competitions (40.5%, 60 persons), with grannies from the father's side this ratio is 16.2% (24 persons). From the aspect of the interaction of value mediation it is a crucial factor. 14.2% (21 persons) of the learners doing sport regularly or occasionally are escorted by the parents of their mother, whereas 10.8% (16 persons) by the parents of their father. The number of grandfathers from the mother's side who escort their grandchildren to trainings or competitions is 18 persons (12.2%), from the father's side 7 persons (4.7%). Two respondents (1.4%) marked other answers, i.e. they are escorted by maternal and paternal grandparents together. It can be stated that this kind of assistance of the grandparents is a communications area, a certain interaction, necessary for both parties, which can strengthen the commitment to physical exercise.

Conclusion

The novelty of the study is that the assistance and role of grandparents in education has not been examined before. We were able to prove an impact system according to which grandparents have a crucial role in today's Hungarian family structure and in the complicated and difficult employment scheme of the parents. Our study proves it evidently that according to the respondents in the relationship of grandparents and grandchildren the stress is on the quality of time spent together, i.e. on its content and emotional values. The key drivers of their relationship are love and respect. Besides being together, the activities and games done together, the grandparents can pass on a lot of activities and thoughts to their grandchildren, ones they may not meet at home or at school. The child can become familiar with the past, the family events and the lives of the elders genuinely only from this source. On the basis of these activities they can create a strong spiritual connection which is a real support for both of them.

Setting an example is important in almost every field of life, including the issues of a healthy lifestyle and the attitude to physical training. Our study reveals that supportive grandparental behaviour can be the basis of activity and activating. If the members of the old generation do not pursue sport any longer, the revival of old memories, family sport activities or escorting grandchildren to trainings and competitions can be supportive for the child, too.

Recommendation:

The free-time activities done together – hiking, cycling, swimming – can be unforgettable experience for the younger generation, the aim of which is not only to maintain the body but also to form the soul. Today's coming generations also need the unconditional love given only by grandparents to their grandchildren.

Recreational sports have to be adjusted to the family structure and have to take into account factor concerning age specific needs, bearing capacity and skilled-related background.

Several authors highlight the importance of games, lifetime sports and nature-based sports (Könyves-Müller 2001, Kerényi et al. 2009) as they can be performed by virtually the whole family regardless of gender and age. These activities have a high potential of shaping communities and it is a beautiful sight when „several generations train playfully together and grandchildren, children, parents and grandparents share the joy of doing sports."

Knowledge of fitness and recreation trends is crucial to professionals and companies operating in the leisure sector as the adequate response to changing consumer behaviour can be the key to success. Retaining good health is one such trend and a priority not only in recreation, but in tourism as well (Müller et. al. 2013).

There are several spas that cater to the needs of three generations. In spas where the target audience is the families services matching the needs of several generations have to be created. (Könyves et al. 2005, Bartha et al. 2011, Müller- Kórik 2009, Müller et al. 2005).

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INTERNATIONAL ORGANISATIONS AND NETWORKS IN PHYSICAL EDUCATION

Branislav Antala

*FIEP World International Vice-president,
FIEP Europe President, ICSSPE Executive Board member
Comenius University in Bratislava, Faculty of Physical Education and Sports, Slovakia*

Abstract

The explosion of information and the development of information and communication technologies contribute to serious worldwide problems – sedentary life styles and physical inactivity of people, all with related health, economic and social consequences. International organizations are actively addressing these current problems of the world. Examples are ICSSPE and FIEP. ICSSPE occupies a position, as an umbrella organization bringing together 300 international and national bodies. ICSSPE activities include publication of scientific books and journal, organisation of multi-disciplinary congresses and conferences serving both scholars and practitioners; making scientific awards to researchers and scholars, preparing policy documents ; supporting research projects. Good example of successful cooperation between international bodies including FIEP is ICSSPE's International Committee of Sport Pedagogy (ICSP). In 2012, Nike, ICSSPE and ACMS launched a global report "Designed to Move" (DTM) (www.designedtomove.org) which focused on the need to increase levels of physical activity among children and young people. DTM has two principal aims: to create early positive experiences with movement activities for children; and to integrate physical activity into everyday life. The last 30 years have seen the publication of a plethora of international documents concerned with school physical education and sport: Charters, Declarations, Manifestos; Resolutions; Policy and Position Statements. Physical education has also been and will be the main theme of different international events: MINEPS, World Summits on Physical Education, World Forums of Physical Education, Global Forums on Physical Education Pedagogy, International Forums of Physical Education and Sport Science.

Good examples of international networks are also different international projects for ex. "Brain Breaks" of HopSports, "Physical Education and Health – Global Perspectives and Best Practice" or UNESCO Worldwide School Physical Education Surveys.

Key words: *physical education, ICSSPE, FIEP, international networks*

Physical Inactivity as a Global Problem

Intensified competition in world markets, religious conflicts, issues of war and peace, violations of fundamental human rights and freedoms, massive population growth in some parts of the world, unsteadiness in economic development and widening gaps between rich and poor countries and people, corruption, unemployment, natural disasters, pollution of the natural environment, lack of food and drinking water, extreme nationalism, terrorism, increased violence and crime, drugs and non-communicable diseases - these are the most serious global problems of today's world.

The explosion of information and the development of information and communication technologies, along with society's continues obsession with television, contribute to other

serious worldwide problems – sedentary life styles and physical inactivity of people, all with significant related health, economic and social consequences.

Just a few generations ago, physical activity was an integral part of daily life. In the name of progress, we have discouraged it so thoroughly that physical inactivity actually now seems normal.

The new project “Designed To Move” prepared by Nike, ICSSPE and ACSM shows that as economies grow, physical activity is systematically designed, innovated and engineered out of daily life. Research shows that developed economies like as the United Kingdom have reduced physical activity levels by as much as 20 % less than two generations. By 2030, Britons will be almost half as active as they were in 1961.

The researchers suggest also that the faster economies are grown, the faster populations reduce their activity levels. In other words, the effects of declining physical activity levels may be felt more acutely in countries with rapidly developing economies, such as Brazil, India and China.

Knowledge of the consequences of physical inactivity has been emerging for years. One of the most important consequences is increase in obesity, especially childhood obesity.

For example, between 1994 and 2008 in the United Kingdom, the prevalence of obesity increased by 79% in men and 47% in women. The number of children and young people who are overweight and obese increases from year to year, including European countries. Physical inactivity is also a major risk factor for all-cause mortality, cardiovascular disease, high blood pressure, stroke, type 2 diabetes, metabolic syndrome, colon cancer and depressions. 9 % of all premature deaths worldwide are attributable to physical inactivity.

Research is fast showing that physical inactivity is already draining economies. In just four countries (China, India, UK and USA) the cost of physical inactivity is estimated to have been more than 200 billion USD in 2008. By 2030 the direct costs alone in UK will increase by more than 61% and in China and India by more than 450 %. Physical inactivity is a big economic, social and health problem (Antala 2012; Antala et al. 2013; Haag, Keskinen, & Talbot 2013; Bendíková 2014). The places for change are first in the family and second the school. School physical education must play in future a more important role than it does today.

International Organisations and its Contribution to the Development of Cooperation and Understanding in Today's World

International organizations are actively addressing these current problems of the world. There is cooperation between sports organizations and federations (IOC, FIFA and others), those working in the field of physical education (PE), sport education and physical activity promotion, especially for children and youth. Good examples are International Council of Sport Science and Physical Education (ICSSPE) and International Federation of Physical Education (FIEP).

ICSSPE and its contribution on international cooperation

ICSSPE was founded in the late 1950s with the aim of maintaining an inclusive perspective on the different disciplines of sport, sport science and physical education, and to continuing collaboration between them. It brings together a wide range of scientific and professional organisations of various sport branches and disciplines, and encourages interdisciplinary and international collaboration.

The greatest strength of the organisation is its unique global network, which enables national and international federations and institutions of sport science and sport pedagogy to co-operate. ICSSPE, as an umbrella organization, brings together 300 international and national bodies and institutes.

ICSSPE activities include publication of scientific books (Directory of Sport Science; Sport Science Studies) and journal (Bulletin ICSSPE); organisation of multi-disciplinary congresses and conferences serving both scholars and practitioners (eg MINEPS V, 2013; Communities and Crisis, 2013); making scientific awards to researchers and scholars (The Philip Noel-Baker Research Award); preparing policy documents (International Position Statement on Physical Education 2010; Berlin Declaration, 2013); supporting research projects (eg Quality of Physical Education and Sport).

In accordance with its 'Associate Status' with UNESCO, ICSSPE serves as a permanent advisory body to UNESCO's CIGEPS (International Governmental Committee of Sport and Physical Education) and conducts research and other projects on its behalf.. ICSSPE also works closely with other UN agencies, notably the UN Office of Sport for Development and Peace (UNOSDP), the World Health Organisation (WHO), the International Red Cross and Red Crescent and UNICEF. ICSSPE is a 'Recognised Organisation' of the International Olympic Committee (IOC), with which it has a long tradition of co-operation and mutual support. The International Paralympic Committee (IPC) is a member of ICSSPE, but also works with ICSSPE as a full partner in international activities such as the International Convention on Science, Education and Medicine in Sport (ICSEMIS). ICSSPE and the International Federation of Sports Medicine (FIMS) maintain close links through ex-officio representation on each other's Boards and co-operate in various areas of common interest. To support its world-wide commitment, the Council establishes contacts with business affiliates, aiming at joint contributions to responsible and sustainable development. ICSSPE promotes the missions of its partners and involves them in scientific and communication projects of the network. ICSSPE has identified "Healthy Living across the Lifespan" as one of its three strategic priorities.

As part of this work, in 2012, Nike, ICSSPE and ACMS co-authored a global report "**Designed to Move**" (DTM) (www.designedtomove.org), which focused on the need to increase levels of physical activity among children and young people. DTM has two principal aims: to create early positive experiences with movement activities for children (which include provision of Quality Physical Education); and to integrate physical activity into everyday life.

FIEP and its Contribution on International Cooperation

International Committee of Sport Pedagogy

Good example of successful cooperation between international bodies is ICSSPE's International Committee of Sport Pedagogy (ICSP). It brings together representatives of the six most important organizations from the field of physical education and sport education (FIEP, IFAPA, IAPESGW, ISCPES, AIESEP and ICCE). ICSP has worked on several common projects led by one of ICSSPE's three strategic priorities – Quality Physical Education (QPE):

- In promoting QPE, the Committee has led work on the preparation of ICSSPE's 2010 "**International Position Statement on Physical Education**", This Position Statement has been endorsed and supported by the International Olympic Committee, the International Paralympic Committee, the United Nations Educational, Scientific

and Cultural Organization and the United Nations Office on Sport for Development and Peace.

- International **“Benchmarks for Physical Education”** The benchmarks for physical education provide countries with self-evaluation guideline indicators that could help to improve the practice of physical education and / or sport in the education system. The benchmarks address specific minimal requirements for a quality physical education and sport, with regard for embracing diversity and inclusion. The intention is to support countries, embracing different levels of subject establishment in education: Emerging, Developing and Advancing. They provide: Government ministers and policy-makers, Curriculum designers, School providers.
- assistance for UNESCO’s **“Guidelines on Quality Physical Education for Policy Makers”** These Guidelines have been developed, accordingly, with the aim of supporting UNESCO Member States in formulating and implementing inclusive quality physical education (QPE) policy and programmes.
- 4 of the organisations participated in the project **"Global Voices on Quality of Physical Education and Sport"**. The associations developed a project that collected the voices of professionals in physical education / school sport in all regions of the world. The purpose was to analyse the views of PE teachers about their understanding of physical education, the challenges they faced and solutions found. Answers on these three questions were analysed: What makes high quality physical education / school sport? What are the challenges for physical education / school sport? How do you manage those challenges?

PE Alliance

In 2009 created FIEP with EUPEA “PE Alliance” This Alliance is a platform for common steps and support for development of PE in European region and for influencing politicians and policy in national and European level.

Global Physical Education Projects and Networks

Physical education and school sport has also been and will be the main theme of different international events: **International Conferences of Ministers and Seniors Officials Responsible for Physical Education and Sport** - MINEPS (Paris, 1976; Moscow, 1988; Punta del Este, 1999; Athens, 2004; Berlin, 2013); **World Summits on Physical Education** (Berlin, 1999; Magglingen, 2005), **World Forums of Physical Education** (Havana, 2010; 2012; 2014); **Global Forums on Physical Education Pedagogy** (USA, 2010; Germany, 2012, South Africa 2014); **International Forums of Physical Education and Sport Science** (India, 2013, Indonesia, 2015).

The last 30 years have seen the publication of a plethora of international documents concerned with school physical education and sport: **Charters** (UNESCO *International Charter of Physical Education and Sport*, 1978; Council of Europe’s *European Sports Charter*, 1992; and PANHALON *Charter of Children’s Sport Laws*, 1995); **Declarations** (EUPEA’s *Declaration of Madrid*, 1991; UNESCO Conference of Minister’s *Declaration of Punta del Este*, 1999, *Berlin Declaration*, 2013); **Manifestos** (FIEP *World Manifesto of Physical Education*, 2000); **Resolutions** (European Parliament’s *Resolution on the Role of Sport in Education*, 2007); **Policy and Position Statements** (European Commission’s *White Paper on Sport*, 2008, ICSSPE *Position Statement on Physical Education*, 2010);

Good examples of international networks are also different international projects (for ex. “Brain Breaks” of HopSports), research projects with publications (for ex. “Physical Education and Health – Global Perspectives and Best Practice”, Sagamore Publishing, 2014 or UNESCO Worldwide School Physical Education Surveys 1999, 2005, 2012).

Examples of Good Practices

First example of good practice related to the quality of physical education from national level comes from Slovakia. National project of lifelong teacher’s education **„Enhancement of qualification of PE teachers“** started on February 1st, 2013. The project is cofounded by European Union in framework of the program „Education“. General teachers teaching PE at primary schools and teachers not graduated in PE, which from different organisational or economic reasons of schools teach the physical education at secondary schools, are the target population. About 3,400 teachers will participate in this education program in following 3 years. Each participant will attend 110 hours of education as a part of the project, from which 60% will be practical lessons and 40% the theory.

Each participant who completes the program will receive particular number of credits. These credits will allow them to enhance their qualification level and salary at their schools. In addition, each participant will get for free a set of 12 educational didactic materials. As a part of the project, 4 textbooks will be published. Each participant of the program will receive them for free.

Further activities of the project will be to design the electronic portal, with didactic teaching materials available for teachers. The portal will also provide an opportunity for mutual exchange of experience and knowledge. Additionally, methodological videos and examples of good practices will be available for them.

The project is unique in Slovakia and may be in all Europe. The authors believe that it will contribute to the enhancement of the quality of physical education, particularly at primary schools, and increase the interest of children in this school subject and regular physical and sport activities.

Second example is using of **“On-Line-Streaming Brain Breaks”** intervention program comes from Croatia. Every school day at least 5-9 minutes per day video intervention was realised during breaks, supervised by classroom teachers. Each interacting video provided motor skill learning or practice with either animated or real instructor. Video training program elicits improvement in children’s perceptions of, attitudes towards, motivation for physical activity and specific academic knowledge.

Challenges and possibilities for the future

For international NGOs which are successful in promoting their mission and demonstrating their value to governments and UN agencies, one of the biggest challenges is to manage the raised expectations for assistance and delivery, within constrained financial contexts. ICSSPE is no exception. As ICSSPE has established its role as a source of international expertise and knowledge in the field of physical education and sport science, increasing numbers and types of agency have requested expert advice and support. With a small staff team and dependence upon volunteer elected officers, it is sometimes difficult to fulfil expectations. However, the recent expressed need for expert input into policy and good practice for health promotion through physical activity has brought ICSSPE and its member organisations into

contact with mainstream health promotion organisations, in ways which would have been unthinkable a decade ago, for example in “Designed To Move”, partnerships with Generation Europe (on resources for young people’s lifestyle management), the American College of Sport Medicine, Excellence in Paediatrics, and the Hellenic Nutrition Foundation. Similarly, following two decades of observation and recording of the demise and attrition of physical education in school curricula, ICSSPE, through its International Committee of Sport Pedagogy and its elected officers, is actively contributing to international and national innovation and capacity-building in physical education systems and strategies in a range of countries and at international level, working with UNESCO and other UN agencies.

ICSSPE has always depended heavily on the work and input from its member universities and institutes. Many of its elected officers are supported for ICSSPE meetings and activities, by the universities for which they work, in the knowledge that their involvement with ICSSPE brings them into contact with enriching colleagues and research, and raises the profile of their sponsoring universities. ICSSPE would welcome suggestions on how it can better serve its members in Japan and Asia.

ICSSPE looks forward to welcoming members and partner organisations to the next International Convention on Science, Education and Medicine in Sport in Brazil in 2016, whose programme will include updates on these developments, and a range of multi-disciplinary sessions on the major issues facing sport and physical education.

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YOUNG PEOPLE'S LIFESTYLE AS A DETERMINANT OF FUTURE HEALTH OF THE SOCIETY, BASED ON TOURISM AND LEISURE STUDENTS FROM THE UNIVERSITY OF SZCZECIN

Wioletta Łubkowska

*Department of Physical Education and Health Promotion,
University of Szczecin, Szczecin, Poland*

Abstract

A 'healthy lifestyle' means taking conscious actions towards increasing one's health potential. Pro-health behaviors include: physical exercise and active forms of leisure, healthy nutrition, amount and quality of sleep, refraining from smoking cigarettes and limiting alcohol consumption, as well as refraining from drug use.

This study is aimed at diagnosing lifestyle of young people who study Tourism and Leisure in Szczecin, Poland.

The research was carried out among 127 students of Tourism and Leisure graduate studies, offered jointly by the Department of Physical Education and Health Promotion and Faculty of Management and Economics of Services at the University of Szczecin, Poland. The average age of subjects was 23.5 ± 0.9 . The research employed the diagnostic poll method with a survey; author's own survey was used. Results were statistically analyzed with Kruskal-Wallis test.

15.3% students suffered from overweight or obesity. On average, 28.8% of subjects were familiar with the definition of BMI. Only 65.4% of students declared regular physical exercise. Main obstacles to physical activity mentioned by students were: lack of time (45%), lack of willingness, laziness (40%) and lack of money (26.6%). Students who specialized in Health Aspects of Tourism and Leisure declared more frequent ($p < 0.05$) consumption of vegetables, fruit, milk and dairy products, along with reduced consumption of sweets, sugar and processed food, in comparison to students who specialized in Tourism Business. 21.7% of subjects reported smoking cigarettes and 100% admitted drinking alcohol. Drug use was reported significantly more often by students of Tourism Business (13.3%).

Students' lifestyle was dominated by anti-health behaviors, such as insufficient physical exercise, passive leisure, smoking cigarettes and drinking alcohol. These anti-health behaviors may lead to diseases of affluence in their future lives. Therefore, it is necessary to include pro-health education in students' curricula; consideration should also be given to target and actual effects of education at Polish universities which offer Economics-related studies.

Key words: *lifestyle, health, healthy behaviors, physical activity, students*

Introduction

The term 'lifestyle' has been used in literature related to many fields, such as Sociology, Psychology, Pedagogy, Medicine, Public Health, Economics and Physical Culture. Woynarowska (2013) defines lifestyle as a set of decisions (actions) of an individual that influence their health and which may be controlled by the individual to certain extent (approx. 50-52% of total influence).

