



Life in Health 2019:

Research and Practice

Proceedings
of the International Conference
held on 5–6 September 2019

Markéta Holinková
Lenka Adámková (Eds.)

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Introduction

The interdisciplinary conference *Life in Health 2019* took place on 5 and 6 September 2019 at the Faculty of Education, Masaryk University in Brno, Czech Republic. The conference was held by the Department of Physical Education and Health Education of the Faculty. The conference focused on health promotion and lifestyle among children, youth, adults and seniors.

Almost 30 papers were presented, some of which are included in the proceedings. The conference was based on previous events of the Faculty focusing on the promotion of public health and health education. In this respect, a tradition was established some years ago at the Faculty of Education, Masaryk University. The organizers of the conference would like to continue this tradition in the coming years. In terms of content, these conferences are relatively broad and provide space for topics relating to holistic health promotion and health education. This includes research-based and theoretical knowledge of educational, healthcare, medical, psychological and social disciplines, thus combining the perspectives of various specialists in health promotion. The knowledge presented is then implemented in study programmes aimed at the education of teachers and other educators.

The papers published in the proceedings represent both general and specific approaches to the promotion of public health, and can be adequately used in the education of children as well as the general population.

Vladislav Mužík

Chair of the conference organizing committee

A Health promotion issues

Art Therapy via Catharsis

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Abstract: Contemporary art therapy focuses primarily on overcoming mental and health problems. Simultaneously, from philosophical and aesthetic point of view these sanity factors have naturally led to one of the central concepts of art theory in ancient Greece, namely catharsis. The aim of this paper is to emphasize some connections among above mentioned sanity factors and catharsis as well as to mention their role in art therapy nowadays.

Keywords: catharsis, art therapy, art, sanity, medical treatment, Aristotle

Art therapy

From early Greece, the thesis about existing relationship between art and health has been, one way or another, accepted in the Western world. Parallel to this fact – maybe surprisingly – art has been assigning a marginal role within various curative disciplines. This paper attempts – humbly, in a way – to remind that from a point of view of philosophy a relationship between these two categories is basic, or rather stronger: it is, or it cannot be otherwise, essential. And that the key term of such a connection is just concept of catharsis as we know it – first of all – from Aristotle’s two written lines in his *Poetics*.

Art therapy is an age-old phenomenon, which is nowadays understood mainly as a psychotherapeutic branch using art (mainly fine art for its practical characteristics) to support and overcome mental and health problems. Let us start with the definition of Art therapy according to the Czech Association for Arttherapy. Here it is:

Art therapy and Art psychotherapy are therapeutic disciplines using artistic means and creativity to support self-development, personal growth and healing. They help to overcome and integrate psychological and health problems through the visual creative process and the therapeutic relationship between client, creation and therapist. Art therapy belongs to the creative non-verbal therapies and is an inter-disciplinary profession used in the field of healthcare and in psycho-social contexts. (CAA, 2019, p. 1)

Other important position, Rudolf Arnheim’s, is such that construes art therapy as an utility art: Art is to have some receptive and productive forces which seem to be suitable for the therapeutic influence; curative process occurs both in perception of a work of art and artistic activity as such (Šicková-Fabrici, 2016, p. 59). Today multifaceted form of relatively “young” art therapy develops primarily procedures leading to certain psychological action to recover using the patient-creation-therapist relationship. This practice is based on one of cornerstones of art world, namely on the theory of catharsis, in other words – purification of emotions. Although the concept has been well-known and widely studied till present time, it still remains as a constant subject of hermeneutic argues as to how exactly we should theoretically grasp its proper sense.

Dispute over catharsis

The term “catharsis” refers to a curative moment that provides both creation and perception of a work of art. Historically, the cathartic effect of art was firstly discussed by the Pythagoreans, unfortunately without written output. The first philosopher who made a written note about catharsis as a piece of wider aesthetic theory was Aristotle. Although there are speculations about some alleged extensive passages devoted to the theory of catharsis in Aristotle's undiscovered work, we still seem to be condemned to work on these two references. In sum and for now, Aristotle's Poetics and Politics are unique sources of reflection on catharsis. In Poetics, we can read the most quoted statement about catharsis and its key role in tragedy.

Tragedy, then, is an imitation of an action that is serious, complete, and of a certain magnitude; in language embellished with each kind of artistic ornament, the several kinds being found in separate parts of the play; in the form of action, not of narrative; through pity and fear effecting the proper purgation of these emotions. (Aristotle, 1997, p. 8)

Aristotle talks about the therapeutic effect of music in Politics:

[...] music should be studied, not for the sake of one, but of many benefits, that is to say, with a view to (1) education, (2) purgation, (3) for enjoyment, for relaxation, and for recreation after exertion. It is clear, therefore, that all the modes must be employed by us, but not all of them in the same manner. In education the most ethical modes are to be preferred, but in listening to the performances of others we may admit the modes of action and passion also. For feelings such as pity and fear, or, again, enthusiasm, exist very strongly in some souls, and have more or less influence over all. (Aristotle, 1999, p. 190–191)

According to Aristotle's Poetics, the primary aim of tragedy is to awake emotions of pity and fear – pity with hero's suffering, fear of his coming unavoidable fate. The secondary aim of the tragedy is cathartic moment that is supposed to relieve the soul of these undesirable (or at least excessive undesirable) emotions through a pleasant way of artistic experience. Catharsis becomes a main criterion of good tragedy, or more generally a work of art as some say. In other words, the value of the artwork lies in its psychic “curative” effect. However, a fundamental question for art therapy here is whether pity and fear are emotions which are desirable, or not.