Analyzing links between lifestyle and health, a distinction is made between pro-health and anti-health lifestyle. A healthy lifestyle means taking conscious actions towards increasing one's health potential.

One of such actions may be physical activity, which is an independent health factor; it is positioned at the heart of healthy lifestyle as an important determinant of maintaining health. Physical activity also serves as a part of pro-health education of the society (Bendíková 2010; Paczyńska-Jędrycka and Łubkowska 2014). According to Drabik (2008), 'it may be said that physical activity acts as a guardian of other behaviors. By controlling these behaviors, one reduces other risk factors. Thus, from the public health's perspective, there is nothing more important than promoting physical activity...'.

It is believed that promoting physical activity as part of the health-related fitness (H-RF) program is one of the most important preventive measures. Nowadays, physical agility is seen as a sign of good health (Żukowska and Szark 2010). It must be noted that human condition is influenced by both genetic factors, as well as important environmental factors (Łubkowska and Tarnowski 2012; Nowak 2011; Sygit 2011).

Positive impact of physical activity, especially regular work-out, on health is not a new or original idea. In fact, first information about using organized physical exercise to improve health (Drygas and Jegier 2003) may be traced to as early as 2500 BC in ancient China. Research carried out in many countries brought a lot of convincing evidence which point to beneficial effects of regular workout in prevention of cardiovascular diseases, certain forms of cancer, osteoporosis, bad posture, overweight and obesity, as well as type II diabetes and depression (Drabik 2008). Physical activity may also be perceived as an important element of psycho-motor recovery (Szark and Żukowska 2010).

Physical and sports education should be regarded as an educational institution (environment) with the content consisting of physical activities. It is the only school subject that may have a direct impact on pupils' health, affecting their lifestyle even in adulthood. It is the key factor of enhancing pupils' and teenagers' physical activity and it plays an important role in primary disease prevention (Bendíková 2010). Furthermore, understanding health-oriented fitness is also of utmost importance (Bendíková 2009).

Apart from physical activity, other important factors of healthy lifestyle are: healthy nutrition, refraining from smoking cigarettes and using psychoactive substances, limited alcohol consumption, appropriate amount and quality of sleep (Woynarowska 2013).

Aim

The research was focused on healthy lifestyle of students at the University of Szczecin, Tourism and Leisure Faculty, provided by the Department of Physical Education and Health Promotion (WKFiPZ) with specialization in Health Aspects of Tourism and Leisure and Faculty of Management and Economics of Services (WZiEU) with specialization in Tourism Business. The main aim of the research was to investigate actual lifestyle of young people who study Tourism and Leisure, as well as their consciously chosen health-related behaviors, such as physical exercise, nutrition, using stimulants and sleep.

This analysis was aimed at answering the following question: 'Does students' specialization (lack or presence of health-related subjects in their academic curricula) affects their lifestyles in terms of health behaviors?'

The following detailed aims were also pursued:

1. Comparison of physical activity of Tourism and Leisure students, based on their specialization.
2. Determining factors which influence taking up physical activity by students.
3. Determining the most common obstacles to physical activity.
4. Determining leisure habits of students.
5. Determining nutrition habits of students.
6. Determining students' attitude towards using stimulants.
7. Determining amount and quality of sleep of students.

Material and Methods

The research employed the diagnostic poll method. It included author's own questionnaire which consisted of demographics and 31 closed-end and semi open-ended questions. Questions focused on five aspects of healthy lifestyle of students, such as: physical activity, nutrition, stimulants use (tobacco, alcohol), sleep. Smoking tobacco was defined as smoking at least 1 cigarette per day; drinking alcohol was defined as consuming at least 25 g of ethanol (in any form) more than once a month.

The research was carried out in 2013 among 127 students (66.8% women and 33.3% men), graduate students of Tourism and Leisure at the University of Szczecin. The average age of subjects was 23.5 ± 0.9 . Most of them (50.8%) lived at their family homes, 32.7% in a privately rented rooms or apartments, and 16.5% in dormitories. 46.7% of subjects declared professional activity: 11.7% worked full-time, 13.3% worked part-time and 21.7% worked only at the weekends and on holidays.

Non-probability sampling was used to select subjects. There were 65 subjects (51.2%) who studied at the Department of Physical Education and Health Promotion whose Tourism and Leisure curriculum included health aspects of tourism and leisure; there were also 62 subjects (48.8%) who studied at the Faculty of Management and Economics of Services and specialized in Tourism Business. Table 1 presents characteristics of these two sub-groups.

Curriculum of graduate students studying Health Aspects of Tourism included pro-health education during such classes as: Health Education, Relaxation Techniques, Healthcare in Tourism, Bio-regeneration in Sport and Leisure, Introduction to Physiotherapy, Kinesiotherapy, Spa Therapy, Injury Prevention in Physical Recreation, Gerontopedagogics, Introduction to Classic Massage, Sports Massage, and Rehabilitating Patients with Sensory Disorders. Tourism Business students learnt about health issues only during Health Tourism classes.

Upon graduation, students who specialized in Health Aspects of Tourism and Leisure are fully prepared to design, plan and work in the field of Tourism and Leisure, with a special consideration given to health aspects and motor rehabilitation. Alumni are qualified to work at bio-regeneration parlors, spa centers, sports and leisure units, social organizations, foundations and associations. They can also conduct independent business activities.

As for Tourism Business specialization, alumni are equipped with knowledge and skills needed in Tourism Business sector in terms of marketing, self-government and administration. Thus, these graduates are competent to work as specialist in tourism or tourism-related companies and institutions. Alumni are also able to conduct independent business activities.

Table 1 Characteristics of sub-groups (n=127)

Questions	Specialized in Health Aspects of Tourism at WKFiPZ	Specialized in Tourism Business at WZiEU	Total	Statistically significant differences between subgroups (p <0.05)
Number of subjects	n=65 (51.2%)	n=62 (48.8%)	n=127 (100.0%)	sns
Number of students/specialization	n=137	n=114	n=251	sns
% of students participating in the research	47.4	54.3	50.8	sns
Age (years) ¹	23.1 ± 1.2	23.9 ± 0.6	23.5 ± 0.9	sns
Sex (M/F)	n=20/45 (30.8%/69.2%)	n=23/39 (37.1%/62.9%)	43/84 (33.8%/66.2%)	sns
Professional activity (%)	43.3	50.0	46.6	sns

Legend: ¹ Values represent arithmetic means ± standard deviation.

Abbreviations: WKFiPZ - Department of Physical Education and Health Promotion; WZiEU - Faculty of Management and Economics of Services; sns – statistically non-significant.

The research used critical analysis method and statistical method. The statistical analysis of results was performed with computer software Statistica v.10.0 (StatSoft Polska, Kraków). Results were presented as average values and standard deviations, and expressed as percentage. Due to lack of normal parameter distribution, differences between averages were checked with non-parametric Kruskal-Wallis test. Values for p < 0.05 were considered statistically significant.

Results

While analyzing the results, students' behaviors related to the above-mentioned lifestyle choices were determined.

Physical activity versus unhealthy body mass

15.3% of students reported overweight or obesity. 58.6% of them were unable to determine that BMI over 25kg/m² signified overweight; 65% didn't know that BMI over 30kg/m² is a sign of obesity. 65.4% of students were physically active. Over 35% students declared working out 1-2 times per week; 19% reported physical activity 3-4 times per week; slightly over 4% of subjects exercised 5-6 times per week, and a similar proportion worked out every day. Approximately 3% of subjects worked out less frequently than once per week, while 35% of them were not active at all. Only 13.4% of subjects rated their level of physical activity as high; 42.3% considered it medium and 44.3% categorized it as low (Figure 1).

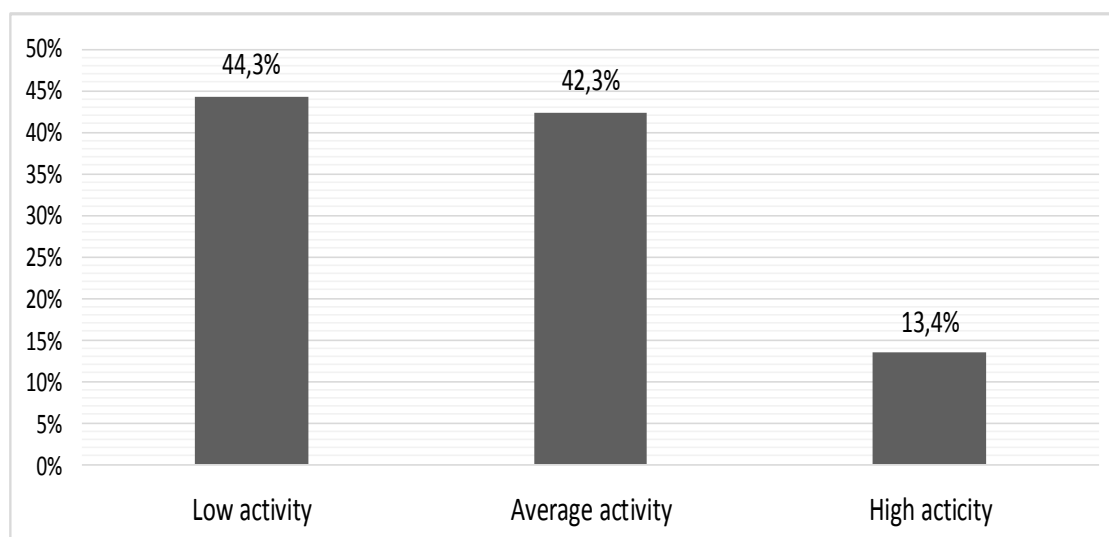


Figure 1 Levels of physical activity of students (n=127)

This subjective assessment of students' physical activity was confirmed by the amount of time they dedicated to exercise. Leisure workout, defined as exercise lasting minimum 30 minutes, was declared by only 37% of students.

Preferred forms of workout were: running (38.5%), gym (35.4%), walking and Nordic walking (35.8%), gymnastics and exercising at home (33.3%), swimming (30.7%), team sports (28.2%), cycling (23.1%), aerobics and fitness (15.3%), and dance (7.6%).

Physical activity versus free time

Half of subjects claimed to have enough free time; 6.6% reported having a lot of free time; 38.3% felt they had little free time, while 5% reported having no free time. The most popular forms of spending free time were: using the computer (games, movies, the Internet) – it was mentioned by 86.6% of subjects. They also reported watching TV and movies on DVD (66.6%), listening to music (53.5%), meeting friends (54.3%), physical activity (44.1%), and reading books (40%). Worryingly, 21.8% of subjects preferred completely passive leisure.

Motivation and obstacles to taking up physical activity

Main motivation for taking up physical activity was: improving and maintaining fitness (76.9%), increased physical and mental well-being (66.6%), watching one's figure (46.1%), health considerations (43.6%), pleasure, fun (42.3%), emotional outlet (38.4%), self-realization (33.3%), relaxation (20.6%).

The most common obstacles / reasons that prevented subjects from physical activity were: lack of free time (45%), lack of motivation, will power (45%), laziness (40%), lack of money, high costs (26.6%), lack of company (23.3%), difficult access to equipment and facilities (13.3%), poor health (8.3%), reluctance (6.7%), and fear of injuries (3.3%). Subjects did not select the following responses: no need for physical activity (0%) and lack of knowledge about needs and beneficial effect on the body (0%).

Nutrition habits

Only 28% of subjects reported regular meals; 45% sometimes ate their meals regularly, while 27% ate irregularly. For over ¾ of subjects (78.3%), regularity of meals was mostly impeded by work/study load; for 13.7% it was laziness and no need for regular meals, while 8% reported lack of knowledge and proper nutrition habits. Over 78% of subjects reported eating 3 meals a day, 5% ate only 1-2 meals, while 17% consumed 4 or more meals daily. Almost half of subjects confirmed eating at night. Also nearly half of them (46.6%) reported eating their last meal 1-2 hours before going to sleep.

Overall, vegetables were consumed daily by 65% of subjects, 63.3% consumed milk and dairy products, 58.3% ate fruit, and 53.3% meat and its derivatives. Only 11.7% ate fish a couple of times per week; 10% ate fish once per week; 40% ate fish once per month, 30% ate fish very rarely, and 8.3% didn't eat fish at all.

Risky behaviors

21.7% of students smoked cigarettes. 69% of smokers reported regular smoking, while 30.9% smoked only occasionally. The most common trigger for occasional smoking was alcohol consumption which resulted in an urge to smoke – this option was selected by over 55% of subjects, while 45% indicated reduction of stress.

There were no teetotalers in the group. 65% declared drinking alcohol occasionally, in moderation, while 35% reported occasional drinking, but without moderation. 33.3% of subjects consumed alcohol a number of times per month, 26.6% - once per week, and 6.6% a number of times per week. The most popular alcohol among subjects was beer (48.3%), but students also tended to drink wine (25%) and vodka (23.3%). The research suggested that over half of subjects (53.3%) drank alcohol to reduce nervousness.

Over 8% of students admitted using drugs, while 20% reported having experimented with them, but not using them regularly. Subjects explained their usage of drugs with need for new experiences, curiosity (76.4%) and as a way to distance themselves from problems and stress (5.9%). 35% confirmed using drugs with their friends, and 6% used drugs at the urging of friends. 5.8% subjects reported regular use of drugs.

Sleep

The research suggests that on work/schooldays, 75% of subjects slept from 6-7 hours, while only 2% of them slept for merely 2-3 hours. At the weekends and on holiday 61.6% of subjects slept for 8-9 hours. Majority of subjects admitted having irregular daily routines, and over three-quarters (78.3%) of subjects reported problems with falling asleep (55% experienced these problems sporadically, while 23.3% often).

Comparison of sub-group with different specializations

Table 2 Lifestyle choices of students of Tourism and Leisure at the University of Szczecin, divided into 2 sub-groups with different specializations (n=127)

Questions	Specialized in Health Aspects of Tourism at WKFiPZ (n=65)	Specialized in Tourism Business at WZiEU (n=62)	Total	p
	in %			
overweight/ obesity BMI>25kg/m ²	13.3	17.3	15.3	ns
knowing the definition of BMI	39.9	17.7	28.8	<0.05
Physical activity	66.6	64.2	65.4	sns
Physical activity in free time	36.6	32.1	34.3	sns
Regular meals	30.0	26.0	28.0	sns
Eating at night	53.3	50.1	51.7	sns
Eating vegetables	73.3	56.7	65.0	<0.05
Eating fruit	73.3	43.3	58.3	<0.05
Consumption of milk and dairy products	73.3	53.3	63.3	<0.05
Consumption of meat and its derivatives	50.1	56.5	53.3	sns
Consumption of fish (at least once per week)	10.2	33.3	21.7	<0.05
Reducing salt intake	50.0	43.3	46.6	sns
Reducing fat intake	46.6	60.0	53.3	sns
Reducing sweets and sugar intake	76.6	53.3	64.9	<0.05
Reducing amount of processed food	53.3	13.3	33.3	0.05
Alcohol consumption	100.0	100.0	100.0	sns
Occasional alcohol consumption, without moderation	30.0	40.0	35.0	sns
Smoking tobacco	20.0	23.4	21.7	sns
Regular smoking	69.0	69.0	69.0	sns
Drug use	3.3	13.3	8.3	<0.05
Amount of sleep less than 6 hours	16.6	6.6	11.6	sns

Legend:

Abbreviations: WKFiPZ - Department of Physical Education and Health Promotion; WZiEU - Faculty of Management and Economics of Services; sns – statistically non-significant

While comparing the subgroups (students were divided according to their specializations), the following statistically significant differences were noted:

- Students of the Department of Physical Education and Health Promotion (WKFiPZ) correctly defined BMI index more often than students of Faculty of Management and Economics of Services (WZiEU); (WKFiPZ): 39.9%; WZiEU: 17.7%);
- WKFiPZ students declared consumption of vegetable more often than WZiEU students (WKFiPZ: 73.3%; WZiEU: 56.7%), consumption of fruit (WKFiPZ: 73.3%; WZiEU: 43.3%) and milk (WKFiPZ: 73.3%; WZiEU: 53.3%);
- WKFiPZ students declared reduced consumption of sweets and sugar more often than WZiEU students (WKFiPZ: 76.6%; WZiEU: 53.3%), and limited consumption of processed food (WKFiPZ: 53.3%; WZiEU: 13.3%);
- WZiEU students declared consuming fish more often than WKFiPZ students (WZiEU: 33.3%; WKFiPZ: 10.2%);
- WZiEU students declared drug use more often than WKFiPZ students (WZiEU: 13.3%; WKFiPZ: 3.3%).

Discussion

The analyzed results point to a growing prevalence of unhealthy behaviors among students. In this research, 15% of students were diagnosed with overweight or obesity, which confirms exponential increase of obesity (number of obese people has significantly increased in the past 30 years). It is especially visible in children and youth around the world (Han et al. 2010). In the USA, over 64% of adults suffer from overweight and obesity (Flegal et al. 2002). In Poland, in 2003 a study conducted by Pol-MONICA Bis pointed to 26% of obese men and 24% of obese women aged 20-74 (Rywik et al. 2003). In 2004, according to LIPIDOGRA 2004 study, there were 48% of overweight men and 39.2% of women, as well as 32.8% of obese men and 31.2% of obese women (Mastej et al. 2006).

Usually, obesity during adolescence results in obesity in adulthood. With time, it leads to severe complications which shorten life expectancy (Fichna and Skowrońska 2006; Olshansky et al. 2005). Obesity is one of the main risk factors for incidence of degenerative overload changes of the osteoarticular system. Author's own study (Łubkowska et al. 2015) which encompassed 500 girls aged 7-15 showed that overweight and obesity did predispose the subjects to bad posture: abnormal spine curvature was found in 30.8% of overweight/obese girls.

Correlation between correct BMI, physical activity and healthy behaviors were proved by Nowak (2011), who studied 1,361 women aged 20-75 (including students). Nowak (2011) reported positive correlations between physical activity, non-smoking and regular dental check-ups. Main recommended lifestyle changes are: increased physical activity and proper nutrition.

This study revealed low physical activity of students - only 65% were physically active, while 34.6% did not participate in any form of physical exercise. Only 37% of students declared working out for longer than 30 minutes.

It confirms a steady decrease of physical activity among adults Poles, who exhibit low physical activity and prefer passive forms of leisure (GUS 2006). According to the final report of AHA (American Heart Association) published in 2009, over 75% of subjects aged 18+ reported not working out as recommended by AHA, while 10% of subjects did not engage in any form of physical activity (*EU Physical Activity Guidelines* 2008).

Are Polish students prepared to become a symbol of healthy lifestyle in the future? Current studies seem to suggest a negative answer to this question.

Results presented in this paper of author's own research conducted among Tourism and

Leisure students (program provided by two departments of University of Szczecin) showed that only 13.4% of subjects assessed their fitness level as 'high', while over 44% considered it 'low'. More optimistic results were presented by Niżnikowska's team (2014), who analyzed actual fitness of 450 students of selected departments (IT Studies, Tourism and Recreation, Nursery, Emergency Medical Service, Public Health) in Biała Podlaska, Poland. Authors concluded that half of subjects (57.9%) engaged in moderate physical activity, 30% in high-intensity physical activity and 12.4% in low-intensity physical activity. The study was carried out with the help of International Physical Activity Questionnaire IPAQ (short version) among undergraduate and graduate students.

This worrying situation may be caused by the following tendency: children, adolescents and adults tend to choose passive forms of leisure, such as watching TV, using computers, listening to music, reading and other activities which don't require any exercise.

In this study, 86.6% of students declared using computers in their free time (games, movies, the Internet); 66.6% watched TV and movies on DVDs, while 21.8% of subjects spent their free time in an entirely inactive way. In 2005, a similar research was conducted by Danilenko et al. (2006) among 200 students from Brześć, Poland, aged 17-24. The research revealed that students from Brześć preferred meeting friends (51%) and watching TV (49%) in their free time. Research carried out by Kulesza (2006) among 200 students of Tourism, Leisure and Physical Education revealed that the subjects tended to spend their time actively (53%), compared to 23% of students who preferred passive leisure.

The most common obstacles to physical activity reported by the subjects in this study were: lack of free time (45%), lack of motivation and strong will power (45%), lack of willingness and laziness (40%), lack of money (26%) more time spent on passive leisure (20%) and reduced access to equipment and facilities (13%). Similar declarations had been obtained in previous analyses. In research conducted by Borek's team (2008) among Physical Education and Physiotherapy students at Opole University of Technology, the subjects reported the following obstacles to physical activity: lack of free time (42%) and lack of willingness (45%). Research carried out by Lipek et al.'s team (2015) revealed that 55% of Medicine students felt they had no time for physical activity, 19% reported lack of motivation for exercise and long distance to sports facilities. Lack of time and motivation were also selected by subjects in research by Markiewicz-Górka et al. (2011), Mędręła-Kuder (2011), Nizioł (2008) and Sochocka and Wojtyłko (2013).

Different conclusions were reached in research by Lisowska and Rysz (2006). While studying this issue among students from Legnica, Poland, they found that subjects listed bad condition of facilities and high prices of services as the most common obstacles to physical activity.

The analysis of author's own research on nutrition routine of students revealed repeated bad habits. These include: incorrect nutrition model – irregular meals (72%), eating at night (51.7%); imbalanced diet – excessive consumption of fats, especially saturated fats (53.3%), insufficient consumption of fish (21.7%) milk and dairy products (63.3%), insufficient fiber intake, including fiber from vegetables (65%) and fruit (58.3%).

Smoking habits of subject were also worrying. Over 21% of students smoked, and 69% of them were regular smokers. This is similar to percentage of smokers in the adult population of Poles (30.3% of smokers according to GUS in 2006). Borek et al. (2008) found in their research that 48% of Physical Education students and 30% of Physiotherapy students smoked.

Research of Poręba et al. (2008) carried out among 240 students of Natural Sciences at four major universities of Wrocław revealed that 23.9% of subjects smoked. According to Sygit's research (2011), as many as 47% of adolescents aged 12-17 were faced with the problem of smoking, and according to Woynarowska and Mazur (2003), this issue increased with age. Therefore, public awareness should be raised in relation to the problem of smoking, and fighting with this addiction should be treated as a key issue in cardiovascular disease prevention (Poręba et al. 2008).

Prevalence of alcohol consumption among students is a worrying phenomenon. None of the subjects reported being a teetotaler. 33.3% of subjects consumed alcohol a number of times per month, 26.6% once a week, and 6.6% a number of times per week. Research carried out by GUS [Central Statistical Office in Poland] (2006) revealed that 20.5% of adult Poles (aged 15+) drank alcohol 1-6 times per week. Research by M.A. Nowak and L. Nowak (2013) among a large group of women (n=1,361) revealed that women who did recreational exercise for over 7 years chose active forms of leisure and consumed low-alcohol drinks.

While analyzing risk behaviors of students, drug use was taken into account. 8.3% of students admitted using drugs.

Another health behavior which was analyzed was the amount of sleep. In this research, students reported 6-7 hours of sleep on work/school days (75%). Worryingly, 2% slept for only 2-3 hours.

While analyzing differences between sub-groups (according to students' specialization), it was found that Tourism Business students displayed more unhealthy lifestyle than the students of Health Aspects of Tourism and Leisure. The following statistically significant differences were revealed: vegetable consumption: (WZiEU: 56.7%; WKFiPZ: 73.3%), fruit consumption (WZiEU: 43.3%; WKFiPZ: 73.3%), milk consumption (WZiEU: 53.3%; WKFiPZ: 73.3%); limited consumption of processed food (WZiEU: 13.3%; WKFiPZ: 53.3%); drug use (WZiEU: 13.3%; WKFiPZ: 3.3%). There was also a statistically significant difference in terms of fish consumption (WZiEU: 33.3%; WKFiPZ: 10.2%).

There were, however, no statistically significant differences in terms of: physical activity, smoking tobacco, alcohol consumption, amount of sleep. Students who participated in the research had unhealthy lifestyle which may become a risk factor in the future, leading to diseases of affluence; it may directly impact health of adult population of Poles in the future. Nowak (2013, p. 6) considered young people's models of physical culture, including students, as well as evaluation and the choice of the value of the body: 'What changes in the patterns of physical culture can we expect in the future?' It is also a question about the effects of the shaping of health-oriented choices in youth, adults and the elderly.

According to the quoted author: 'Sports education is necessary for the positive development of the body and other sides of human personality at the same time. Participation in broadly understood sport is not only a form of autotelic behavior, but also instrumental behavior, which must be interpreted both in terms of freedom of choice and obligation.'

Conclusions

Students' lifestyle is dominated by unhealthy behaviors, such as insufficient physical exercise, passive leisure, smoking cigarettes and drinking alcohol.

It was revealed that lifestyle of Tourism Business students was more unhealthy than lifestyle of Health Aspect of Tourism and Leisure students in terms of the following behaviors: consumption of vegetables, fruit milk and dairy products, reduced consumption of sweets, sugar, and processed food, as well as drug use.

These unhealthy behaviors may lead to diseases of affluence in their future lives.

Therefore, it is necessary to include pro-health education in their curricula; consideration should also be given to target and actual effects of education at Polish universities which offer Economy-related studies.

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OVERWEIGHT AND OBESITY – THE PROBLEM OF 21st CENTURY LOWER SECONDARY SCHOOL STUDENTS

Hanna Żukowska, Jagoda Guzek, Mirosława Szark-Eckardt

*Faculty of Physical Education, Kazimierz Wielki University in Bydgoszcz
Department of Physical Education, Health and Tourism, Poland*

Abstract

This paper analyzes a group of students from one of lower secondary schools in Bydgoszcz in order to determine the degree of overweight and obesity problem in them. The body mass index based on height and weight was used in the study for the purpose of assessing the degree of obesity. Then, a questionnaire survey consisting of the questions concerning nutrition, physical activity, lifestyle as well as the occurrence of overweight and obesity among their immediate family members was carried out. There are numerous causes of weight disorders, however, based on the survey it can be observed that the increased prevalence of overweight and obesity was accompanied by improper eating habits, lack of physical activity and an adverse impact of immediate surroundings.

Key words: *obesity, overweight, body mass index, lower secondary school students, physical activity*

Introduction

Until recently the issue of overweight and obesity was not so widespread and mostly affected adults. Nowadays, the problem is called a civilization disease and is increasingly spreading to wider social circles including children and youth. When analyzing the issue of obesity in children and teenagers, attention should be paid not only to diet or physical activity, but also to the influence of the immediate surroundings of individuals affected by the disease. The lifestyle of the entire family of an individual affected by overweight or obesity problem as well as the functioning of the school environment, in which teenagers spend a considerable part of the day have a significant impact on young people. It is at school where they eat two or three out of five major daily meals necessary to ensure the proper functioning of their bodies. When committing nutrition mistakes, missing regular meals or snacking between meals, young people do not realize the consequences of such a conduct for their health and even their entire future lives.

As Małecka-Tendera and Mazur report, it is difficult to determine the degree of obesity in youth "...as the pace of body fat development from birth to adolescence is variable. During the period of growth the body height and weight do not only increase with age, but also their proportions change" (Małecka-Tendera, Mazur 2011, p. 9-10). The accumulation of excess body fat can be significantly prevented by a proper diet and physical activity among other things. As far as eating habits are concerned, we deal with the so called rational diet. In accordance with the definition, the rational diet "... is the way of eating we should apply on a daily basis. The rational diet provides the right amount of calories and all the necessary nutrients" (www.aktywniepozdrawie.pl/racjonalne; access on 17.09.2015).

As regards rational eating, one should not forget that demand for different nutrients may vary depending on age, gender or lifestyle.

Intensive physical activity, adolescence and increased growing processes in young people aged between 13 and 15 are connected with higher demand for the elements mentioned above. The total daily intake of nutrients for boys and girls aged between 13 and 15 is presented below.

Table 1 Daily intake of nutrients (*Source: Maria Jagiełło*)

	Girls	Boys
Calories [kcal]	2200-2300	2700-3000
Protein [g]	75	90-95
Fat [g]	75-80	95-105
Carbohydrate [g]	310-320	375-420

Improper diet leads to gaining on weight (Obuchowicz 2005, Przybylska et al. 2012, Redriks 2000, Wang 2001) and many diseases and ailments such as bloating, constipation, ulcers or diabetes. Proper eating habits facilitate maintaining a normal body weight and contribute to good health (<http://www.dietyodchudzajace.pl/nawyki-zywieniowe.html>, access on 17.09.2015).

Lower secondary school students belong to the group of people who are especially submissive and susceptible to increase in fat tissue caused by improper eating habits. Due to easy access to fast foods available in school shops, newsagents and vending machines, they can easily satisfy their hunger. Rushed meals (snack bars, buns, crisps, fast foods, etc.) provide unnecessary empty calories instead of the proper amount of required nutrients and are the major cause of missing main, essential meals. Snacking between meals and consuming improper meals leads to the situation where youth face learning problems and find it more difficult to control their emotions (Wanat et al. 2011, 381-384). Hence, it is so important to have regular nutritious meals in adolescence (4-5 meals a day). Eating regularly has a beneficial effect on memory, concentration and the function of the whole human body. Until recently the issue of overweight and obesity was not observed, however scientific research and statistics indicate an increasing number of people with incorrect body mass (Obuchowicz 2005, Przybylska et al. 2012).

The second significant element of preventing overweight and obesity is being physically active on a regular basis. Drabik (1997, p. 28) reports that "physical activity is the basic element of a healthy life style bearing 50 % responsibility for the human health. It is a factor which maintains or improves the functioning of the human body during its maximum or, particularly submaximum working, a disease-prevention factor, especially in case of cardiovascular diseases, coping with stress and therapy of numerous disorders and diseases". Lack of physical activity is the second common cause of overweight and obesity in children and teenagers following improper eating habits. A sedentary lifestyle doubles the risk of falling ill (Respondek and Jarosz 2006, p. 53).

Failing to do regular exercise at all is the cause of many chronic diseases including obesity, cardiovascular diseases, diabetes and osteoporosis (Sygit and Sygit 2008).

Physical activity is connected with the quality of life - being physically active on a regular basis is conducive to maintaining and improving the health condition of young people (Bendíková 2014, Bouchard et al. 1994, Drabik 2006, Duda 2008, Nosko 1990, Sieńko-Awierianów et al. 2012).

After spending the whole day at school in a sitting position, children and teenagers go back home and usually sit at the desk again to use a computer, do homework or watch TV. Very often the only physical activity taken by them during the day is only walking to school and back home. They find free time spent in sedentary pursuits much more attractive. This way they can spend hours chatting with their friends on-line or watching their favorite television programs. While doing the above mentioned activities they frequently consume large amounts of unhealthy snacks and the calories eaten by them only contribute to increased body fat instead of being burnt (Bendíková 2007, Łuszczynska 2007, Małecka-Tendera and Socha 2011).

Aim

The aim of the study was to determine the degree of overweight and obesity in lower secondary school students from Bydgoszcz.

Methods

Children involved in the study and organization of studies

The study was conducted among the students from one of lower secondary schools in Bydgoszcz (Figure 1). In order to establish the degree of obesity, the height and weight of the subjects was measured and based on the results achieved, the body mass index was calculated. Then the values were shown on the grid lines of relative body mass (source: http://olaf.czd.pl/images/stories/siatki/Centyle_wskaznika_masy_ciaa_chlopcow.pdf, access on: 10.10.2015). Based on the standards published by the World Health Organization it was assumed that: the value ≤ 5 percentile determines weight deficiency, the value ≥ 85 and < 95 percentile determines overweight and the value equal or exceeding the 95 percentile determines obesity (Jodkowska et al. 2007, p. 6; Oblacińska and Tabak 2006 p. 9-10).

Then, a study was carried out using the method of diagnostic survey (Pilch and Bauman, 2001). The students were given a questionnaire composed of four parts: the first one took the subjects' age and place of residence into account. The second part concerned eating habits of respondents: quantity, type and frequency of meals eaten by them throughout the day. The third part referred to taking physical activity and lifestyle, whereas in the last part respondents answered several questions including the prevalence of overweight and obesity among their immediate family members.

The surveyed population was in the following age groups:

- 13-14 years – form 1 students of lower secondary school,
- 14-15 years – form 2 students of lower secondary school,
- 15-16 years – form 3 students of lower secondary school.

The Figure below expresses the percentage of the lower secondary school students involved in the study, broken down to classes (Figure 1).

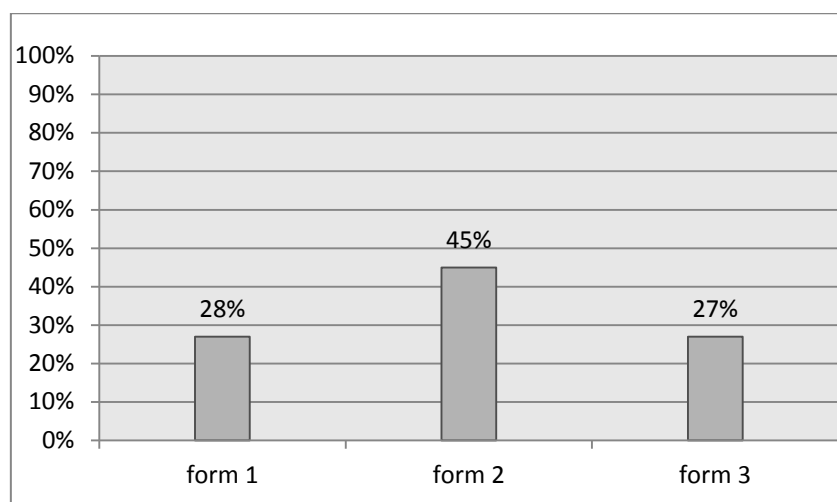


Figure 1 The number of the examined students in a breakdown by classes

The surveyed population included 27% first form students, 45% second form students and 27% third form students. The following figures display the respondents' place of residence (Figure 2).

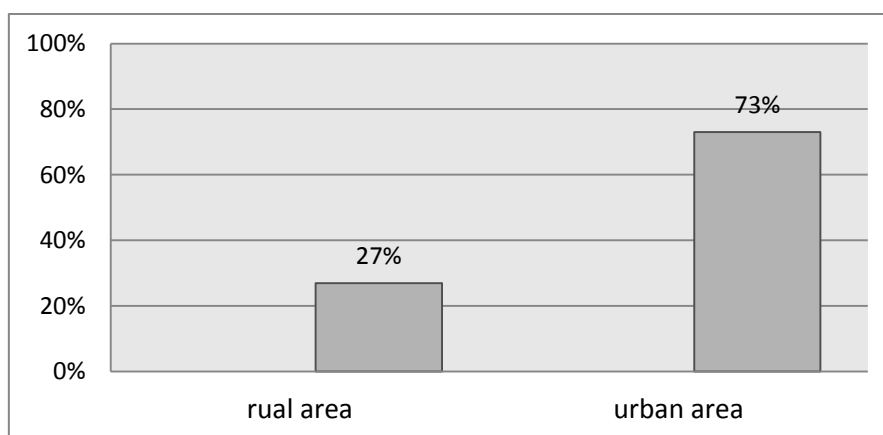


Figure 2 Respondents' place of residence

The majority of the students involved in the study were residents of Bydgoszcz - 73%.

Results and discussion

The table below presents the results of the research concerning the prevalence of body weight disorders in respondents.

Among lower secondary students involved in the study, a substantial part of the results was at a standard level. As regards first form students, 11% of them were overweight and in the group of second form students 13% were overweight and 15% were obese, whereas among third form students 11% were overweight and 7% turned out to be obese.

The first part of the diagnostics survey summarized the questions about eating habits of lower secondary school students interviewed.

Table 2 Prevalence of body weight disorders respondents

Form	Weight deficiency		Proper body weight		Overweight		Obesity	
	N	%	N	%	N	%	N	%
First form	0	0	49	89	6	11	0	0
Second form	0	0	54	72	9	13	11	15
Third form	0	0	45	82	6	11	4	7

61% of the students involved in the study claimed that they had three to four meals throughout the day. Five portions during the day were eaten by 18% of them and over 5 meals per day by 9%.

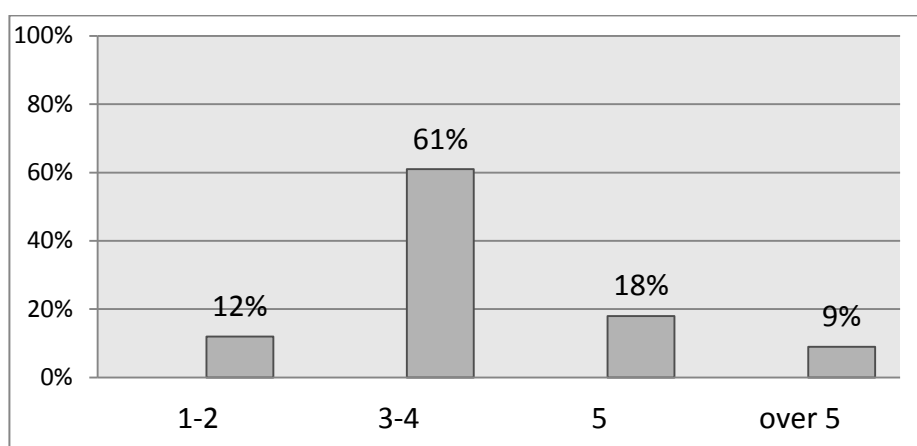


Figure 3 Frequency of meals per day

Regularity of eating meals during the day is displayed by the Figure below.

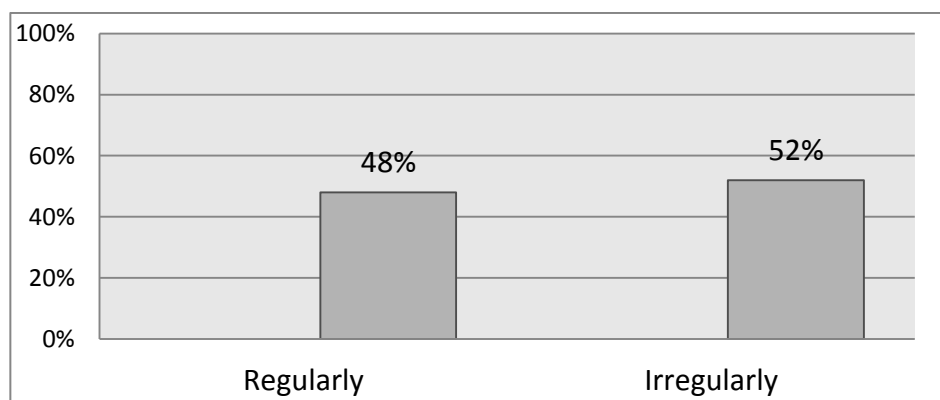


Figure 4 Regularity of eating meals during the day

Over half of the interviewed young people (52%) reported eating meals on an irregular basis. Figure 5 shows a daily intake of fruit and vegetables eaten by respondents.