The dispute over the sense of catharsis is led between two main lines of interpretation (Copleston, 2014, p. 487). The first one interprets catharsis as a purification through pity and fear, while the emotions themselves are purifying and developing (R. Janko). The interpretation follows the religious practice of ancient Greece associated with the ceremony of consecration, symbolically rebirth of the consecrated. The second line of interpretation grasps catharsis as a purification from pity and fear, so the proper aim here is to eliminate pity and fear temporarily (J. Bernays). This line of comprehending is closely connected to the use of the concept of catharsis in the medicine of the Aristotelian time (Copleston, 2014, p. 487). The Hippocratic school of medicine formulated a theory of the four humors. They understood a disease as an unbalance of body juices or the presence of the pathological substance, and treatment was to induce a reaction of the organism in which the pathological substance was expelled from the body and by such activity a kind of balance was established. According to this doctrine, in curative potential of art a possibility of not only such eliminating disease

states of mind can be seen, but they can be also evoked in a prophylactic way (Thomson, 1952, p. 383). Slightly exaggerating, we can talk about mental immunization or vaccination.

We can also simply see the dispute over catharsis as a question of the nature of emotions. Are emotions, for example emotions of fear and pity, desirable or undesirable? We usually understand to fear as an unwelcome emotion, while we try to cultivate a develop our sense of sympathy and pity. On the other hand, we know that fear has a protective function and extreme altruism can be, and used to be, devastating.

Aristotle's Ethics

According to The Nicomachean Ethics a virtue is characterized as a ballanced-center between two bad extremes. For example, courage is to be a centre and desirable measure between rashness and cowardice.

Moderation in the feelings of fear and confidence is courage of those that exceed, he that exceeds in fearlessness has no name (as often happens), but he that exceeds in confidence is foolhardy, while he that exceeds in fear, but is deficient in confidence, is cowardly. Moderation in respect of certain pleasures and also (though to a less extent) certain pains is temperance, while excess is profligacy. But defectiveness in the matter of these pleasures is hardly ever found, and so this sort of people also have as yet received no name: let us put them down as "void of sensibility". (Aristotle, 1893, p. 48)

Many experts (e.g. R. Janko, I. Smithson) noticed a close relation of Aristotle's ethics and his concept of catharsis. Seen in a such a way, catharsis can be understood as a process of centering emotions from "unhealthy" extremes to the "healthy" center. As Janko says:

Because Aristotle puts such a heavy emphasis on our ability to learn from mimeseis, particularly when they arouse strong emotions, there is good reason to suppose that he thought that the experience of tragic catharsis could affect our emotional habits. Hence the end-results of catharsis is to dispose us to feel emotion in the right way, at the right time, towards the right object, with the correct motive, to the proper degree, etc. (Janko, 1992, p. 347)

It is well known that Plato, Aristotle's tutor, rejected art for a potential serious threat to society. Art has an influence on emotions of citizens and therefore makes it difficult to rationally manage a community that maintains social order. Aristotle added that tragedy can help maintain a kind of social order by enabling citizens to balance their mental powers which are necessary for common life. The tragedy is directly related not only to the mental health of the individual, but also to the health of the society.

As time went by, many concepts of catharsis has emerged, e.g. Robertello's, Girolamo Fracastoro's, Vincenzo Maggi's, Benedetto Varchio's, Corneille's, Lessing's. Aristotle himself was inspired by the Hippocratic practice of treating hysteria and epilepsy. More than two thousand years later, S. Freud and J. Breuer described the catharsis method in the Studies on Hysteria (1895). Here, a catharsis method means a disappearance of hysterical symptoms at the point where a patient recalls a clear piece of memory at the event that was evoked by a hysterical symptom. "The injured person's reaction to the trauma only exercises a completely 'cathartic' effect if it is an adequate reaction – as, for instance, revenge. But language serves as a substitute for action; by its help, an affect can be 'abreacted' almost as effectively." (Freud, 1969, p. 8). Freud's interpretation of catharsis as a form of abreaction of

suppressed affects, in connection with the treatment of neuroses, represents a significant interpretative shift towards modern psychology and surely prepared a way how to grasp art therapy nowadays. But we should keep in mind here that Freud's concept is fundamentally different from the Aristotle's.

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The Impact of Modern Information and Communication Technologies on the Behaviour of Adolescents with Psychiatric Diagnoses

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Abstract: Adolescents perceive the Internet as a natural communication medium and a tool for processing information. They can access it from a mobile phone, personal computer and many other portable devices. The area of social networks, which is a common part of the adolescents' life and style, has become the phenomenon of the young generation, but is also associated with a number of risks.

The research analysed the impact of the use of modern information and communication technologies on the behaviour of six adolescent psychiatric patients.

The specially designed qualitative research and analyses of technical documentation, interviews and observations have been used to compile case studies of people hospitalized due to the worsening of their mental condition.

Informants showed symptoms of overuse of the Internet, or even addiction. In the online environment, they were looking for trust, friends, role models, advice, support and praise. The high number of their virtual contacts sharply contrasted with the low activity in their real life. Using the Internet intensively, they were compensating for the unfulfilled needs in their family and school life, ventilating their worries, fears and psychological pain. They got into a vicious circle, which, without expert help, steadily kept intensifying.

A harmonious family background, good environment at school and classroom, actual good friends and adequate leisure time play an essential role in dealing with the overuse of or dependence on online activities. It is important that the adolescent experiences success, reward, and positive motivation. Appropriate psychotherapy and counselling services may help in cases of such problems.

Key words: adolescent, case history, behaviour, internet, communication, observation, case study, psychiatry, risk, interview, social networking, research, health, anamnesis

In today's society, emphasis is placed on communication among people and social intercourse, whose aim is the exchange of thoughts among the participants in communication. It is a two-way process of transmitting and receiving messages from one person to another. In a broader sense, communication means the transmission of information through various communication systems using communication media (Vymětal, 2010).