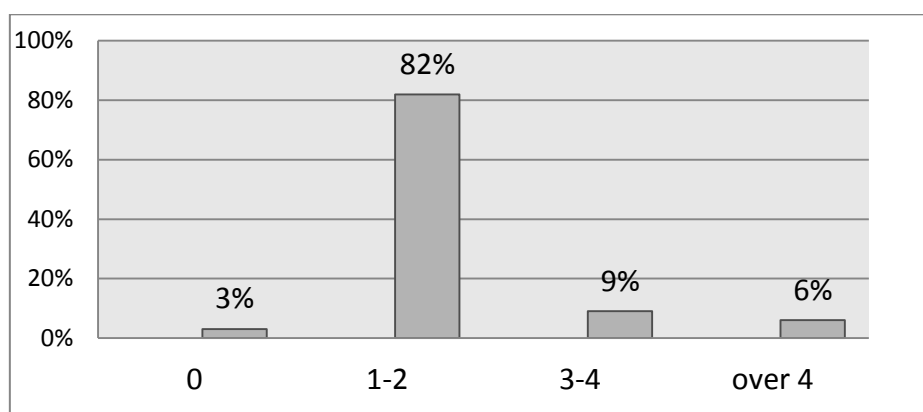


Figure 5 Daily intake of fruit and vegetables

The greatest number of the lower secondary school students, that is 82%, claimed eating one to two portions of fruit and vegetables per day, whereas the rest of the responses were given by less than 9% of them.

The figures displayed below summarize the type of second breakfast eaten by respondents.

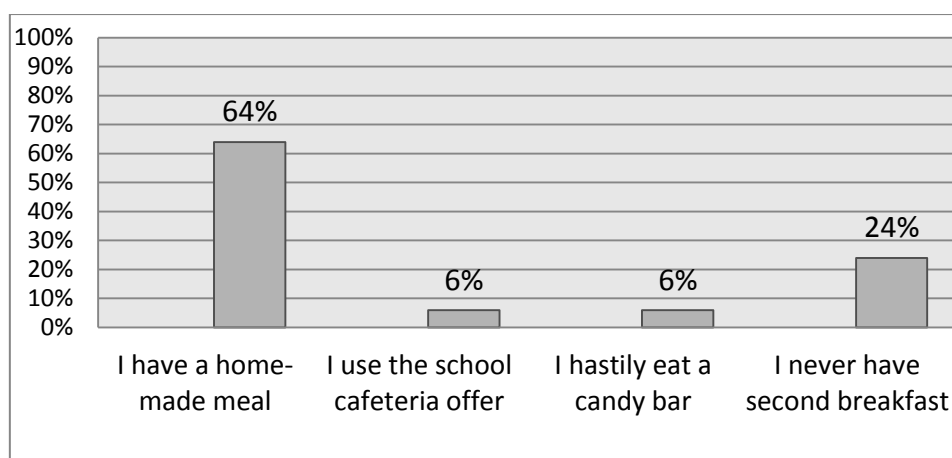


Figure 6 Second breakfast

The majority (64%) of the students responded they ate a meal prepared at home, 24% reported they did not have second breakfast, whereas 6% confessed using the school cafeteria offer and the same percentage confessed to hastily eating a candy bar.

From among the list of thirteen products which could comprise a meal, dairy products, poultry, fruit and vegetables were the most popular among the students.

The following Figure reveals the percentage of respondents snacking between meals.

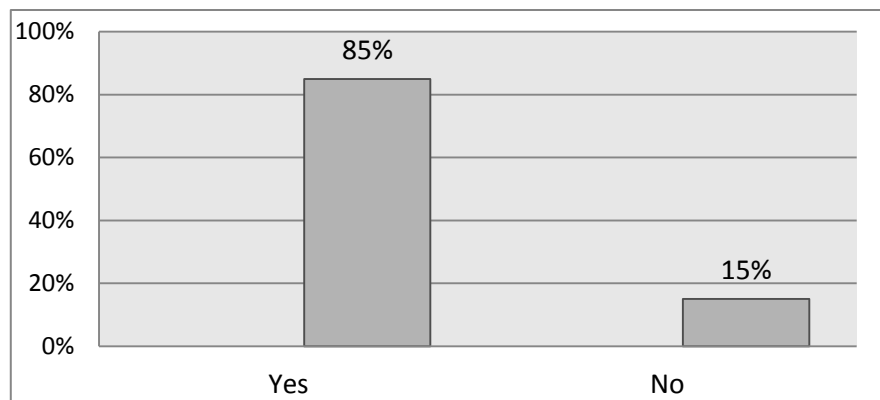


Figure 7 Snacking between meals

85% of lower secondary school students involved in the study admitted snacking between meals, unfortunately, most often sweets. Yet, some of them reported eating fruit and vegetables.

The other question concerned the frequency of reaching for products like fast foods. The obtained results are revealed in the Figure below.

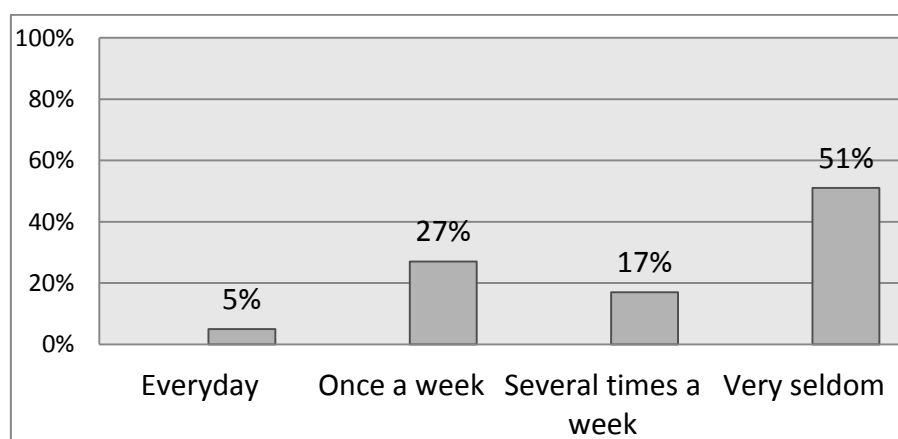


Figure 8 Frequency of eating fast food

Over half of the men (51%) reported that they very seldom reached for fast foods. 27% of students ate fast foods once a week, while 17% of them several times a week and only 5% every day.

The second part of the diagnostic survey concerned physical activity of respondents. The responses to the question about free time activities considerably varied, but a significant group of the students reported watching television or sitting at the computer for more than one hour (1-2 hours – 27%, 2-4 hours – 46%) (Figure 9). Also a significant percentage of respondents chose spending leisure time with friends. There were also those who spent free time riding on a bicycle or swimming.

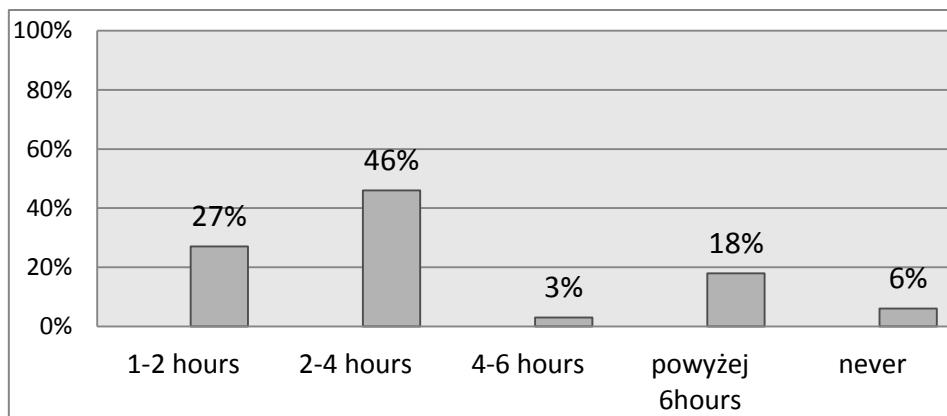


Figure 10 Number of hours spent in front of the TV or computer per day

The Figure below summarizes the data concerning the frequency of attending physical education classes.



Figure 11 Attendance at physical education classes

100% of male respondents answered that they attended physical education classes.

The Figure below summarizes the frequency of taking on physical activity by respondents throughout the week.

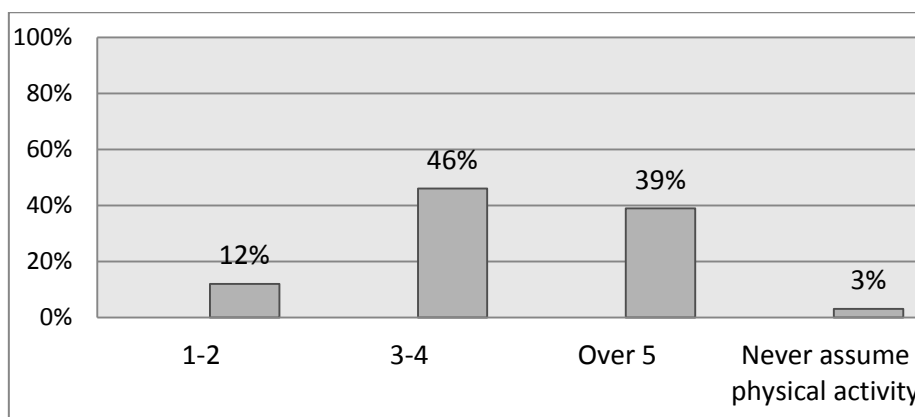


Figure 12 Frequency of taking on physical activity throughout the week

Nearly half of the boys (46%) assumed physical activity 3 to 4 times a week whereas 39% of respondents over 5 times a week.

The results of the third part of the survey conducted among lower secondary school students are displayed below.

The Figure below reveals the percentage of teenagers whose immediate family members suffer from overweight or obesity.

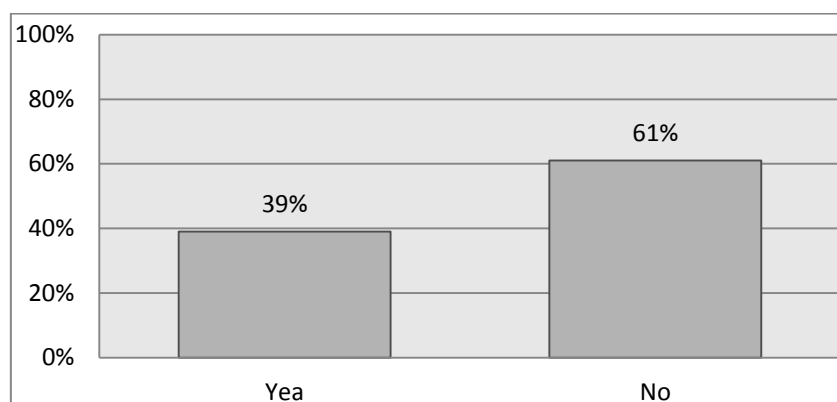


Figure 13 Prevalence of overweight and obesity in immediate family members

Female respondents' answers to the above question were very similar. 61% of the students reported there was no problem of overweight or obesity in their immediate surroundings, whereas 39% claimed there was such a problem in their families.

The next question asked about the consequences of overweight and obesity. A significant group of respondents claimed none of the listed diseases occurred in their case. Yet, there were also such individuals who were affected by the following diseases: psychological problems, bone degeneration disease as well as sleep apnea syndrome.

The Figure below shows the awareness of parents about healthy eating principles.

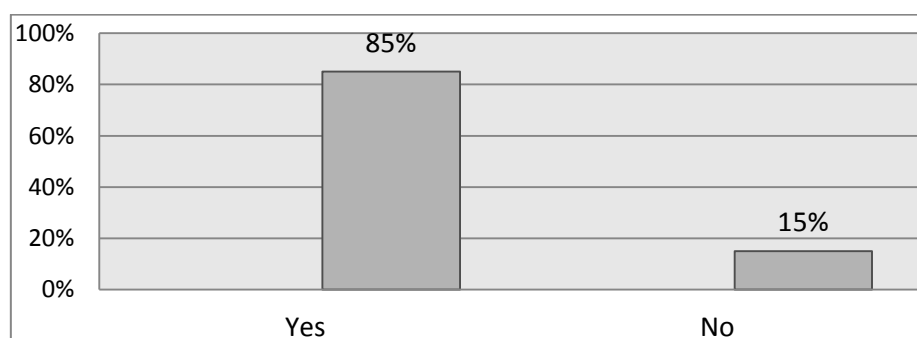


Figure 14 Awareness of parents about healthy eating principles

A decisive majority of respondents (85% boys) claimed their parents were aware of healthy eating principles (Figure 15).

A significant part of lower secondary school students, 79%, claimed that school did not organize any activities on healthy eating habits.

All in all, when analyzing the survey results of respondents who suffered from overweight or obesity problems, it can be concluded that the cause of body mass disorders was insufficient

intake of fruit and vegetables and excessive consumption of carbohydrates throughout the day. A vast majority of respondents admitted eating sweets several times a week and it was sweets they snacked between meals most frequently.

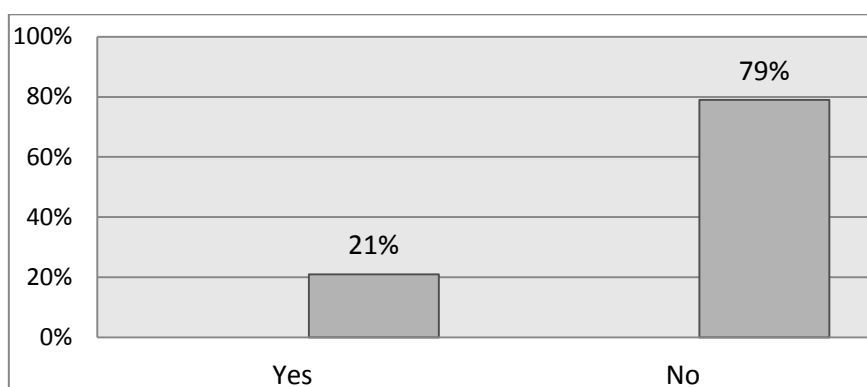


Figure 16 Organizing school activities on healthy eating habits

Despite the fact that a considerable majority of boys attended physical education classes, they spent too much time watching television or in front of the computer. Only few of them reported spending free time with their friends or cycling. Dramatic as it seems to be is the fact that nearly half of overweight or obese respondents spent too many hours sitting in front of the TV or computer throughout the day. Sitting for too long in front of the TV or computer as well as insufficient physical activity may have an impact on the increasing issue of overweight and obesity. All overweight and obese respondents admitted they had immediate relatives with excessive body mass. Over half of lower secondary school students involved in the survey claimed their parents were aware of healthy eating principles, which did not mean all of them observed these principles.

Some of respondents also reported buying ready sandwiches or fast foods, however a significant group of overweight or obese students admitted buying candy bars, buns or sweet beverages, which may lead one to reflect on the idea of introducing fresh fruit and vegetables instead of sweets.

Based on the analysis of the answers provided by respondents it may be claimed that school is not much engaged in improving the situation of body mass disorders among lower secondary school students as the opinions about organizing school activities on healthy eating habits varied.

Conclusions

Improper eating habits, lack of physical activity and the impact of immediate surroundings affect the issue of overweight and obesity among 21st century lower secondary school students. It is essential to educate young people, their immediate family and school surrounding on the negative influence of improper diet on health and future life as well.

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HEALTH, PHYSICAL ACTIVITY AND LEISURE TIME IN LIFESTYLE AMONG CHILDREN AND YOUTH

Elena Bendíková¹, Ricardo Ricci Uvinha²

¹Faculty of Arts, Matej Bel University, Slovakia

²Graduate Program in Physical Activity Sciences, University of Sao Paulo, Brazil

Abstract

The paper presents national and international theoretical framework and knowledge associated with scientific research into the relationship between health, sports activities and free time in the lifestyle of children and youth. It focuses on the benefits of sports activities (sports programmes) as preventive measures against contemporary prevalence of lifestyle diseases. The paper is a part of the granted project: VEGA no. 1/0376/14 "Physical activity intervention for the prevention of health of the population of Slovakia"

Key words: health, children and youth, leisure time, lifestyle, physical activity

Theoretical background

Life harmony, human synchronization and environment are primordial assumption of its physical, mental and social health. Lifestyle is a dynamic category, which is characterized by conscious and peculiar depiction of life reality into relatively stable structure, in order to achieve a harmonious balance between biophysical and socio-cultural aspects of personality. Lifestyle as a complex expression saturates factors, which may in relation to health functions risk- increases the risk of a particular disease as well as preventive (protective)- reduces likelihood of particular disease, protects against disease, raises immunity.

A Lifestyle is a complex of procedures, policies and overall philosophy of life of individuals or groups. It depends on living conditions, environment, social norms, culture, values of orientation, level of science as well as on economic, political and organizational structures of society. The lifestyle incorporated character of nutrition values, diet, physical activity, health, income, housing quality, interpersonal relations and level of education. It is a part of a way of life in society (Hartl & Hartlová 2010).

Harmonization of lifestyle is reflected in the concept of a **healthy lifestyle**. It is a complex of learned, purposeful, continuous and systematic actions that human being performs for him/her health. The healthy lifestyle is characterized by a balanced physical, mental and psychological stress, which includes:

- ✓ regular routine of a day (observance of a principles of the healthy lifestyle),
- ✓ regularity, purposefulness and plenty of physical stimuli,
- ✓ observance of a personal, occupational and communal hygiene,
- ✓ varied, balanced and rational nutrition,
- ✓ regular and fit drinking regime,
- ✓ rejection of drugs, resistance to harmful influences and habits,
- ✓ harmonious relations between people, peace of mind and positive attitude towards life,
- ✓ responsible environmental behavior,
- ✓ responsibility in the field of work and life (knowing of own opportunities, tidying and security of space for work and game, responsible sexual life).

Health literacy is a set of knowledge, skills, competencies, abilities to obtain and processes to understand health information. What is more, this information is provided to make right decisions about health as well as about adequate medical care. The aim of the health literacy is to increase proportion of citizens about their own health through capabilities to implement effective preventive steps, which are intervening in lifestyle (Jančoková 2000, Zadarko & Barabasz 2009, Zadarko et al. 2009, Zadarko Barabasz & Junger 2010).

Center for Health Care Strategy defines health literacy as "the ability to read, understand and act on the basis of health information". Holčík (2009) integrates definition about health literacy as "the ability to make right decisions, which are related to health in the context of everyday life- at home, in society, at workplace, in health facilities, even at marketplace or in politics. It is an important method to increase impact of human beings on their own health and strengthen their ability to gain and share information as well as to receive and carry their own personal part of the responsibility."

The health literacy is for human beings about raising awareness about the effects of several different sources of information, educational methods and forms as well as to improve the ability about knowing what is right in all of the sources of information, which are available. The health literacy should be a part of general literacy, which human beings may achieve through their activities in conditions that are created by society.

A physical activity has a tight connection in relation to **quality of life** (quality of life- QOL), lifestyle and health (Nowak 1997). Quality of a life is a complex and multi aspect phenomenon, which in itself implies biological, psychological, kinetic, economic, aesthetic, social, ethical and philosophical dimension. Moreover, it contains two fundamental dimensions (Hartl & Hartlová, 2010):

- a) subjective quality of life (well-being) is perceived as satisfaction of their own lives, which are based on emotional survival and cognitive evaluation,
- b) objective quality of life contains fulfilment of essential materials and social living conditions, physical health and social status.

Nowadays, it shows that quality of life is considered to be more appropriate indicator of health as morbidity or mortality. WHO (2010) perceives **quality of life** as "individual perception of one's position in society in relation to culture and value system, in which human beings live and in relation to their objectives, standards and performances."

Hrozenká a kol. (2008) states the following models of QOL:

- ✓ Lenhart's model of quality of life covers personal satisfaction, functional status (how to succeed) and resources and options, which are available.
- ✓ Bigel's model emphasizes that the perception of quality of life exceeds clinical approaches, which measures mental abilities (survival, cognitive processed, etc.) by including ability to answer challenges of environment.
- ✓ Two-dimensional model of comfort. The concept of comfort Hrozenká a kol. (2008) explains by the words of Kolcaba, who introduces the concept of comfort as positive criterion of nursing care. Comfort is meant by Kolcaba as satisfying basic human needs, relief, comfort and transcendence of a particular health situation.
- ✓ Three-dimensional model of measuring results of rehabilitation. Here, the author refers to Test et al., who have implemented criterion of purpose of therapeutic decision and planning of care term. Furthermore, this model includes a variety of areas, which are related to physical, functional, psychological and social health.

The mutual interactions of biological, psychological, social and cultural factors find their expression in lifestyle and in way of a human being, which are requiring knowledge, analysis, evaluation and eventual generalization of intervening factors, which determine the quality of life of human beings. For human beings quality of life has values, which acts as a motivating power of their actions. Values might be creative, experiencing (what human beings get from the world, experiencing with love, friendship, good- evil, etc.) attitudinal (relates to the meaning of life, attitude to death, trauma, etc.).

Maslow's hierarchy of values is linked with the quality of life, which include: physiological needs, safety needs, need to belong to somebody, intrinsic value of life and self-realization (Figure 1).

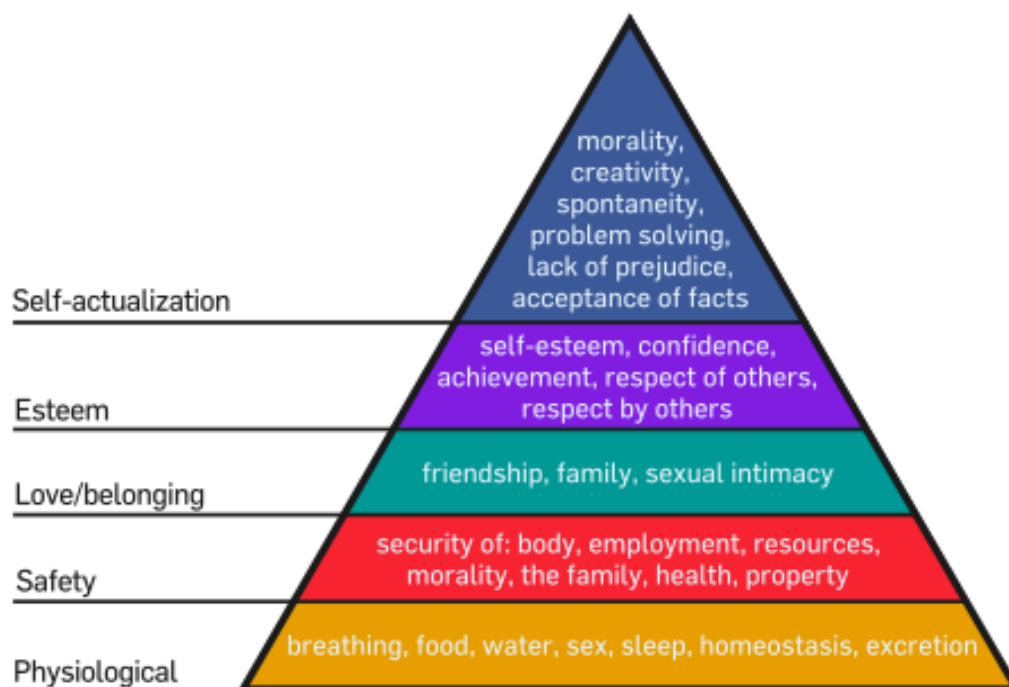


Figure 1 Maslow's hierarchy of values (<http://sk.wikipedia.org>)

Life satisfaction during adolescent age is strongly influenced by life experience and relationships, especially by family relationships as well as health status. During a questionnaire survey about 11, 13 and 15 years old pupils from Slovakia (HBSC-Slovakia, 2011) was presented that 80% of respondents in all of the age groups rated their life satisfaction positively (6 or more points). Evaluation of girls was worse than boys. The girls appeared a statistically significant difference in life satisfaction between the years of 11 and 15.

Everybody has in some way endangered quality of life due to continued stress and imbalance between demands of surroundings and internal sources of organism. Very important is an ability to fill personal and social aims with one's efforts as well as improving perception of personal strength. The most important role plays improving access to resources that allows to control over one's lives and is prerequisite of changes, which lead to the healthy lifestyle.

Negligible is also increasing of participation and active approach to deal with situations of social environment. What is needed is self-confidence as a belief about one's abilities to organize, filling steps and solve situations, which need to be done. Moreover, control of one's life and overcoming of difficulties or environmental claims are consequences of proceeding and conviction that procedure leads to satisfactory results.

A motion is from the general and neurophysiological point of view one of the basic and the most important characteristics of living matter. The motion of living beings is the main external manifestation of their vital functions as well as means, by which living beings are directed towards reaching and fulfilling of important life goals and vitally important roles

The basis of any physical activity is **motion**, which is an essential means of human beings as well as manifestation of his/ her feelings, moods, needs, communications and natural ability to function. The motion is also a return to biological nature of human beings. Physical motion, thus improves health and positively affects all of the body systems.

A physical activity (PA) presents summary of all motions, which are important to reach targets and achievements and reach adequate physical and mental development. The content and focus of physical activities determine objectiveness of action. According to them, we might talk about working, social, artistic, sporting and other activities. **The physical activity** is concretized in the motion modes, which represents irreplaceable value of healthy lifestyle. Furthermore, it contains **the following functions**:

- ✓ **health-** positive adaptation of organ systems, which are changing conditions of external and internal environment, improving physical fitness and motion performance, sense of a personal satisfaction;
- ✓ **formative-educational-** formation and development of personality in positive activities, formation of positive orientation values, education and acquisition of moral qualities and norms, meaningful filling of leisure time, self-realization, self-knowledge, self-esteem, self-acceptance;
- ✓ **socializing-** creation of opportunities for social contacts and relationships, acquisition of behavioral patterns, social norms, role positions, getting social experience;
- ✓ **self-realization-** satisfaction and development of needs, interests, tendencies, individual skills and abilities to choose and select an attractive activity;
- ✓ **stimulation-** impact on proper function and mutual coordination between all organs and organ systems, especially during developmentally early stages;
- ✓ **compensation-** influence, which effects as a stabilizing element of internal environment through balancing of unilateral load;
- ✓ **preventive-** gaining experience as a primary prevention, for example socio-pathological phenomenon, application of positive aspirations, desires;
- ✓ **regeneration and rehabilitation-** impact on accelerating of recovery and rehabilitation processes after fatigue, sickness or illness, during addiction treatment, etc., recovery of unilateral load, especially after work or study load;
- ✓ **cognitive and entertaining-** impact on acquiring knowledge and skills in attractive conditions and actions with an expected long-term impact, which has a positive value on orientations and attitudes.

Current way of life has gained a hypokinetic character, which has reflected into motion regime of human beings (Stejskal 2004).

A motion regime "presents arrangement of all of the physical activities that occur in a way of human beings in his/ her period of time" (Junger & Kasa 1996). According to Teplý (1995) all of the physical activities are the motion regime, summary of all motor activities, which are more or less regularly or relatively long integrated into the way of life of human beings within the specialized life cycle. The definition of the musculoskeletal system must be consisted of two characteristics- motion (in general) and regime. The motion regime is about arrangement of all repetitive motion activities that occur in the way of life of a human being in specialized time interval (Peráčková 2008). During the life of an individual but also between individuals as well, there is a differentiation of content, range and intensity of motion regime. Differences are conditioned by a number of factors of subjective and objective nature, which are for example age, sex health, hobbies, conditions (Cuddihy et al. 2002). Liba (2000) states that the motion regime depends on complex factors such as age, sex, health, motion skills, value orientation, interests, attitudes, social status, profession, environment, traditions and so on. The aim of motion regime varies, which depends on the stage of ontogenesis. Much research and methodology recommends different minimum ranges of motion activities. However, several authors agree on the demands of everyday physical activity with average intensity. In the case of acceptance of health point of view of physical activity, there are important indicators, such as volume and intensity (determined by number of steps, level of aerobic capacity, level of load and so on.).

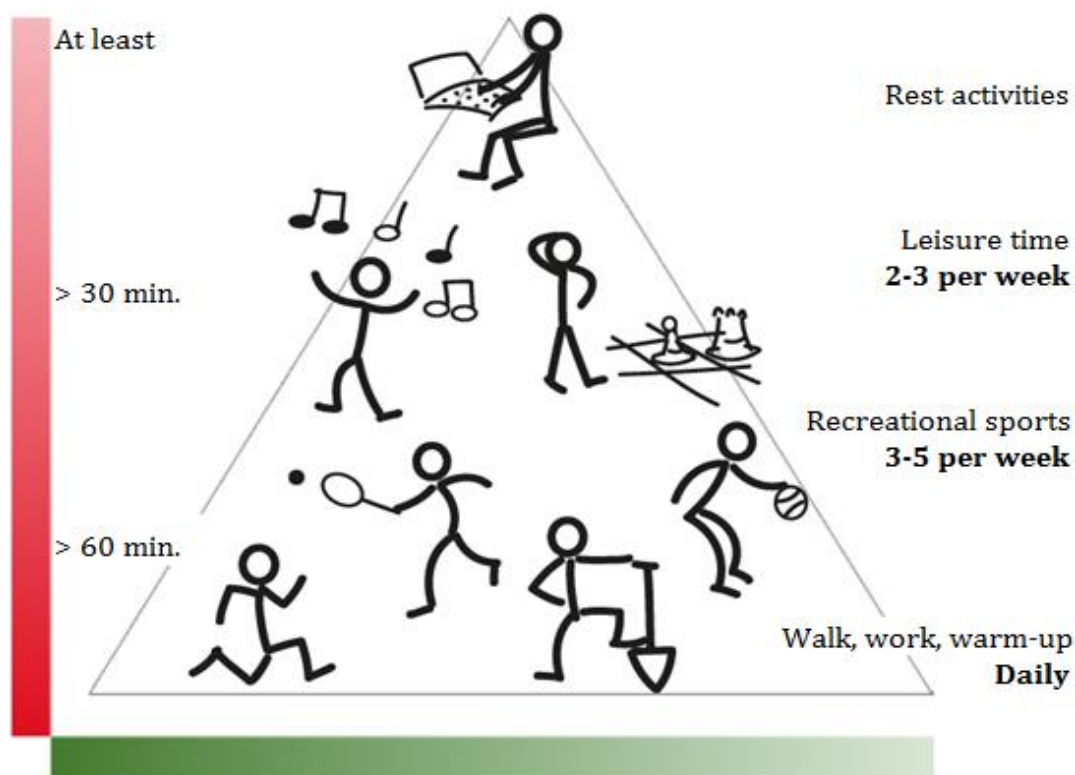


Figure 2 Structure of physical activity of motion regime of human being (www.nds.sk)

A threshold value is defined as minimal need of physical activity of a human being. This is a necessary amount of PA, which is needed for the healthy development of the organism. What is more, it is changing due to process of getting older. There are different recommendations of implementation of required level of physical activity in terms of age, sex and health condition.

Recommended proportion of physical activity in percentage, according to age in their all-day mode:

4-6 years old	25 %
7-11 years old	20,8 %
12-14 years old	16,6 %
15-18 years old	12,5 %

Recommended proportion of physical activity of youth, according to age in hours per day:

4-6 years old	6 hours
7-11 years old	5 hours
12-14 years old	4 hours
15-18 years old	3 hours

Table 1 Recommended minimum volume of PA for the youngest age groups (Šimonek 2011)

Age group	Daily minimum of PA/hours	Note
Infant, child at breast	No specific requirements	Physical activity should enable motion development
Toddler	1,5	30 min. of organized PA and 60 min. of spontaneous PA
Pre-school age	2	60 min. of organized PA a 60 min. of spontaneous PA
Younger school age	1 and more	To divide PA into more shorter segments

Legend: PA – physical activity

Table 2 Volume of PA in individual age categories (Novotná 2009)

Age categorie/age	Range of physical activity	
	Daily/hours	Weekly/hours
3- 7	6	42
7 -10	3 - 4	20 - 30
10 - 17	3	20
17 - 30	2,5	16 -18
30 - 40	3	20
40 - 50	3,5	25
50 – 60	4	30
60 -70	5	35

Sigmund a kol. (2004) recommends to carry out daily activities at the range of energy expenditure. For children and youth should be 6 – 8 kcal/kg per day and for adults 90 kcal/kg per week.

Table 3 Recommended volume and PA intensity values for children and youth from health point of view (Šimonek 2011, Bendíková 2014)

Authors (year)	Country	Recommended level of physical activities
Ross a Gilbert (1985)	USA	At least 3x/week for 20 min period on the level of 60 % of aerobic capacity, involvement of large muscle groups.
Stephards (1986)	Canada	Minimálne 3 hod/týž. v priemere 25 min na úrovni 4 MET.
Pyke (1987)	Australia	Frequency of 3 - 4x / week for at least 30 min., higher intensity of loads.
Blair et al. (1989)	USA	Minimum energy expenditure during physical exercise kcal.kg ⁻¹ day ⁻¹ .
ACSM (1991)	USA	Frequency of 3x/week for 20 min period, minimal intensity or on the level of 60 % VO ₂ max.
Hatano (1993)	USA	Carrying out daily minimum of 10,000 steps (300-400 kcal.kg ⁻¹ day ⁻¹) as a universal standard for the general population.
Telama et al. (1994)	Finland	At least 30 min of PA/every day.
Corbin et al. (1994)	USA	Minimum standard: 30 min/daily PA of medium intensity with energy expenditure of at least 3-4 kcal.kg ⁻¹ .day ⁻¹ .
Sallis a Patric (1994)	USA	Recommendation for children and youth aged 11-21 years: 30-60 min PA / daily or almost daily, supplemented by 3 or more weekly intervals containing at least 20 min PA of medium to high intensity.
Bunc (1996)	Czech Republic	Minimum weekly energy expenditure in physical activities 6-8 MJ and developing about 17 MJ / week..
Pangrazi et al. (1996)	USA	30-60 min daily of medium intensity of PA, PA of high intensity is not directly recommended.
Heller (1996)	Czech Republic	Everyday minimum intensity: 30 min of aerobic exercise in target zone: PF= 60-85 % out of max.
Cooper (1999)	USA	30 – 60 min of PA daily, including at least 3-4x/ week aerobic exercise of medium and higher intensity held for the period of 30 min, 3x/week stretching exercise and 2-3x/ week strengthening exercises.
Frömel et al. (1999)	Czech Republic	In the predominant number of days in week: 11 kcal. kg. day for boys, 9 kcal. kg. day for girls. The average number of steps: 13,000 for boys, 11,000 steps for girls, daily PA over 95 min for boys and 85 min for girls. The rate of PA for weekly energy expenditure should represent 25%.
PCPFS (2001)	USA	At least 5x/ week reach the daily number of 11,000 steps.
President's Council on Physical Fitness and Sports (2001)	USA	For pupil's health support of pupil it is recommended to perform a daily average of 11,000 steps, at least 5 days a week.
Strong et al. (2005)	USA	During the day, at least 60 min of adequate, entertaining and different motion activities of medium and higher intensity with the duration at least 10 min for one interval.

It applies to all age groups, that increasing of energy expenditure by 150 kcal a day or by 1000 kcal a week over current level of sedentary lifestyle is sufficient for health improvement. For primary school girls the daily number of steps, hops should be 11 000 and 13 000 for boys. Secondary school girls should pass out 9000 steps a day and boys should pass out 11 000 steps.

Tudor-Locke, Bassett (2004) report that people who walk during the day less than 4 999 steps have according to the authors sedentary lifestyle, in implementing of 5 000-7 499 steps a day they are considered not to be active enough, at 7 500-9 999 steps a day they are considered to be average active, over 10 000 steps a day they are active and over 12 500 steps a day they are considered to be highly active.

Insufficient recommended volume of motion activity in human motion regime creates favorable input as well as stimuli for formation “civilization diseases”, which have far-reaching outcomes for human health (Pate & O'Neill 2008, Bendíková 2014).

By comparing the morbidity of the population for the period of 1996 - 2008 there are statistics given, where for 10,000 children there was more than twofold (age 0-14 years) and higher increase (age 15-19 years) of health disorders and diseases, especially in the prevalence of a false posture and muscle imbalances, that is already increasing at pre-school and school population, (Dobay 2007, Žukowska & Szark 2010, Łubkowska & Troszczyński 2011, Łubkowska & Tarnowski 2012, Bendíková & Pavlović 2013, Žukowska et al. 2014, Kanášová et al. 2015, Šmída 2015), which are transmitted due to a lack of primary and secondary prevention to adulthood (Novotná 2009, Novotná & Novotná 2013), also involved in the functional muscular disorders (Bailey & Martin 1994).

Remedy of the weakness in adulthood is actually very small or none. Muscle imbalances are considered to be the most important cause of chronic musculoskeletal pain and spinal disorders that unfavorably affect posture, movement stereotypes, muscle coordination, increase tendency to injury and they not only affect musculoskeletal statics change, but also limit the range of movement in joints as well as their mobility (Véle 2006).

Slovakia is also already touched by the epidemic of obesity among children and youth. Research says that approximately 18% of children are overweight, about 7% are obese and the situation is getting worse. Severe obesity is associated with a 12-fold increase in mortality of 15-35 old persons when compared to thin persons (National Audit Office 2001). In 2002 Slovak project MONIKA found 57, 4% of overweight and obesity on a sample of 6876 people aged 15 to 64 years. Diabetes mellitus (DM) has got the upward trend in morbidity. Since 2000, the number of treated diabetics increased by 27%. The disease is associated with childhood obesity and since the incidence increases it is entitled to expect increase in the DM of 2. type. In Slovakia, one third of children has got raised cholesterol (in the Czech republic it is less, “only” one fourth. There are respiratory diseases accruing, incidence of influenza and influenza-imitating diseases is increased among children by 34 %. Since 2000, the number of asthma cases has increased almost threefold. More common are also psychic disorders among children and youth (Zdravotnícka ročenka SR, 2007).