Modern means of communication include, in particular, a mobile phone, especially a so-called "smart" phone, tablet, or computer, virtually all of which have easy the Internet connection, offering social networks, which are particularly important for children and adolescents. The popularity of mobile phones in this age group has been steadily growing, primarily not so much as a necessity, but as an expression of a response to certain social pressures and the need to integrate among peers, that is, to increase social status. The mobile phone is also used

for entertainment, eliminating loneliness and modifying social behaviour. Thus it has become a tool for gaining power in interpersonal relationships. In the using of a mobile device, there may be psychological dependence and the illusion that thanks to on-line communication and easy accessibility of others, people are always close to each other (Hubinková, Bakić-Tomić, & Surynek, 2008; Kimáková & Zeisbergová, 2014).

The physical barrier that often exists among adolescents is thus overcome. This adolescents' way may be much less dependent on parental control and decision-making, and may feel free and competent in their lives (Weinstein & Davis, 2015). Deuze (2015, p. 57) recalls that "people get lost in the media just to find what they seem to lack outside the media: a relatively coherent self-consciousness, a sense of belonging and community".

Theoretical basis

Modern means of communication can be attractive for adolescents as technological toys with which they can experiment in various ways and develop computer skills. However, modern means of communication are rather a tool for social contact or relaxation that is ventilating certain emotions in the Internet environment. It is among adolescents where the greatest risk of addiction occurs. Excessive Internet use has been a natural part of their everyday life since childhood, which is also supported by the fact that today's young people are the Internet generation – they grew up with the Internet (Blinka, 2015). There they find the company they are looking for. Online communities tend to be open and welcome newcomers. The risk of non-acceptance can be minimized by changing virtual identity, which can either assist in the development of identity or, on the contrary, suppress it (Gackenbach & Bown, 2017).

Modern information and communication technologies lead to and may result in superficiality in the processing of information: *in the past, the text used to be read, today the text is skimmed*. In the past, people *dove* into the text content; nowadays people *surf* the net. Children and young people develop new habits that are exclusively associated with this environment – such as lying or cheating - which may then be transmitted into their real life (Spitzer, 2014, p. 66).

Social networks and the Internet are very important phenomena associated with young people. These networks can be considered to be "interconnected groups of people who maintain on-line communication using various tools and means" (Kopecký, 2013, p. 206). The most famous is Facebook, which thanks to the number of exaggerated users, is known as the third most populous country in the world. There are also Instagram and Twitter, and the more business-like service LinkedIn. Nowadays, besides private communication, these networks are increasingly being used for marketing (Kopecký, 2013).

Social media are already a common part of our culture. It serves adolescents primarily for social interaction, for engaging in online communities, for finding their position in the world. It has transformed from associations of people sharing common interests into networks aimed at developing and shaping friendships. Social networks are also associated with the phenomenon of the so-called online public, which is based on content sharing, virtual space and an imagined community. It is about the meeting of young people in cyberspace, through which they can engage in social life, make themselves known, and make themselves visible. Unlike adults, adolescents do not search for risks; they are much less sceptical about social networks. They have learned to use them and make use of them for their needs (Boyd, 2017).

Beside the partial impacts, the social networks influence the lifestyle of their users. These changes are most noticeable in people who have grown up using modern ways of communication (the so-called digital natives) and who often very intensively live a so-called

second life on social networks, where they entrust them with their joys and worries, meet new people, publish personal information, meet new partners, and are influenced by fashion trends (often very dubious or risky ones). The problem might be the fact that in using these networks they strive for peer recognition. They try to create the most original and interesting profiles to achieve this. The discrepancy between an ideal presentation in the virtual world and one's reality can lead to very serious consequences – depression, suicidal tendencies, dissatisfaction with one's body, and hatred of others. Facebook and Twitter promote social interaction, but may involve the risk of cyberbullying or manipulation of a child or adolescent by an adult (i.e. so-called *grooming*). Another important phenomenon is the challenges associated with videos posted mainly on the YouTube social network. Their essence is that the user should imitate Youtuber behaviour, which is often unethical (including the ridiculing of others), or very dangerous. There is not only the risk of injury, but even death (e.g. resulting from dousing with flammable liquid and igniting, climbing high buildings, jumping into water from high rocks) (Filip, 2017).

Other dangers of social networks include the spreading of inappropriate incentives involving violence, sex, racism, user manipulation (subliminal and conscious advertising, influencing public opinion), addictive behaviour, and the glorification of inappropriate patterns leading to risky behaviour (Szotkowski & Kopecký, 2018).

The Internet enables adolescents to fulfil their needs, as it is “always an accessible means of managing emotional hypersensitivity and liability” (Blinka, 2015, p. 94). Nevertheless, its excessive use is most often associated with watching videos that may often be risky, frequent visits to chat rooms or social networks, and playing online games. The reasons why adolescents develop Internet addiction may be related to the failure to accomplish one or more developmental tasks or needs in the areas of identity creation, socialization skills and sexuality (Blinka, 2015). Boys are more inclined to be eager to play computer games because of the greater need for respect, prestige and self-confidence, thus they are also at risk of addiction. This is also associated with the higher incidence of obesity, violence, procrastination, poor school performance, anxiety, social phobia, shyness, impulsivity and depression (Janošová, 2008; Kimáková & Bernadič, 2018; Zimbardo & Coulombe, 2017).

The term *Internet addiction* (netolism) is not yet clearly defined or fully accepted. Although it actually occurs in reality, it is not yet considered an official diagnosis because its definition is problematic and requires more research, especially in the field of neurology and genetics (Montag & Reuter, 2015). Spending over one hour a day for adolescents and two hours a day for older adolescents is considered excessive usage of Internet. It is common that online activities prevail at the expense of more beneficial activities. Individuals who are often bored or have difficulty in controlling their impulsiveness are prone to the excessive use of the Internet. The attractiveness of online activities is enhanced by the diversity of their offer, the ability to change the activity, and well-designed reward systems. Another type of potentially at-risk user is shy, less socially skilled, more introverted, and with low self-esteem or mental difficulties. For this type of individual, the Internet is a place where they can escape from their problems and make it easier to find friends, unlike in their real life (Blinka, 2014).

Internet addiction is characterized:

- by the exaggerated importance of the Internet (i.e. it being at the centre of one's life – thoughts, experience and behaviour);
- mood swings (sedation or arousal, escaping from real world problems);
- higher tolerance of online activity (increase in time spent with on-line activities);

- withdrawal symptoms (unpleasant symptoms, discomfort in limiting or terminating activity);
- conflict (internal – in the area of desires, values; and external – relationships, quarreling and resentment in the family);
- and relapse (tendency to repeat inappropriate behaviour despite the desire to stop) (de Abreu, 2017).

Data on the prevalence of Internet addiction in the population fluctuate considerably: from 0.7% to 27.7%. In adults it is approximately 2%, in adolescents it is reported to be higher, especially in developed Asian countries (e.g. Japan, South Korea) (Poli, 2017). A substantial difference between substance dependence and the Internet dependence is the fact that it is almost impossible to fully exclude the Internet and new media from life, as these means of communication and information are also commonly used for work and educational purposes (Víchová & Koblovský, 2013). Dependence on modern means of communication is relatively severe and is associated with other mental (anxiety and depression) and physical (orthopaedic problems, visual and eating disorders, obesity, neglect of hygiene and sleep) problems. Depressed and anxious people can search the Internet for information on their discomfort, but Internet addiction to searching for information on anxiety and depression can also lead to guilt, fear, loneliness, and procrastination (Gregory, 2018).

Suicidal behaviour is also associated with the use of social networks at two levels: they might increase the risk of suicide or act as a protective factor. On the social networks, there are a number of accurate suicide guide books, chat rooms, and community associations of individuals interested in this issue, including those considering suicide. On the other hand, social media can play an important role in prevention, e.g. dealing with suicidal tendencies with a view to averting suicide (Koutek & Kocourková, 2007; Walrave et al., 2016).

In social networking environments, the topic of self-harm is often encountered. These activities are carried out mainly by people aged 13–25, three times more often in girls. The principle is based on the idea of distraction from unpleasant thoughts, feelings and states by causing oneself bodily harm (e.g. burning, cutting with a knife – most often cuts on the hands, painful scratching, striking the wall, swallowing inappropriate objects). It may also signify a desire to gain the attention of the social environment or to avoid an unpleasant situation. It is often present in behaviour and mood disorders, as well as in disharmonic personality development. In adolescents, this behaviour may be the result of bullying, loss of a loved one (partner, parent), traumatic experience, unpleasant event, or heavy stress (Kriegelová, 2008; Novák, 2013). Social networks are often a place that increases self-harm in adolescents. There are communities focused on this topic, often members of certain subcultures (e.g. emo, gothic) (Černá & Šmahel, 2009; Smolík, 2010). Even in the case of self-harm, it is possible to detect it in many social networks (in reflection, discussion) and offer professional help (Beasley & Mitchel, 2015).

Preventive activities related to the usage of modern information and communication technologies, including dependence on the Internet and its services, can be divided into two main groups: the first are programs aimed at providing knowledge and information; the second group is interactive prevention programs. Adolescents learn about the negative impact of potentially risky behaviour. Peer programs or approaches that aim at changing attitudes and behaviours towards modern means of communication are effective. It is important to try to offer adolescents other, more appropriate (healthier) activities and to motivate them. Orders or prohibitions from close persons (family members) usually do not work and the adolescents naturally resist them (Jedlička, 2015; Vondráčková, 2014).

It is necessary to introduce effective preventive measures in the family from childhood, for example not to *place* children in front of the TV, tablet or mobile as a form of baby-sitting because the adults lack time. A healthy lifestyle helps children to develop appropriate leisure activities. We cannot fully prevent the adolescents from using the Internet in their free time, as their peers do the same thing, because it would increase the risk of their potential failure to be accepted, thus becoming socially isolated. However, parents should be interested in what a child does in cyberspace, why the child is interested or engaged in certain activities and what they bring to him or her. It is essential to explain to children and adolescents the risks of modern communication and how to work with information, to set up time for computer games, chatting, etc. If the child uses the Internet excessively, it is not good to tackle the problem alone. It is useful to look for professional help (Jedlička, 2015; Ježková, 2012; Machová & Kubátová, 2015). It is recommended to encourage children to understand that face-to-face communication is always less threatening than communication on the Internet. At the same time, a ban on posting personal or family related information online should be obeyed. Children also need to be educated in media literacy and responsible media behaviour, which, in addition to parents, is also the task of educators (Mertin, 2010; Vojtová, 2005).

During the treatment of internet addiction, similar principles as in the treatment of substance dependence are used. A combination of psychological and pharmacological interventions is recommended. The aim is to reduce the time spent by the individual on the Internet, but also to reduce depression and anxiety. In general, we try to achieve controlled behaviour using the Internet. Motivational interviews, work with the family, cooperation with the school and appropriate leisure time, lifestyle change, recognition of triggers, improvement of adequate self-confidence and prevention of relapses are important (Vojtová, 2005; Vondráčková, 2014).

Objective of the research and research questions

The aim of the research was to analyse the impact of the use of modern information and communication technologies on the behaviour of six adolescent psychiatric patients. Four research questions were identified:

- 1) What is the access of informants to the Internet use?
- 2) How does the online activity of the informants affect their behaviour?
- 3) What are the causes of the risky online behaviour?
- 4) What factors should be emphasized in the informants when dealing with their risky behaviour?