A common feature of all mentioned health disorders is maladaptation, which based on living conditions of the modern world (Hošek 1995).

deficit of motion – poor condition – maladaptation – life dissatisfaction

The following status as we have already mentioned above is related to physical deficiency, which is currently undergoing by pupils during primary and secondary education, on average of 13 000 lessons. Therefrom, approximately 7 % are devoted to physical activities and 93 % to theoretical education (Bendíková 2012). Primary schools are attended by 4-6 % of pupils with health disorders and secondary schools are up to 13 % of pupils. All of the above weaknesses and disorders, as well as others, are increasing the risks of chronic diseases in adulthood (Antala 2012). The Ministry of Education points out that 70 % of pupils spend four hours of leisure time in the following activities: "playing computer games, internet surfing, watching Tv or playing with cell phones." In favor of the above are the authors such as Bebčáková (2000), Paugschová & Jančoková (2008), Antala (2009).

According to survey "Children and parents in Cyberspace", which was realized by Institute for Public Affairs (IPA) "dependent children are losing control of their own lives and everything subordinate to satisfaction of compulsive need. The children do not respect rules and rituals within family, reduce space for school duties, as well as isolate himself/herself. What is more, this is followed by changing of the overall mental status – often appears mental fatigue, sleeping disorders, headaches, frequent mood swings, as well as may occur signs of depression and so on."

In implementation of physical activity per week was found unfavorable status at primary school pupils throughout the Slovak Republic (HBSC - Slovensko, 2011). Daily physical activity was done by only 31 % of male respondents at the age of 11 and 13 and only 13 % of female respondents at the age of 15. On the other hand, more than ¾ of respondents reported watching TV 2 or more hours a day (weekdays). Moreover, according to survey 13 years old girls had the highest numbers of passive leisure time.

The Ministry of Education points out that "every third pupil" participates in regular organized physical activity. Although, this requires to change the current lifestyle of children and youth, which should carry signs of physical activities, because physical activity as a part of lifestyle include physical work and sport. This is one of the basic attributes of human beings life, which improves fitness and health. What is more, it reduces the risk of civilized diseases and is one of the factors, which extends the life of human beings. In this regard, we note benefits of physical activity, which can be used to support different forms of physical education in schools. The issue of health benefits seems as the basis for changing lifestyle (Figure 3) through the perception of physical education in education of pupils.

Benefit = advantage, support or profit, is the value obtained by human being as a result of the action based on program (in this case based on physical activity). Physical activity is performed regularly, which brings long-term benefit. There is an increase of energy expenditure, as well as reduce of overweight. Physical activities positively affect musculoskeletal, cardiovascular, respiratory systems, as well as activity of internal organs.

The scientific records (Ihász & Rikk 2010, Hendl Dobrý et al. 2011) suggest that regular physical activity of medium and high intensity reduce the risk of formation of coronary artery disease, stroke, type II diabetes, hypertension and colon cancer from 30 up to 50 %.

The health benefits of physical activity (as proven at all ages, regardless of gender) (Hendl Dobrý et al. 2011, Bendíková 2014):

- ✓ increasing the level of HDL,
- ✓ decreasing high blood pressure,
- ✓ fat burning,
- ✓ maintaining blood sugar levels,
- ✓ increasing bone density,
- ✓ strengthening the immune system,
- ✓ improving metabolism,
- ✓ increasing the efficiency of energy system,
- ✓ maintaining of body weight,
- ✓ faster process of falling asleep, better sleeping,
- ✓ improving physical appearance (body image).

Aristotle, well-known thinker, defined the concept of ideas many years ago, which find their justification even nowadays. His understanding of **leisure time**, as space for cultivation and self-realization of man, is very close to the current concept. The position and importance of leisure time at the beginning of the 21st century ushered in documents and activities, which were adopted and realized in the last decades of the previous century. The key document for promoting appropriate forms of leisure time is "The Convention on the Rights of the Child from 1989", as well as "The Charter of Participation of Youth in the Life of Communities and Regions" (was approved by The Council of Europe in March 1992), and "The Charter of Education for Leisure Time", Commission for Education of the World Association for Recreation and Leisure time (World Leisure and Recreation Association, WRLA) from 1993 (Hofbauer 2004).

Realization of activities is carried out at the time, which is so-called leisure time. The concept of **leisure time** can be defined as "a set of activities that child and person may perform completely freely, either to relax or to entertain or further develop their knowledge, creative skills, interests at a time of being away from work, study, family or social obligations" (Junger 1991, p. 33). What is more, it shall complement, enhance and develop moral knowledge, mental endurance and habits of human beings (Pávková 2002). The leisure time is not only a source of rest and distraction, but also a space for further developments of personality (Uvinha 2010a, b).

Leisure time has two important functions, which consists of:

- ✓ **regeneration of human beings strengths**, in order to further performance of his/ her duties,
- ✓ **general development of human beings**, who create conditions, in order to develop versatile during leisure time.

The leisure time is a subject of examination of several disciplines. Sociology examines leisure time as a symbol of age, social position, profession, education and social success. In psychological concept is leisure time perceived as one way of experiencing reality and subject of interest is relation to reality, human beings, intellectual activity in leisure time and motivation to a particular action (Uviha 2014, Dobay 2015, Rozim & Marko 2015). A sense of leisure time is associated with the fact that human being opens network of the most diverse activities, which can be carried out freely with enthusiasm and without compulsion, voluntarily and so on. Therefore, we can review, which time proportions have a recreational physical education and sports activities in leisure time, whether it is necessary to know the quantitative side of leisure time (Uvinha & Velardi 2014). In this context, it is based on macrostructure time fund, which divides time fund at the level of macrostructure in the following way (Figure 3):

- 1. The working time:** is a time dimension of work that is needed to acquisition, as well as means of livelihood.
- 2. The necessary working time:** a) time needed to satisfy biological needs,
b) other activities needed for existence.
- 3. The Leisure time:** presents a dimension, which arises if we subtract working time and necessary working time from nominal daily, weekly and annual working time.

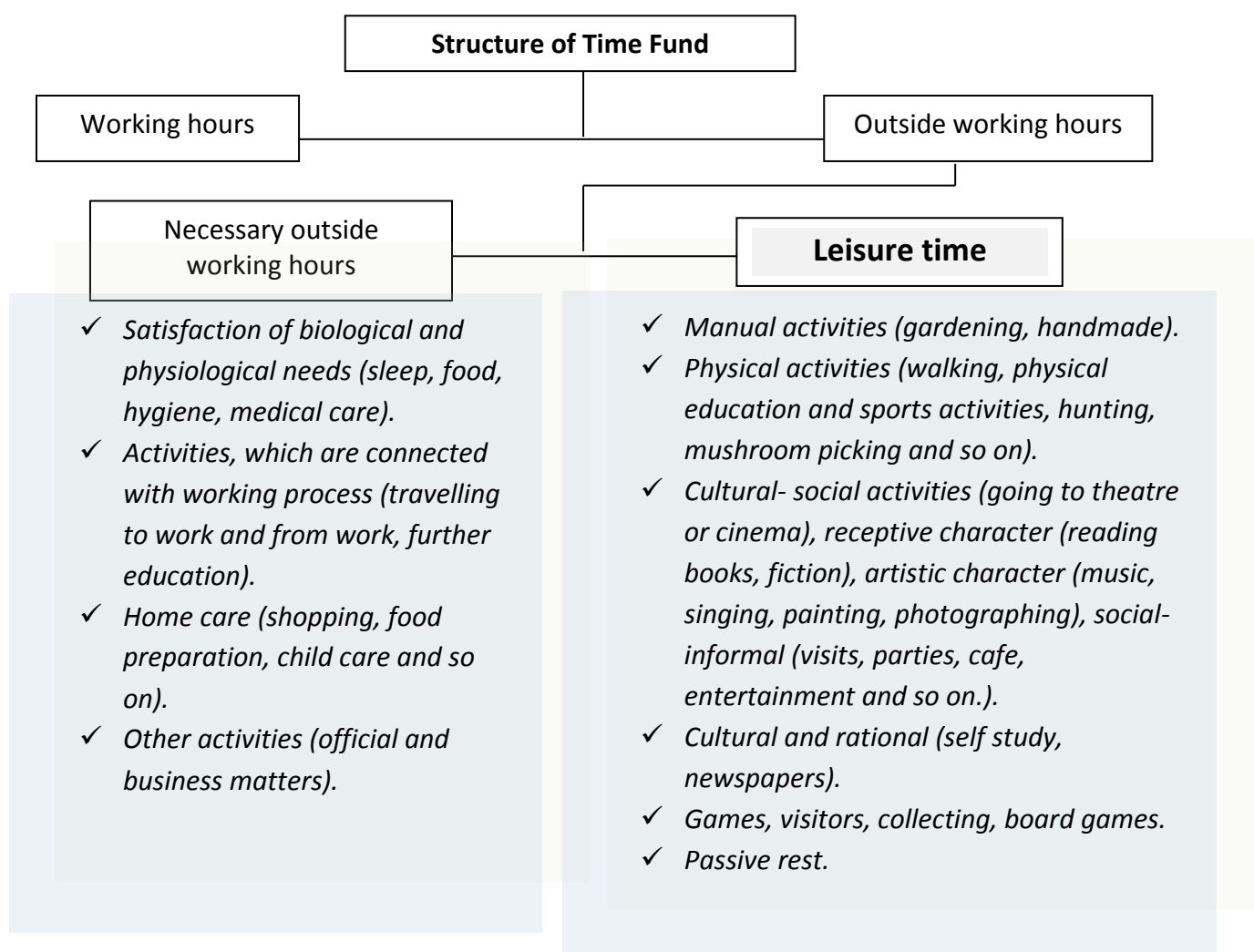


Figure 3 Structure of time fund (Junger 1991)

The Gallo & Lenčo (2009) survey conducted on the sample of 834 young people aged 13 to 27 refers to the perception of the amount of leisure time and its good use, which is not the same among all children or young people. Research shows that young people (13-27 years) have an average of four hours of free time during the week day. They devote most of their leisure time (54,4 %) to rest at home, when they for example watch TV, listen to the music or play computer games. The second most common daily activity of young people is meeting with friends in the yard, in the pub or at the disco. Young people devote approximately the same space to communication with friends via chat, cell phone and messages as to reading and finding information on the Internet.

Among basic institutions providing education in the leisure time belong (Pávková 2002, Mikláňková 2003):

- ✓ *family*, is involved also in developing a relation of a child to physical activity of the lifelong character since the very early age,
- ✓ *educational system*,
- ✓ *the area of physical education and sports* (physical education, sports clubs, sports and physical education facilities)
- ✓ *culture department* (educational institutions, cultural centers, educational centers, houses of culture, clubs, libraries, museums, galleries, observatories, planetariums, facilities for leisure time and special interests, theaters, cinemas, musical institutions, etc.)
- ✓ *other departments*, especially in the system of further education, support programs, adaptation, prevention, etc.

Bendíková (2010) based on survey result we point to the fact that during several age periods there are different initiators who are involved in creating the relation of children and youth to physical activities. Parents have considerable potential in shaping a healthy lifestyle and physical literacy in preschool period but also during the younger school age, while in the period of pubescence and adolescence it is peers and fashion trends influence. At the same time surveys show the significant influence of the father in directing a child to physical activity compared to the mother. The share of educational institutions in the orientation of children to physical activity begins when entering school. In the studied groups none of the adolescents stated kindergarten as the initiator of the PA. The school is involved in developing the relation to physical activity more intensely in the period of younger school age than in the period of pubescence and adolescence. Precisely school should build on a family and participate in shaping the lifelong physical activity through its mandatory and optional (non)organizational forms.

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MOBILITY AND POSTURE

Renata Malátová

*Department of Physical Education and Sport, Faculty of Education,
University of South Bohemia, České Budějovice, Czech Republic*

Abstract

Dorsal pains originating from spine dysfunctions belong to the most frequent chronic illnesses. This work is focused on postural functions, spine stabilisation as well as the anatomical and physiological principle of movement as the quality and interplay, or the lack of interplay of all these mechanisms decides the resulting body posture. Correct stabilisation of the spine is essential for physiological, individually optimal body posture.

Key words: *body posture, stabilisation of spine, motoric functions, movement patterns, physical activities*

Introduction

Mobility is a primary expression of life that enables humans to lead their lives and that should therefore represent the basic essential need. Mobility also plays major role in the individual stages of human ontogenesis. It greatly influences the mental development in children, particularly during the infant and toddler developmental stages (up to 15 months of age) when movement is spontaneous and reflects needs, temperament and intellect of the child. With increasing age this spontaneous need of movement starts being influenced by surrounding social environment (Bursová, 2005).

Currently physical activity in both children and adults is continuously decreasing. This fact causes lowered level of physical fitness which in its turn causes insufficient predisposition for both working and leisure activities. This in turn is connected to increased health risks particularly overweight and obesity in children and adolescents (Bunc, 2008).

Dysfunctions of the musculoskeletal system are currently one of the most frequent chronic illnesses in adults. The causes for the development of such dysfunctions usually go back to childhood years when an uneven load on the musculoskeletal system caused development of muscular imbalance that is in its turn exhibited by faulty body posture. Physical dysfunctions of the musculoskeletal system are exhibited by changes in body shape but can be, in contrast to real deformities and orthopaedic defects, corrected by will (Kolář, 2001).

Adequate motion of the musculoskeletal system activates the whole organism. It increases substance metabolism, influences heart activity, increases breathing volume, the vital lung capacity and stimulates the production of endorphins in the brain. Suitably chosen physical activity can positively influence correct body posture and consequently the position of individual spinal vertebrae, its biological curvature, muscular balance and physiological activation of individual muscle groups during movement patterns.

The above stated facts indicate that physical activity has irreplaceable physiological impact on human development. It is essential for healthy growth, and is also the basic instrument in preventive health care.

Physical activity in children and adolescents has dominating forming influence on the shape and function of individual developing organs and consequently on the shape and function of the whole body; in adults regular physical activity ensures maintained physical functions and their structure (Bursová, 2005).

The connection between physical movement and mental quality of an individual was acknowledged as long ago as ancient China and India as well as ancient Greece and Rome. The oldest systems of physical education (Kung Fu, yoga, kalokagathia) all had the same aim. They all emphasised the need of harmonic development of physical and simultaneously mental abilities of a human. The Greek kalokagathia characterises the connection between body and soul. When the reign (mind, spirit) is healthy so is the body structure. Both these seemingly different functions must be understood not only philosophically but also according to new scientific findings as two sides of the same coin that cannot be separated (Véle, 2003).

Physiological nature of motion

Development of motoric functions begin in early intrauterine stages of life from the first circumstantial motoric expressions of the foetus to first controlled, steered motions of the child. This is a gradual multi-step regulatory and steering process causally bonded to the slow maturing of individual sections of the central nervous system (CNS). Maturity continues from the spinal cord through brain stem and reticular formation, vestibular apparatus and cerebellum, subcortical basal ganglia to the innermost centre of the cerebral cortex (Mourek, 2005).

The activity of skeletal muscles is always controlled as a functional unit (Trojan et al., 2003). In humans the motoric control is steered by all parts of the CNS from the cerebral cortex to the spinal cord. The basis for all movement is the muscle tonus which is behind the position of the motoric system (the system of postural and body straightening reflexes) with the assistance from reticular formation, statokinetic sensor and cerebellum (vestibular and spinal). The motoric positional system is the basis for the motoric motional system (system of determined movements) that is controlled by cerebral cortex, basal ganglia and cerebrotocerebellum. All neural impulses causing muscular contractions are in the final shape asserted through motoneurons from the cores of cranial nerves or cerebral cord (Trojan et al., 2003).

Realisation of body position or its parts has reflexive character (Trojan et al., 2003). For the control of supporting (involuntary) motorics (simple involuntary movements) these structures are important: motoric unit, cerebral cord and stem, spinal and vestibular cerebellum (Rokyta et al., 2008).

Primarily the support motorics is controlled by motion centre of cerebral stem particularly the reticular formation through coordination of position, posture and straightening reflexes. The corresponding afferentation originates from proprioceptors, exteroceptors and the statokinetic sensor (Trojan et al., 2003).

The spinal cord represents the lowest reflex motoric centre. Information for reflex muscular activity originates from proprioceptors stored in the muscles and tendons and from exteroceptors stored in the skin (Trojan et al., 2003). The circuit of the cerebral cord consists of the five basic sections.

The receptor is placed in the muscles, tendons or in the skin from which the centripetal fibres (efferent, sensitive) lead into the centre in the cerebral cord and from there the centrifugal fibres (efferent, motoric) lead toward the effector (Rokyta et al., 2008).

Postural activity is the basis of reflex motorics with the decisive element of **postural reflexes** being the contraction of antigravitational muscles (physiological extensors). The basic muscular tonus is maintained by exteroceptive and proprioceptive spinal reflexes, gamma-system and reticular formation (Trojan et al., 2003).

Postural reflexes are divided into *local static reactions* (exteroceptive extensor reflexes, ipsilateral – one limb), further *segmental static reactions* (more complex, more limbs) which include the crossed segmental reflex, ensures the upright posture, balance and walking base. Finally, to postural reflexes belong *the overall static reactions* to which belong tonic neck reflexes, tonic labyrinth reflexes and phasic labyrinth reflexes. While the tonic labyrinth reflexes are applied at rest, the phasic labyrinth reflexes are activated at quick and complex movements. The control of postural reflexes stems directly from the vestibular nuclei and indirectly from facilitative and descending reticular formation.

Statokinetic sensor has important morphofunctional connections to the spinal cord, the reticular foundation, the eye-moving nerves (nystagmus), the cerebellum, the extrapyramidal system, the cerebral cortex and particularly the temporal lobe (Bartůňková, 2007).

The straightening reflexes are closely connected to the postural reflexes. The stimulus is here the constant direction of the ever existent gravitational pull with prominent control from the reticular formation particularly from the area of midbrain and information from the vestibular system. Thanks to this mechanism there is a perfect interplay of static reactions and adequate tonus of the antigravitational muscles. Dysfunctions of the straightening reflexes occur when the vestibular system or proprioceptive afferentation fails. Straightening reflexes of the body are among the straightening reflexes that respond to stimuli from touch exteroceptors that in their turn increase tonus of the neck and torso muscles. For the cortex postural and straightening reflexes mutual collaboration of cerebral cortex, eye-correction and symbiosis of all involved systems is necessary (Bartůňková, 2007).

The cerebellum (vestibular and spinal) contributes to the supporting motorics which is an important integration and coordination centre of reflexes, subconscious as well as conscious movements. Vestibular cerebellum is necessary for keeping of upright position.

On the other hand, spinal cerebellum analyses information from the proprioceptors (i.e. muscular movement and tonus) and is closely connected to the control of muscular tonus (Trojan et al., 2003).