Research methodology

It was a qualitatively focused survey, the results of which cannot be generalized for the whole population; the influence of the researcher on the results of this study is quite significant, thus there are certain risks of distortion (Disman, 2011; Reichel, 2009). Therefore, its validity was ensured by means of triangulation, i.e. a combination of different approaches to the investigation of a given phenomenon (Miovský, 2006). The data were analysed using professional documentation (school, medical, psychological); various types of observation, semi-structured interview and case studies were used. Anamnestic data were taken from the parents of the informants and were supplemented with available documentation (Dokoupilová, 2018).

The informants were observed both during the interviews and during their stay in the psychiatric ward. The observations were unstructured and open, and for the most part of the research, they were participative (Hendl, 2005; Dokoupilová, 2018). Semi-structured interviews were conducted with the informants, focusing on their current state, family background, school benefits, school and class relationships, leisure time, best friends and acquaintances, the Internet and social networking behaviour, possible attacks on them, health problems and their solutions, and meeting their needs. The questioning scheme was prepared in advance and followed during the interviews (Dokoupilová, 2018).

The collected data are presented in the form of six case studies, the purpose of which is to understand and interpret events related to the studied subjects (Sedláček, 2007). In the case studies, the following data were collected: personal history, family history, school history, previous mental health problems, current problems, a comprehensive psychiatric examination, diagnosis, prognosis, conclusion and recommendations (Dokoupilová, 2018).

Hospitalized informants at the children's and adolescent ward of the psychiatric clinic were addressed. The aim was to get persons aged 13-18 with a psychiatric diagnosis who had a history of risky behaviour related to the use of modern means of communication (e.g. excessive use of the Internet, self-harm in connection with contact with people in the online community) (Dokoupilová, 2018). Protection of personal data has been strictly followed; therefore, no data are provided which might identify the participants. The informants were informed about the course of the research and its conditions; they could terminate their participation at any time or refuse it at the beginning. The consent of the legal representative was obtained from those under the age of consent (Dokoupilová, 2018). The research was carried out from autumn 2017 to autumn 2018. The selection of respondents in the research group was random and based on their main psychiatric diagnosis and possibilities of cooperation. The snowball technique was used (Ferjenčík, 2000).

Presentation of case studies

Case study 1

This is a 17-year-old boy whose parents divorced 13 years ago. He has been hospitalized for evasive behaviour and truancy, and has long shown signs of social anxiety. The boy is an only child, who now lives with his mother and stepfather in a harmonious family. He meets his biological father, as they get along well. No burden was found in the mother or her parents. In the father's parents, there is a history of alcoholism and kidney disease.

The informant was born from the mother's first pregnancy; the birth itself and later adaptations were without problems. He was not breastfed. Psychomotor development and speech development corresponded to the norm. He underwent smallpox, but otherwise was properly vaccinated. In 2007 he underwent an operation of the tonsils and in 2009 an operation of the foot tendons. In 2008 he was hospitalized with bilateral pneumonia, and also suffered from a concussion, but without hospitalization. He has never been unconscious. He has been visiting a psychologist since September 2018 and is under the care of a psychiatrist for mood disorders.

He started kindergarten at the age of 3. Separation from his mother was managed well, but he had more difficulties adapting to the new environment. After some time, he got used to the kindergarten, later also elementary school (from 6 years of age), thanks to psychological support without major problems. In the last 2 years, evasive behaviour, communication disorders and social anxiety (including, among other things, girls ridiculing him because of his acne) have escalated since the start of secondary school. The informant now attends

a public secondary school specialized in law and has relatively good marks. He enjoys history, but is not good at mathematics or physics. A year ago, he attended a technical secondary school, but was not interested in the school at all and did not attend.

His interests include cycling, football, and computers. By nature, he is rather quiet and introverted. He regularly meets with a group of elementary school students. According to his mother, he has not experienced drugs.

The psychological examination revealed that the boy's difficulties in adapting to the junior elementary school were caused by the attitude of his mother's boyfriend, who verbally attacked him and mocked him. When his mother later broke up with this man, everything was all right. Psychological help was sought again at the senior elementary school due to some problematic relations between the informant with his teachers. After his transfer to secondary school, there was some absenteeism and truancy. The informant suffered from depression, was disinterested and quiet. At home after school, he played mainly computer games and communicated with peers via the net. He was too afraid of being ridiculed and meeting strangers (including a doctor, visitors, and unknown relatives). During the transition from elementary to secondary school, there were anxiety attacks accompanied by somatic symptoms (tremors, diarrhoea and nausea), culminating in unexcused missed lessons and truancy. After the transfer to secondary school, the situation initially calmed down but after a short time the anxiety attacks returned. Then he was hospitalised at the psychiatric ward.

From conversations with the boy, I understood that he enjoys high school, but he does not feel comfortable among many girls; he feels marginalized and outcast. Although he started skipping school, he kept doing his homework, playing computer games with friends and communicating with them via the net. Sometimes he got drunk in the park, tried marijuana, which calmed him down. He does not know what he wants to do in the future. He gets along with his mother and her second husband. Sometimes they do not completely get along because he forgets to tidy up or do something. He takes antidepressants and feels somewhat better after taking them, but he still has problems speaking in public (presentations, tests). He has never had suicidal thoughts, and he also denies feeling persecuted. Upon his arrival at the ward, he was shy when being spoken to by a doctor, but he described his mood as good and spoke with other patients without major problems.

After having his medication adjusted and psychotherapy implemented, the informant trained to go back to school to cope with his problems. After a week, he was given a longer weekend pass to attend school. After his release home, his condition normalized and he was able to talk to his classmates and in a good mood. Individual psychotherapy and continued outpatient psychiatric care have been recommended. Prognostically, the boy's condition seems favourable in the case of mutual cooperation.

Case study 2

This is a 17-year-old boy who has been hospitalized with impaired consciousness, severe psychomotor restlessness and the risk of developing a malignant neuroleptic syndrome. The main reason for admission was attempted suicide by overdose of medication and the intentional cutting of his forearm. The boy grew up only with his mother and with significantly older sisters, who already have their own families. He gets along well with them. The boy's father, who died 10 years ago, was addicted to alcohol, treated for depression, and did not take part in the upbringing of the boy at all. The father's parents are also dead; in their medical history, there is alcohol abuse and a stroke.

The informant was born from the third physiological pregnancy in term postpartum adaptation proceeded normally, as did psychomotor development. The boy was breastfed briefly. He did not suffer from any serious illnesses, injuries or hospitalization, and was properly vaccinated. He was psychiatrically monitored for depression and started taking prescribed medications. He does not smoke, but tried ecstasy and marijuana 2 years ago; he denies using other drugs. However, he often purchases powder caffeine on the Internet, of which he takes 150 mg daily; he also gets medicines such as benzodiazepines. He has no problems with eating, is somatically healthy, and without allergies.

The boy started attending kindergarten at the age of 3.5. He managed the adaptation without any problems, and from the age of 6 attended elementary school with excellent results. After the transition to secondary school, he was not satisfied with the content of teaching, suffered from states of depression and thus changed school. At the beginning of attending the second school, similar problems occurred again, but thanks to intervention, all the problems were managed. Now he is satisfied in his second year and achieving good results. During the summer he has summer jobs and makes some money. He lives with his mother in a rented apartment. He has not had a serious relationship with a girl yet. His main interests are computers and surfing the internet. He enjoys programming and IT, which he would like to study and make a living of.

About a year ago, his mother noticed her son was depressed. He spent almost all of his time in front of the computer, and practically stopped meeting with his friends. At elementary school, he had been bullied due to having the *wrong* label of clothing, but after the intervention of the school authorities and a psychologist, the attacks stopped. Some suicidal behaviour occurred at home in the evening. The boy cut his wrists and overdosed on medication while his mother was at home. He shouted out to her and she called emergency services. She was devastated by her son's behaviour.

The informant told me that he has been in a depressed mood since last year, sleeps badly, avoids his classmates, is anxious and does not want to do anything. There was a temporary improvement after psychiatric intervention and medication. The suicide attempt took place when he learned that his classmate had posted intimate photos on a social network of their mutual female friend. The boy reported this to the Police of the Czech Republic, but he was accused by the female friend that he had ruined her life. By phone she criticised him for his overly great concern and effort. Anxiety at school and dissatisfaction with classmates' behaviour also contributed to the suicidal behaviour. Now he is glad that the suicide attempt failed and does not remember it much. He recalls that in his childhood his mother was dealing with a complicated family and economic situation, she did not have enough time for him. He has tried tobacco and marijuana, the last time being a year ago. He also tried ecstasy once at home and had the feeling of being energized after using it. He gets drunk about four times in six months; during the summer holidays there was one week when he drank daily, but he stopped, realizing his failure. He likes to take medicines from the benzodiazepine group due to his problems with falling asleep, and then high doses of caffeine to wake up in the morning. Both of these he buys over the Internet.

The boy is reasonably somatically mature, slightly tense; he has quite a sophisticated manner and is restrained. In performance tests, he tries to succeed as best as possible, but there is some awkwardness in his verbal expression. He is prone to depressive experience, but his intellectual capacity is above-average. The boy is rather introverted, and has an abundant inner life. In his emotional experience there is a lack of satisfaction, including the lack of appropriate support in real life, which may increase his tendency to addictive substances. During hospitalization, the informant repeatedly expressed disagreement with his attempting suicide and regret that the incident had occurred. He was actively involved in group activities

and was evaluated positively at school. Total abstinence from addictive substances and reducing the time spent at the computer are recommended. It is necessary to continue in outpatient psychiatric care and counselling, to use the recommended medication, to give him more household chores and appreciate their fulfilment. The prognosis seems satisfactory.

Case study 3

This is a 14-year-old girl transferred from a children's psychiatric clinic in Prague where she was admitted for a suspected psychotic disorder. She was brought by ambulance from the airport accompanied by her mother. On her summer holiday in Greece, she had a psychological episode with suicidal tendencies. At the beginning of the year, she attempted suicide by using a cleaning agent; she is in the care of a child psychiatrist and takes psychopharmaceuticals. The girl was born to a mother in a common law relationship. Both parents come from the Ukraine. The mother has been living in the Czech Republic since 1999; the father returned to the Ukraine. He overused alcohol and made debts. He is not in contact with his daughter, and the family has no further information about him. The mother is healthy, finished secondary school, and is able to decently take care of the family. The mother's parents died. Her father drank too much alcohol and died of complications from it. The girl has no siblings. The family has no hereditary psychiatric burden.

The girl was born of her mother's third pregnancy; some previous ones were terminated at the mother's request. The birth was natural, however, the girl was weak and had to spend one day in the incubator. She had serious neonatal jaundice. She was breastfed for 2 years. Psychomotor development was in accordance with the norm, as was speech development; she attended speech therapy for a few months to correct the mispronunciation of certain sounds. She had smallpox, otherwise, she was properly vaccinated, and there have been no surgeries or serious injuries. She was hospitalized once in the paediatrics ward after drinking up a small amount of cleanser in a suicidal intent; there were no internal burns, but she has been monitored psychiatrically and psychologically. She has no allergies and has had her period since 12, but irregularly probably due to psychopharmaceuticals.