The cerebellum is also important for conscious movement as it is an important integration and coordination centre not only for subconscious but also conscious movements as it ensures smooth, aimed and adequate movements. It is also connected to the cerebral motoric and sensory cortex, basal ganglia, reticular formation, vestibular sensors, proprioceptors and exteroceptors. However, its actions are outside our subjective perception. Although all movement is controlled by the cerebral cortex, the cerebellum has a great influence over it (it uses its memory resources and returns the information to the cerebral cortex). Damage to the cerebellum causes ipsilateral ataxia (Rokyta et al., 2008). Output information from the motoric areas is in the cerebellum integrated with information from the statokinetic sensor (information about head position in the space) and from the proprioceptors (information about the position of the torso and limbs) which also function as a back-up to the output cortex information.

During each conscious movement the cortex information is continuously, quickly and accurately corrected according to the actual state of the tonus and according to the contractions of all individual muscles. This feedback can both facilitate and inhibit impulses from the cerebral cortex. The resulting function of the cerebellum cortex is not only feedback regulation of movement but also share in programming or terminating a movement. The cerebellum can be therefore said to be connected to three basic somatic functions (connection to controlling muscular tonus, to postural reflexes and conscious movements) that together make one functional system. Its activities are paramount for continuous, targeted and adequate presentation of each conscious movement as well as for exact positioning of the aim, length, endurance and intensity of the movement. Simultaneously, the subconscious motoric movement traces are created for individual movement patterns. The cerebellum also significantly contributes to the control of reticular formation and gamma-system (Trojan et al., 2003).

Another significant centre for controlling conscious motorics are the basal ganglia responsible for programming of slow and modified movements (Vokurka et al., 2007).

Thalamus is yet another centre for controlling conscious motorics. It has several motoric nuclei, where one of the main functions is signal integration received from the spinal cord, brainstem, cerebellum, basal ganglia and cerebral cortex. This information is further transported back to the neocortex and basal ganglia (Trojan et al., 2003).

Conscious movements are controlled by complex activity of the nervous system where the cerebral cortex plays a predominant role in their integration. Input information for conscious movements is secured by a synchronised activity of all receptors, consequently analysed by cerebral cortex with direct contribution of subcortical structures above all thalamic nuclei. Incoming information is simultaneously compared with previous information stored in the memory. Based on the analysis, mutual comparison and evaluation an output motoric information is created and sent directly through corticospinal channel (single neuron pyramidal channel) into spinal cord or indirectly (extra-corticospinal system) through transfer in subcortical structures to the spinal cord (Trojan et al., 2003).

The foundation for movement activity is contraction of skeletal muscle. These striated muscles function above all as functional units of the musculoskeletal system via their mechanical properties (flexibility, strength, ability to contract and relax) (Trojan et al., 2005). Striated, skeletal, muscles can be macroscopically divided into red and white muscles (Rokyta et al., 2008). *Red muscles* contain large amounts of myoglobin (proteins binding oxygen in the tissue). They also contain high count of mitochondria and are richly perfused which is closely connected to the specialisation of these muscles toward aerobic metabolism (richly oxygenated) which is energetically more advantageous than the anaerobic metabolism. Slow oxidative red fibres are in majority why they appear in places where tonus is needed. These are the so called tonic muscles (postural, antigravitational).

White muscles have relatively low myoglobin count, are less perfused and have lower mitochondria count. On the other hand, they contain rich sarcoplasmic reticulum and high amount of glycolytic enzymes why their characteristics is anaerobic metabolism. These muscles are capable of very quick movements; they are physical muscles, though their disadvantage is great energy demand but quick fatigue.

This division has lately been critically reevaluated and the current opinion is that muscular fibres are plastic enough to fulfil the need of both red and the white muscles (Rokyta et al., 2008).

Body posture

To decide what the ideal upright body posture should be is rather complicated. Basically it applies that higher muscular activity is as straining as significant hypotonia which appears with overload of ligament apparatus. Ideal position of the pelvis is reached when the cristae iliacae are at the same height, and the connecting spinae iliacae anterior superiores and spinae iliacae posteriores superiores are in parallel. Sacrum should be so tilted to grant physiological curvature to the lumbar lordosis which is continuously followed by a weak thoracic kyphosis. The tilt of the pelvis regarding anteversion or retroversion decides the degree of lumbar lordosis. The spinal anteroposterior curvature should be continuous and flow into each other. Any side diversions demonstrate scoliotic posture or scoliosis. Head position is given by the line of eye vision and position of the cervical spine. Eyes are trying to keep levelled horizontal vision which forces the head to remain upright, while the weight of the head inclines a flexion. There is also a caudocranial influence of the position of the pelvis that influences the spine all the way to the atlanto-occipital area (Véle, 1997).

According to Čermák et al. (2005) the ideal posture is described as a certain standard with legs lightly together, knees and hips leisurely stretched and the pelvis positioned so as to keep the body weight equally over the hip joint connectors. The spine should be kept naturally curved, shoulders down, shoulder blades close to the ribs and drawn towards the spine. Position of the head keeps the auditory canal in horizontal line with lower eye socket corner.

Bursová (2005) claims the upright position is the result of individual postural function that ensures correct positioning and maintaining upright posture in changing situations of the gravitational field enabling specific human mobility. She further states that correct body posture in childhood and adolescence is a good indicator of health. In school children incorrect posture is so frequent it is often classified as civilisation illness.

Kolář (1996) says that upright body posture must get mastered by each individual from birth and is the result of reflexive actions that start in central nervous system based on inherent, genetically based movement patterns. The condition of this action is a certain movement stimulation that promotes strengthening of reflexive connections. This results in an individual postural stereotype of upright body posture. Seen as postural functions Kolář (2006, 2007) further evaluates body posture (ideal posture) based on biomechanical, anatomical and neurophysiological functions and emphasises that a connection between these functions must be seen in context of motoric (morphological) development.

Hošková and Matoušová (2005) describe the upright body posture as an individual postural program that evolved during physical development of the given individual and is the result of complex postural reflexes. It is characterised as the way the individual has adjusted to the earth gravity that must be judged individually. The process of keeping an upright posture requires interplay of all involved muscles. To reach the required effect of chosen compensational exercise it is necessary to start from physiological facts about the skeletomuscular system in order to avoid wrong load on the body during the exercise. To renew the muscular balance during compensational exercise the physiological situation of the peripheral structures of the mobility system must first be normalised (by relaxation and stretching of shortened muscles and strengthening weakened ones).

Then, education on correct, physiological way to perform the given movements is conducted (Kabelíková and Vávrová, 1997).

Re-education of the postural program is according to Véle (1995) really complex and long-term process that needs to reprogram the already fixed mostly incorrect posture. During movement coordination between all muscles exhibiting it is necessary. This is secured through slow implication of the movements that needs to be maintained under constant surveillance, conscious control and can be stopped whenever (Kabelíková and Vávrová, 1997). It is also important to synchronise exercise with breathing. Kabelíková and Vávrová (1997) state that for majority of muscles an increase in tonus appears with inhale while it again decreases with exhale. Véle (2007) says that there is a mutual connection between breathing and postural muscles. Individual muscle groups work in mutual interplay. When body posture is to be corrected, breathing patterns must be corrected as well.

The evaluation and education of correct body posture is different for Brugger concept (Pavlů, 2000), different for Pilates (Ungarová, 2003), different criteria for the ideal posture can be found in the work of Kendall et al. (1993) and other experts on this field.

Rough examination of the overall posture can be conducted through easy tests and methods. One deals with evaluation of posture standards according to Jaroš and Lomíček (Hošková and Matoušová, 2005), testing of weak body posture according to Mathias (Hošková and Matoušová, 2005), or evaluation according to Klein, Thomas and Mayer (Haladová and Nechvátalová, 1997). Finally, there exists the evaluation of mobility according to Janda (1996) using functional muscular test.

Basic mobility stereotypes

Many different muscle groups get activated during every physical movement which create a certain functional unit. If this movement is conducted correctly (if it is quick, rhythmical, coordinated and smooth) the individual groups connect according to particular chronological interplay. During wrongly executed exercise (without correction) muscle groups that are not related to the given exercise activate, thus decreasing the efficiency and quality of the movement.

The basis of complex physical movements is a combination of simple moves (flexing of a leg, side flex of a leg, arm stretch, head bend, flex of the torso and so on). These are basic move stereotypes that Janda (1984) characterises as temporal set of conscious and subconscious reflexes. Control over connecting individual muscle groups in the basic movement stereotypes is subcortical or automatic and up to a point non-committal. The quality of basic movement stereotypes and the degree of their fixation firstly depends on the quality of central nervous system and other physiological conditions are basically impossible to influence by external factors (Bursová, 2005). They are unique for each individual and create part of sports talents (Kolář, 1988).

Universal, spontaneous, targeted physical activity enables obtaining wide physical experience that is the basis for following specialised training and motoric teaching. As late as around the 5th – 6th year in a child's life is it possible to optimise physical training through conscious movements and regulate its quality through verbal evaluation feedback. This period is the most important for change and fixation of basic movement stereotypes (Bursová, 2005). The ability to rebuild fixed physical stereotypes decreases with age (Janda, 1984).

Postural function

Postural function ensures upright positioning of the body in the gravitational field. By body posture we mean a position in which the body and its parts are at rest (Bursová, 2005).

Posture is however not characterised by standing and sitting positions only. It is an intrinsic part of any body position (erect head position in infants when in prone body position or raised lower limbs against gravitational pull when positioned on the back) and particularly of any movement. Posture is a basic condition for the movement not vice versa.

Postural functions are a part and main prerequisite for every movement, while their importance is magnified during physical exercise. Wrongly adopted postured caused by unsuitable training method is one of the main causes why sports can be harmful. The paradox is that posture is usually not improved during physical training; in contrary the influence of repetitive uneven load on the body further deepens postural dysfunctions and lead to sport injuries and chronic injuries in particular.

Regarding possible preventions and treatments of musculoskeletal dysfunctions the major task is to question the forces acting on the skeletal and soft tissues. These forces play a major role in the occurrence and development of countless illnesses to the skeletomuscular system. Gravitational force has the major influence of all external forces. During movement rotational and shearing force vector are added the external force vectors and all increase during physical activity. Another factor causing dysfunctions to the musculoskeletal system is represented by the inner forces that appear during postural activities (stabilisation and postural reactivity). Postural activity evolves due to the influence of external forces, when stabilising (strengthening) muscle function controlled by CNS must be activated. This activity is connected throughout the musculoskeletal system and happens subconsciously. Coordinated activity of these muscles ensures strengthening of individual skeletal parts that are connected through joints. A number of loosely connected sections can thus function as a single relatively firm unit. Such muscular activity is purely subconscious. Internal forces originating from muscular activity (influence vectors, force, stereotype repetitions) are thought to influence the musculoskeletal system from long-term point of view and have much more significant impact than the external forces. Effects of wrong influence of the internal forces (caused by muscular activity) are often underestimated. Problems often stem from the restricted possibilities of measuring these forces and also from the fact that the influence of internal forces is not singularly the result of muscular mechanics but is also dependent on the controlling processes of the CNS. Diagnostic analysis of the internal forces is often only superfluous (Kolář, 2006).

Postural function in children

Assessment of postural functions in children is complicated by difficulty to identify them from physiological developmental divergence that will disappear with ache independent of therapy in contrast to irregularities requiring active correction. This difficulty recognising what is still the norm and what is a deviation is complicated in children regarding both structural and functional findings. Among the physiological developmental deviations belong for example (Kolář, 2006):

- unequal growth of lower limbs,
- different shape of the pelvis, more horizontal in space, causing a more prominent lumbar lordosis,
- in children aged 11 to 14 it is perfectly physiological not to be able to reach toes with stretched arms when sitting with stretched legs, caused by anthropometric measures in that period of physical development,
- valgus knee position and flat feet in physiological child around 6 to 7 years old,
- anteversion position of femurs with typical inside turn of the patella and prone position of the foot,
- hyperextension of knee joints.

For assessment of postural functions in children certain alterations must be made to the tests and evaluations used for adults and adolescents. Some degree of uncertainty and gradual development is characteristic that is furthermore unproportional. This fact is most obvious during growth acceleration. This period is particularly sensitive to correctly chosen structure of training load. The existent disproportionality, instability and ongoing development must be observed and taken into account regarding the volume and particularly content of training load of children and adolescents, together with the individual variability of physiological and mental development. Among children of same calendar year of birth different levels of morphological and functional features can be observed. Differences between the expected and the real level corresponding to given biological age is ever present (Kolář, 2006; 2007; Kolář et al., 2009).

Postural stability, stabilisation and reactivity are recognised when postural functions are observed.

Postural stability

In static position the body keeps the same position in space. Each such position (standing, sitting etc.) indirectly contains dynamic processes. Static state cannot be reached by static posture; it is a process that must resist natural lability of the musculoskeletal system. Static position is therefore not a simple achieving of a position it is its constant maintenance of it. It is an unfinished, continuous dynamic process. It is also an ability that enables such body posture that will prevent an accidental or uncontrolled fall.

Stability is influenced by biochemical and neurophysical factors. Among the biophysical belong factors influencing stability such as the size of support areas, directly proportional to the stability degree.

Basic condition for stability in static position is the placement of centre of gravity that must always be dependable on the support base but not the supporting area which is the area of the ground in contact with the body. Support base on the other hand is the whole area, defined by the furthest borders of the ground or areas of the support and is normally larger than the supporting area itself (Kolář, 2006, 2007; Kolář et al., 2009).

Stability is directly proportional to the size of the supporting base area and body weight and inversely proportional to the height of the centre of gravity over the supporting base and centre of support base and the tilt of the supporting area compared to the horizontal level. On the other hand, during locomotion the gravitational force vector needs not be aimed directly into the supporting base, contrary to the eliminant of the external forces such as inertia, friction and reactional force as well as the gravitational force (Karas et al., 1990).

When the vector of gravitational force is during static load not influencing the supporting base, considerable muscular strength is required in order to maintain the balance. Unbalanced posture is firstly maintained by increased muscular activity, later by pain and subsequently occurrence of a deformity. These are therefore initially functional and later structural changes of the musculoskeletal system.

Postural stabilisation and postural reactivity

During postural stabilisation an active (muscular) hold of individual body parts steered by CNS occurs against the action of external forces. Gravity pull dominates this muscular activity. For static posture (standing, sitting etc.) muscular activity ensures relative rigidity of the joint-connected sections that enables endurance in this position against gravitational pull. This process is called postural stabilisation (Kolář, 2007). It is not effective only against gravitational force but is an intrinsic part of all movements as well even including movements restricted to upper or lower limbs.

Every movement of any part of the body challenging for the body strength (lifting or holding a burden, moving limbs against or without a force, ricocheting or throwing), creates contracting muscular force necessary for overcoming the resistance.

This force is transferred to force momentum in the levering segmented system of human body and causes reactional muscular forces in the whole musculoskeletal system. Such reaction stabilisation function is defined as postural reactivity (Kolář, 2007; Kolář et al., 2009). The purpose of this reaction is fortification of individual mobile (joints) so as to achieve as stable punctum fixum as possible and keep joint segments stable against external forces. The necessary fortification of the joints is achieved by coordinated action of agonist, antagonist and other muscle groups. The movement of the torso with the help of limbs requires a certain degree of movement in the limb joints. On the other hand, the torso must maintain a relatively rigid unit and cannot consist of loosely connected segments.

No conscious movement (including limbs) can be executed without ligament stabilisation of the muscle, i.e. without securing rigidity of joint segment in the ligament area. For example flexion of hip joint cannot be executed without fortification of the spine and the pelvis or without fortification of ligament ends of hip flexors (m. rectus femoris, m. iliopsoas, m. sartorius). Therefore spine extensors, abdominal muscles, diaphragm, pelvic floor and others are all connected to the movement of the hip joint. The activity of stabilisation muscles therefore causes activity in other muscle groups that are connected through ligaments of the stabilisation muscles. These then secure fortification in other joints (Kolář, 2007; Kolář et al., 2009).

In experimental studies the often mentioned reality is that activation of diaphragm, pelvic floor, abdominal and dorsal muscles (i.e. muscles that ensure fortification of torso and enable thus movement of the limbs) happens ahead of mobile activity of the limbs. In other studies simultaneous activation of diaphragm muscles, m. transversus abdominis, pelvic floor and m. multifidus during postural activity is mentioned (Hodges and Gandevia, 2000; Sapsford, 2004). Each movement in the segment is transferred to the whole posture, in other words each mobility manoeuvre owns stabilisation transfer into through ligaments connecting areas and consequently to the whole body. For example a simple swallowing cannot be done without activation of tongue muscles, pressing the tongue against upper palate and stabilisation of other muscle groups.

Furthermore, there exists no movement of either upper or lower limbs without fortification (stabilisation) of the torso as a whole. Ribcage, stomach, girdle areas and of course spine function as one unit that is conditional for all movement activities. As the stabilisation function is integrated into all movements, the significance of inner forces lie not only in their quantity but also their frequent stereotype repetition. Assuming they cause unphysiological load, it is only a matter of time before complications occur, including morphology changes. Another important fact is that while conscious movements can be freely controlled, the reactive stabilisation functions happen automatically and subconsciously and therefore without our knowledge (Kolář, 2007).

Postural functions and functioning anatomic relations

Anatomic conditions are closely connected to postural stability, stabilisation and postural reactivity. In order to understand the significance and incidental further development of the symptoms, anatomic conditions and their relation to the load exerted during postural activities, bipedal stance and walking must be determined. Majority of scientific work focused on this field originate from French authors (Labelle et al., 2005; Legaye, 1998). Anatomic connections used in diagnostics are dependent on the position in space. Anatomic parameters independent on the position of the photographed patient (standing, sitting, lying) are also used for evaluation. The photographs can therefore be compared in retrospective. Anatomic conditions need to be seen from full view, as changes in spine curvature, flatfoot or valgus osteotomy of the knee can be all seen from a full view body posture of the individual. In case of a pathological finding correction must be made through securing and compensation for correct body posture.

Postural functions seen from central control

When assessing postural functions it is important to consider the quality of central control mechanisms as well as the anatomical and biomechanical parameters, as body posture also influences muscular tension – namely muscular balance or imbalance, and correct physiological posture. Neurophysiological factors that influence postural functions are represented by undisturbed multisensory integration of proprioceptive, vestibular, visual and dermal information, by the degree of excitability of the nervous system, the quality of feedback mechanisms regulating balance functions, quality of mobility differentiation (the quality of selective mobility) and the level of relaxation abilities connected to it. Postural stability is also influenced by mental effects.

During examination it is important to note first the position of individual body segments and then the distribution and degree of muscular tonus. During static positions (sitting, standing) the individual mobility segments are fortified by coordinated activity of agonists and antagonists (coactive activity). This segmental fortification in its turn enables reaching an upright posture and locomotion of the body as a single unit. In physiological circumstances muscular activity and ligament system get information through the CNS that this fortification occurs with centred positioning of the joints (neutral position) which is a functional position that enables balanced pressure load on the joints. The precondition of this state is balance between the agonist and the antagonist muscle. Fortification in a centred position is greatly dependent on muscular condition and therefore the quality of the CNS.

Neutral positioning of the joints should occur with minimum effort from the deep muscles (minimum postural tonus). All excessive (total or localised) muscular tonus brings significant consequences. It is practically impossible than an increased static postural tonus would be the cause or consequence of some problem or another (Kolář, 2007; Kolář et al., 2009).