She started attending kindergarten at the age of 3.5, and enjoyed it. She started attending elementary school at the age of 6.5 and is now in ninth grade. In the second grade, her mother sought counselling services, as her daughter had problems to absorb substances. A year ago her marks became dramatically worse, and she sees herself as incapable. She enjoys chemistry, art and volleyball, and has difficulty at mathematics and physics. She behaves naively, and suffers from low self-esteem; however, she is social and has many friends. Her mother knows that she has tried marijuana with her friends; she came home drunk several times and her mother also found a pack of cigarettes on her. She has a best friend, but tends to be in contact with the trouble-makers, which her mother forbids. The girl is an only child. She gets along well with her mother and lives in their own apartment, where she has her own room and a pet.

Two years ago in the summer, the girl got in with a group where they drank alcohol, smoked tobacco and marijuana. Self-harm and the recording of injuries on their mobile phones was also popular, followed by posting this on social networks in a virtual group. The informant did not get along with the gang and was physically attacked. This resulted in sadness and mood swings, and she avoided people. She skipped school, ate irregularly; apparently she must also have been bullied. She sent intimate photos of herself to a male friend, who resent the photos, and then used them to blackmail her. At home she repeatedly stole small sums of money, probably for buying cigarettes. According to the mother, her daughter often lies, and without her mum's permission, she follows communication on social networks. The girl ingested

a cleaning agent in a suicidal attempt, was hospitalized, and is in the care of a psychiatrist. She is taking medication, and her condition was stabilised.

A year ago on a summer holiday in Greece, the girl's condition deteriorated again. She was restless and anxious and kept falling asleep after medication. The next day the symptoms reappeared. She wanted to leave the hotel, which her mother did not allow. She felt anxious in the confined hotel room, and wanted to jump off the balcony; she was crying, screaming, and defending herself. She and her mum were hospitalized for a short time at a psychiatric ward in Greece, and then they were flown to the Czech Republic. Anxiety symptoms, mental and motor restlessness occurred during the flight.

The informant was disoriented at the time of admission, was able to answer only very simple questions, and lacked communication. Association gaps and paranoid thoughts were present in her thinking. Attention deficit disorder, passivity, and anxieties were found. She did not engage in activities at the ward. She was not aggressive, nor did she talk about suicide. The girl looks attractive and sporty. She described what bothered her on vacation and how she felt. She had the feeling that someone was laughing at her and that people in the surroundings were gossiping about her. She often hears *voices*, but it is mostly some whispering or noise, rarely a clear language. After elementary school, she would like to go to art-specialized secondary school. She is afraid of strangers who after getting to know her better would not like her. She is angry at herself that she is insincere and sometimes lies. She wants to be smarter and better in the eyes of her friends. She has already had a boyfriend, but only on a platonic level. She attempted suicide, as she thought she was alone in the world, and no one liked her. She tried marijuana and ecstasy a year ago. She was in with a bad gang, longing for acceptance, afraid she wouldn't fit in with her successful classmates. She would like to find her father to see if he is alive and how he is doing. Psychotherapeutic sessions help her enormously, and she has no trouble confiding.

The informant adapted well to the ward regime, was cheerful and herself, fitting into the group. Suicidal thoughts no longer appeared. She was recommended to avoid drug abuse, to continue antipsychotic medication and individual psychotherapy. Restricting social networking is also appropriate.

A few days later, she had to be re-hospitalised, as the girl had similar symptoms to those on her holiday in Greece, probably after taking marijuana. The informant was silent, hearing *voices* again, was fearful, anxious, confused and disoriented. After a few days, thanks to medication and psychotherapy, she became normal and was transferred to a children's psychiatric hospital.

Case study 4

The informant is a 15-year-old girl sent to hospital by a general practitioner and a child psychiatrist with a diagnosis of anorexia nervosa, which has lasted for at least six months. She spent 2 weeks in the ICU, where she was released at her mum's request against the advice of the doctors. The girl's mother is healthy and graduated from high school. She is now on a partial disability pension and takes care of her mother, who has hypertension. The mother's father suffered from Parkinson's disease and died 11 years ago. The girl's own father died of total body failure due to alcohol abuse 7 years ago. He had secondary education. His father died of alcohol abuse; his mother had a stroke. The girl has one year healthy younger brother and two half-brothers from the father's side.

The girl was born from the first physiological pregnancy, which was a Caesarean section, and the postpartum adaptation was without any problems. She did not have neonatal jaundice. She was breastfed for 3 months. Both psychomotor development and speech development were in accordance with the norm. She had smallpox, and was vaccinated properly. She underwent left ear surgery. In 2014 she suffered a concussion after an accident where she had run out in front of a car. Her interests include reading books, sports (biking, cross-country skiing, and ball games), her mobile phone and social networking. According to her mother, she is mentally unstable and has problems integrating into a team. Her best friend is a cousin. The mother denies that her daughter has had experience with drugs and alcohol. She had her first period 2 years ago, but about six months ago, her menstruation stopped due to her low body weight.

She started attending kindergarten at the age of 3. At first it was difficult for her, but after a month the situation was OK. She started to attend elementary school at the age of 6. Now she attends the first year of secondary nursing school and has excellent results. She enjoys all the subjects except for physics. Originally she wanted to study at grammar school; however, she was not admitted. Since then there have been problems with food intake. The girl lives in a house with her mother. Her parents were not married and her father died 7 years ago. Their cohabitation lasted 10 years, and there were frequent conflicts due to the father's alcohol abuse.