Functional dysfunctions

Among functional disturbances of the musculoskeletal system belong dysfunctions of moving stereotypes, postural stereotypes and muscular imbalance of local character or associated into typical syndromes. Muscular imbalance occurs as an adaptation mechanism to external forces, based on a disturbance in muscular balance where one of the antagonist muscles outweighs the second. The differentiation process occurs as some of the muscles react by weakening other by shortening process. At the beginning of muscle imbalance occurrence the muscular interplay is changed due to changed muscular tonus in the damaged segment also influencing the posture in favour of the hypertonic muscle. If this situation is not corrected hypertonia increases and cramped tonus or muscular spasm evolves. In the end, structural restructuring occurs also with shortening of the ligament and restriction in movement. These are usually postural muscles with dominance of red fibres innervated by small α -motoneurons.

On the other side of the joint a functional attenuation or hypotonia appears. Hypotonic muscles are elongated, they slowly weaken, lose weight or atrophy.

These are the so called phasic muscles with dominance of white muscular fibres innervated mostly by large α -motoneurons.

Typical effects of muscular imbalance are incorrect movement stereotypes and upper (cervicobrachial) and lower (lumboischadic) cross syndrome as well as layer syndrome (Čermák et al., 2005; Tlapák, 1999; Janda, 1984).

Conclusion

Human movement is a complex process. Upright body position or posture in standing position is for humans a typical adjustment to gravitational force which at the same time decides the overall character of motoric movement. Upright position in gravitational field is unstable due to narrow supporting base on the ground and must therefore be continuously maintained by muscular activity - postural motorics. Dysfunction in mobility on the functional (muscular imbalance) and structural basis cause somatic and mental problems and significantly restrict mobility behaviour in humans.

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USING OF BIORHYTHMS AT SCHOOL BY THE APPLICATION OF PHYSICAL ACTIVITY

Ludmila Jančoková

Matej Bel University, Banská Bystrica,
Faculty of Arts, Department of Physical Education and Sports, Slovak Republic

Abstract

In the article we present theoretical background of the biorhythms in relationship to human's physical activity and health. Life harmony, synchronisation of human-being and environment is the primary precondition of his physical, psychological and social health. This facts create the way for natural biorhythms' renovation which are one of the primary elements of student's health but they are also the base of our long-lived existence. We paid our attention on biorhythms' use and application in education process at school environment in association with student's performance by physical activity. The paper is a part of the granted project: VEGA no. 1/0376/14 "Physical activity intervention for the prevention of health of the population of Slovakia"

Key words: *biorhythms, health, physical activity, school*

Theoretical background

From the evolutional development point of view, the organizational structure of the environment with heterogenous impact created in human –being basic and temporary factors which were reflected in activity of nervous, endocrine and metabolic systems where one of the main mechanism of living organisms' adaptation (also the human – being) on rhythmical changes of exogenous environment is the organization of life processes in the time. The timeline of these rhythmical changes is very different. It affects the processes from the molecular level (enzymatic activities) through the cellular (mitotic activity) up to very complex functional programmes as rhythm of physical, working, sport activities and also the rhythm of sleeping and waking (Bendíková & Jančoková 2012).

The existence of biological rhythms was the problem which was already known during the ancient times thanks to ancient philosophers and physicians like Hippocrate, Galen, and Avicenna whose the first researches were connected with the people's periodicity which was in relationship with their diseases (Halberg et al. 2003), but on the other hand, the main attention and interest of the biorhythms started only last century as Jančoková (1988) stated, because they are expressed and manifested in the lifestyle of each human – being.

The lifestyle can be understood as the complex of processes and principles of individual or group's whole life philosophy which depends on life conditions, environment, social norms, culture, value orientation, level of the science and it also depends on the whole economic, political and organizational structure of the society. It also includes the character of nutrition, physical activity, health, financial earnings, the quality of housing and living, interpersonal relationships and education level. It is specific part of the way of life of exact society and culture (Šimonek 2000, Bendíková 2014, Šmída 2015a).

The specific attention of this context is important to dedicate to quality of health care which is currently monitored from different points of view and levels of various authors (Masoli et

al. 2004, Brukkerová 2005, Paugschová 2009, Zadarko & Barabasz 2009, Zadarko et al. 2009, Zadarko et al. 2010, Paugschová et al. 2010, Bendíková 2011, Palovičová & Vančová 2013, Vančová & Pivovarníček 2013, Šmída 2015b).

The health is a demonstration of physical, spiritual and social relax, in other words, the human – being's comfort. It is also the organism's status which predicates its optimal self-regulation as well as the balance between its functions and exogenous environment – organism's homeostasis from the point of view of the biorhythms' use and application.

Chronobiology (the science which concerns the term biorhythms (Klerman et al. 2002)) passed from its beginning to nowadays through many social and philosophical changes. The researches and studies which are interested in biorhythms' problem appeared only in 20th century (researches of American, Swedish, German physiologists) and they simultaneously focus on enormous spectrum of oscillations in animal and human organisms and they tried to experimentally confirm or influence the biorhythms' process and working.

Today, the biorhythms 'study is a large scientific discipline which is realized as obvious part of various traditional biological and medical branches which are simultaneously presenting in the organism as the whole. The biological rhythms are one of the main characteristics of the biological systems with a very important trait of their unrepeatability.

Pivovarníček (2009, 2011) state that the problem of diurnal rhythms, which are part of circadian rhythms (from latin circa= approximately, dian= day), is the most examined and studied sphere from the point of view of sports chronobiology which has also the impact on sports performance during the day.

The biorhythms' research passing together on various levels which present quantitative and qualitative changes in living organisms which repeat regularly and they come back approximately at the same time Bartůňková (2007). The reason of periodicity has an internal (endogenous) origin and the modulation arrives by the external (exogenous) reason. Jančoková (2000), Švorc et al. (2008), Vančová, Jančoková et al. (2013) state that the rhythmical changes in the organism's activity are regulated by the internal endogenous and external exogenous factors and according this fact we distinguish biorhythms' classification into two main principal groups.

The first is created by the external rhythms which present the oscillations of passive system which depends on periodical impulse from the external (exogenous) environment. They can be observed and monitored only in terms of circadian periodicity of social or climatic environment. Besides of the task of the start timer and activity's finishing activity, they can change the intensity and the length of the activity (alternatively its frequency) in terms of endogenous cycle which is regulated.

The second group is created by endogenous rhythms which predicate genetically fixed biological rhythms. These rhythms lasting in the environment without the external time impacts. They are individual and independent oscillating systems which are able to hold their period also in constant non-periodic conditions. They are also called physiological mechanism which is timed as "the biological or endogenous clocks". The clocks enable and allow organisms to time and repeat biological processes for approximately 24 hours or the other time interval also in the case of omitting of the signal of exogenous factor by which the organism is synchronized.

The biological rhythms are divided from the point of view of the period's length and duration into ultradian, circadian and infradian rhythms (Švorc et al. 2008).

From the point of view of the biorhythms' use we receive thanks to many authors' research (Romanov 1980, Aganžan & Šabatura 1989), lots of information with positive and negative character which confirm that there exist specific limits in the organism's state when the exogenous factors are affecting. If the limits are crossed, the irreversible function disorders (and even the death) can come. The knowledge about the principles and requests of biological rhythmicity in human life is a part of effect's optimalization on the health as on the bio- psycho- social quality of human life.

The biological clocks of the organs are controlled by circadian rhythms which change phases of activity and relax during 24 hours and each organ has during the day its maximal activity lasting for two hours.

6.00 - 10.00 AM

A lot of heart collapses and heart attacks are characterised for this time period. The body has the biggest immunity and is able to fight against viruses and bacteria. The time period when the blood pressure is strongly increasing last for the first three hours after waking up. The blood vessels are "solid and the blood is glutinous". The exercise is very contributive but cannot be exhausting. The important thing is to not omit the breakfast. The short-term memory has its peak from 9.00 AM t 10.00 AM.

10.00 AM – 2.00 PM

The time period from 10.00 AM to 12.00 AM is the best for doing and performing the most necessary activities which require absolute concentration. The communication in all spheres is possible. The time period, when our body is ready and prepared for little break and relax mainly after the work, lasting from 12.00 AM to 2.00.

2.00 PM – 6.00 PM

Our brain gets back to its form between 2.00 PM- 4.00 PM when it is prepared to learn things which we have to memorize. The body is in excellent form from 4.00 PM to 6.00 PM when the body temperature is rising and achieve its highest level. It is the best period for exercising and doing some physical activity. After 5.00 PM our brain tends to be "lazy" and that is why we should be interested in some artistic activity or to have an active relax or to organize some meeting with friends.

6.00 PM - 8.00 PM

This time period is characterized by deceleration of digestive system and also the hormone insulin (which regulates saccharides) decreases its own activity. The highest level of the glucose is in the evening and if we overeat during the evening it is possibility to get the diabetes. On the other hand our senses are mostly perceptible during this time period up to 9.00 PM.

8.00 PM- 00.00 (noon)

This time period is characterized by the whole apathy except of the right cerebral hemisphere which regulates our emotions. This is the time period of the best inspiration for writing a book or drawing a portrait. It is the period when the best ideas and thoughts come into brain which can be awarded by Pulitzer price.

11.00 PM - 00.00 (noon)

People who fall asleep at 11.00 PM usually start dreaming. The brain and the body retrospect all activity during the day. They revise all experiences and all spend effort during the day. They filtrate necessary and useless things. They inform us about the attitudes through the dreams which we should revise again.

00,00 (noon) - 04.00 AM

Our endogenous clocks has the lowest activity during the night. The body temperature is decreasing also with the blood pressure. On the other hand the blood density is increasing. The biggest fatigue of the organism is characterized for 4.00 AM.

The biological clocks modulate our sleeping, waking, physical performance, blood pressure, pulse frequency and the other physiological functions and behaviour. "This is caused by the hypothalamus and its structure, 20-thousands of nerve cells which coordinate our rhythm of being. "

It is predicted that the human biorhythms is connected with geophysical system of the Earth – the Sun- The Moon, in the other words, the Earth's rotation around its own axis, the Earth's rotation around the Sun and the Moon's rotation around the Earth.

The exogenous factors (so called synchronizers which influence the biorhythms but they are not their cause, for example changing of the day and night) have also significant effect. The biorhythms were examined and detected in the majority of biochemical and physiological functions of the organism. The psychological processes are also subordinated to the biorhythms, for example: memorizing, concentration of the attention, reaction time and so one. The biological rhythmicity have its own pragmatic meaning for example in case studies of social- pathologic phenomenon (as car accidents), studies of sports preparation and competitions (training, performance), in organization of studying, concentration of the attention etc.

The hygiene of educational and pedagogical impact support the child's adaptation and make it easier through the respect of inevitable requests. The point is in consolidating of health's state of children, in regulating of parameters of the exogenous environment and in contacting of children with new environment's factors, in considering of sensitive periods of ontogenesis, in respecting of intraindividual characteristics and interindividual differences when determining and identifying of pedagogical procedures and requests.

The effective need of adaptation mechanisms predicts the right synchronization of educational conditions – duration and organization of the lessons and lectures, the break regime, the right changing and switching of subjects, normalizing of the whole number of subjects during the day and week, the whole work and life regime of the students and others conditions. The school performance is determined by the impact of exogenous and endogenous factors. Their negative impact slow down and weaken the adaptation abilities of students and it also decreases their employability.

The circadian rhythms are very purposeful also in process of using of optimal organization of the regime of student's work and relax. The student is a personality who has to be seen in

holistic way and it is nowadays loaded unilaterally and cognitively. The students' performance is changing during the lesson according to the level of fatigue. It can be expressed in lack of interest, decreasing of schoolwork memorizing, low attention and concentration (Matejovičová et al. 2007, Bendíková 2010). The point is that the hygiene of education process belongs to the most current problems.

Ághová a kol. (1993) stated, that by the right educational organization it is inevitable to monitor various factors which have very important role from the point of view of the rhythmicity (development of physical, psychological peculiarities of children and teenagers, the level of neurophysiological processes mainly on the level of central nervous system, on biological rhythms, on various level of work performance during the education lesson, day, week and school year, optimal duration and the right organization of each lesson, the right changing of subjects and lessons, normalizing of the whole amount of lessons and subjects during the day and week, appropriateness of the breaks, positive influence of the whole day students' regime – the need of security of activities' rhythmical changing and their rational change, incorporation of active physical activity, enough of sleep, adequate load in the leisure time, optimal duration of holidays, respecting of all requests of school hygiene).

Thanks to the biorhythms' study it was detected that human working performance oscillate during the day (the regime of working and relaxing). The most convenient optimum for working is the time period between 9.00 AM to 11.00AM and in the afternoon from 3.00PM to 5.00 PM. The decrease of the performance is characterized for the time period from 1.00 PM to 3.00 PM. Permanent performance's decrease is noticed after 6.00 PM and major decrease is noticed after 9.00 PM. The main fall and decrease of all organism's functions comes at 2.00 AM and lasts to 4.00 AM.

The curve of physiological and psychological performance and preparation has two peaks but the morning peak is higher than the evening peak. The knowledge of principles and requests of biological rhythmicity during the day is a part of optimalization of influence on the health as well as bio –psycho – social quality. Interruption or loss of biorhythms have very serious and dangerous results not only for the human organism but mainly for the health. The sleep and wake rhythm (cycle) is very important and significant factor for chronotypes.

According to this fact we recognize specific types of chronotype (Bendíková & Jančoková 2013):

- a) The morning lark – this type achieves the highest activity and performance in the early morning hours, opposite to the evening owl, this type has shifted sleeping time (1-2 hours).
- b) The evening owl – this type achieves the highest activity and performance in the late afternoon and evening hours.

The biological rhythm of the working day:

- we achieve the highest performance during the 2nd and the 3rd class,
- the performance decreases during the midday hours,
- the performance is increasing during the afternoon, it culminates approximately at 3.00 PM, but it is not at the level as it was in the morning hours.

The biological rhythm of the class (lesson) – 45 minutes

- the perception is the simplest during the first part of the class,

- a teacher should use students' attention, explain in the beginning of the class and then test their knowledge,
- the class's performance curve is similar to the curve of the day.

The biological rhythm of the week – 7 days

- Tuesday is the most powerful and performing day → adequate for exams,
- Wednesday requests the change of the activities, relax,
- a little increase of the attention is characterized for Thursday,
- our organism is preparing for week – end's rest in the end of the week.

The break time (rest)

- the main break – regeneration of energy – 20-30 minutes,
- little break – at least 10 minutes,
- the inevitable point is that a child should have the time for snack and lunch.

The period of concentration and attention is different in each class. According to (Mačurová & Brtková 1998) we recognize following concentration periods at primary schools:

the 1 st class	-	10 – 12 minutes,
the 2 nd class	-	10 – 15 minutes,
the 3 ^r class	-	15 – 20 minutes,
the 4 th class	-	15 – 25 minutes.

The period of concentration increases in upper class on period from 25 to 30 minutes. Students at secondary (high) schools have longer period of concentration – lasting from 30 to 35 minutes.

According to the age period we distinguish following periods of concentration (Mačurová & Pavúk 2005):

5 – 7 years old children	-	15 minutes,
7 – 10 years old children	-	20 minutes,
10 – 12 years old children	-	25 minutes,
10 – 15 years old children	-	approximately 30 minutes,
Students at secondary (high) schools	-	30 – 35 minutes.

From the hygienic point of view it is stated, that 4 classes (lessons) is an optimal amount of class (lessons) for the youngest pupils; older students should have 5 – 6 classes (lessons) ; 6 classes (lessons) should not be integrated more than three times a week.

There is no meaning to integrate more than six theoretical classes (lessons) during the day from the point of view of the effectivity (Mačurová & Pavúk 2005).

The theory should be included in the morning hours and the practice in the afternoon when organizing theoretical and practical parts of the teaching.

When organizing timetables through the day and week, we should respect the need of subjects' switching in following way: more difficult cognitive subjects should be followed by the subjects which do not require too cognitive concentration. More difficult subjects are characterized by the content which is receiving by the second signal system – the order of subjects according to their difficulty should be following:

Maths, Grammar, foreign languages, Physics, Chemistry, Geography, Literature, Civics, Biology, History followed by practical classes (Physical education, Music teaching, Arts). More difficult cognitive subjects should be included as the first three classes in timetable, but more adequate variant is to organize them on the 2nd or 3^d place. It is inevitable to respect the principle of subjects' switching in following way: similar subjects should not be interlocked. For example: Maths – Physics, foreign language – Slovak language; Physical education should be stated and organized in the middle of the timetable, alternatively in the second part of teaching, because it has compensating, stimulating and regenerating function. If the physical education is the first class it has warm-up function. If the physical education is the last class it has the function of active rest but it does not fulfil the expected function from the point of view of the effect of educational process.

The days, which are characterized by more classes (the amount is heighten), must not continue one after another. The principle is that the breaks should not be shortened.

The work and rest rhythmicity make the activities and their process easier what significantly influences the effect of educational process, it also helps students to orientate in basic life and social patterns and that is why it is very appropriate to apply and use the physical prevention (sport moment). There is a request and need of work and rest changing (biorhythm) which is stated as a physiological process which enables the rest of the most prominent nervous centres and systems. The point is the sleep essence which has generalized decay in parts of cerebral cortex and in other structures of nervous system and it is irreplaceable physiological precondition of organism's recovery.

The sleep need significantly depends on the level of development and maturity of human organism. Younger person or subject has higher demands on sleep length (new-born child usually sleep approximately 20 hours, the adult sleep 8 hours and the elderly people sleep 6 hours).

The sleep need of school age children is covered by the night sleep. The sleepiness is monitored in children of the first classes at primary schools as the lingering of biological rhythm from the pre-school age. Instead of sleep length there is another important feature – the stereotype – each day we should go sleep at the same hour to create an adequate and strong reflex for fast and deep sleep.

The youngest pupils should go sleep between 7.00 PM to 8.00 PM which is the most optimal time.

These positive stereotypes are interrupted by watching television and internet and they are very negative elements from the point of view of the health.

When we go sleep earlier in the evening it has influence on whole quality of sleep.

The determining sleep is sleep to 3.00 AM when there is a change of the organism's biological clocks in terms of progressive re- coordination to the status of waking for the future activities during the day. In terms of health- hygienic principles, the child should sleep on the straight, solid mat which corresponds to child's proportions.

We should not go sleep after the dinner or immediately after eating, after difficult physical performance and activity or strong emotional experience. We should fall sleep in calm and quiet place without outside disturbance, interruption, noise, light. The room in which we sleep should be ventilated, pure and the air should be fresh (sleep when the window is properly open). The pupil or student should wake up between 6.30 AM – 7.00 AM and before he goes to school he should have enough time for the morning hygiene and he should

eat the breakfast peacefully. Shortening of biological norm of the sleep may cause the sleep disorders. When the hygienic recommendations are not respected we can monitor higher level of fatigue, lack of concentration or attention and lower level of performance (mainly in young pupils and students). Mentioned status are very unfavourable from the point of view of the health optimum.

Conclusions

Nowadays, it is inevitable to look for a new and unused possibilities of biorhythms for human health as well as the other improvement of educational process at school environment. In school theory and practice there is tendency to point out on the fact that the biorhythms' problem and knowledge are not accepted. Their knowledge has very significant meaning by which we can interpret the functional and psychological students' abilities in the right way. When we respect the vital functions of the organism it is allowed to control the student's (pupil's) regime more rationally and we can guide the way of educational process.

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