In childhood the girl was examined for concentration problems, but ADHD was not confirmed. A year ago she visited a psychologist several times because of eating disorders. She was also at a child psychiatrist's, from where she was immediately sent to hospital. About two years ago, she started to feel fat; her classmates had told her to lose weight. After the unsuccessful admission to the grammar school, she began to lose weight intensively, and was also selected for a competition by a modelling agency. She would wear loose clothing. Though she had enough food, she had inhibitions to consume it. Even after hospitalization at the ICU, the situation did not improve. The girl also changed her behaviour, became more apathetic, but started doing more sports. She did not talk to the girls in her class until the end of elementary school; however, she did fit in better at grammar school. She stopped obsessing about food and weighing herself. In front of her mother, she eats the whole portion of food, but the next day she refuses to eat, weeps and feels guilty. Her mother did not notice her taking laxatives or vomiting, only the more frequent occurrence of constipation. She eats little and occasionally spits out the food in the garbage. She spends a lot of time on social networks. Once, her mum found her taking pictures of food and uploading them to her profile.

The girl has a tall, athletic figure. Initially, she did not share much, and was reserved. She keeps bargaining about being allowed to have her treatment at home. At first she wanted only a slight weight adjustment, so she watched her sugars and portions, and did more sports. The drastic weight loss occurred when she was not admitted to the grammar school and was selected for a modelling competition. Later she was terrified of her great weight loss and tried to gain it back. She believes the family relationships are good. The informant is slightly tense, sad, and has quite simple verbal expression. She is constantly repeating her wish to leave the hospital. In the future, she would like to study humanities at university. During the day, she fasts at school; in the evening, she overeats. Her eating is unbalanced: she chooses food according to taste, rather than nutritional benefit.

In the psychiatric ward, the girl adapted with difficulty and was very negative about hospitalization. She was tearful and indignant that her cell phone would be taken away. There was a dietary regime, consultations with a nutritionist, individual, group and family psychotherapy, and ergo therapy provided. The girl was prematurely released into outpatient care after her mother signed a negative reverse. A regular eating and drinking regime, weight

control, infection prevention, and physical activity reduction are recommended. Given that the informant has difficulty in adhering to the rules; her prognosis for the future seems problematic.

Case study 5

The informant is a 13-year-old boy with a perinatal burden and psychiatric heredity. He has been in foster care since the age of 3.5, and in psychiatric care since 2014 with a diagnosis of attention deficit hyperactivity disorder (ADHD). He was hospitalized at the children's psychiatric ward for suicidal tendencies, affective raptures, and verbal aggression towards his foster parents and other behavioural disorders. Since 2008, the boy has been in foster care with the relatives of his biological mother (i.e. her uncle and aunt), who have two of their own adult sons and are now retired. The foster-mother's sister (i.e. mother of the boy's mother, or his maternal grand-mother) died of cancer. The mother's father is a soldier; he is alive, but rarely meets with his family. The boy's mother has a basic education and was in prison. During pregnancy, she used methamphetamine intravenously, but has been abstaining for two years. She contacts her son very rarely. The boy's biological father is healthy, graduated from apprentice school, and has occasional jobs. He takes his son once a month for the weekend. The boy's paternal grandmother is alive and has a nice relationship with the boy; she understands him best. She was treated with anxiety problems in the past. The boy has an adult half-sister on his father's side, but does not see her.

The informant lived with his mother up to the age of 3, and remembers violent domestic quarrels. When he was about one year old, he fell off a changing table and suffered a gash in his head and concussion. He learned from his grandmother that his mother would bring him to his grandmother to babysit in a state of filth, hunger, and sometimes bruised. In 2008, he was taken out of his mother's care. She stopped seeing him and did not resume contact until 2015, when she started taking him home on the weekends. She was living with her boyfriend in a village, but as their social situation was so bleak, he stopped visiting his mother after several visits. For two years, there was no contact with his mother. The boy used to have a good relationship with the foster-mother, but it is getting worse, because she requires him to perform various duties, which annoys him. The relationship with her husband is more intense, as tensions arise due to discipline and obedience problems.

The informant was born from his mother's second pregnancy, preceded by one abortion. The mother used intravenous methamphetamine during pregnancy. The birth was physiologically normal, on term; the postpartum adaptation was good, but the baby was not breastfed. The psychomotor development and speech development corresponded to the norm; the boy only briefly attended speech therapy (difficulty with the sound *R*). He is left-handed and has had chicken pox; otherwise, he was properly vaccinated. He underwent several minor surgical procedures of the oral cavity (tongue, teeth) under general anaesthesia (he is very afraid of pain), and twice he had the repositioning of a fracture in his forearm. He does not suffer from allergies. His interests include playing the flute, reading, parkour, baseball, computers and social networking. He is a kind, helpful, observant, curious and clever boy, but with occasional uncontrolled outbursts of fury and rage. He is determined, aggressive and competitive, but tries to play *fair*. He would like to suppress his negative emotions, but does not know how. He often talks with his friends who he had met when doing sports. He does not take drugs.

He started kindergarten at the age of 3.5, and quickly got used to it. He attended elementary school from the age of 6 with very good results, which then deteriorated at the end of 2017. He was reprimanded by the principal because during a lesson he photographed a classmate

using a mobile phone and posted photos on a social network. He is very fond of physical education, but does not care for other subjects, despite the fact that he could be good at them. At school he has an individual educational plan and a personal assistant. The boy lives in an apartment with his foster parents, has his own room; the foster parents' marriage is harmonious and the family climate is good, non-conflicting.

Since 2014 he has been diagnosed with ADHD and visits a child psychiatrist. Since 2015 he has also been under the care of a psychologist and a special education counsellor (i.e. etoped). He had two two-month stays at an Educational Care Centre (because he would often be truant, he refused to participate in class, he felt like an outcast, marginalised); he appreciates the helpful approach of the therapists. In 2016 he was neurologically examined for headaches, without any serious findings. He was brought to the crisis centre twice due to *affective rupture* at home; he had threatened his foster parents that he would use violence. He refused to take his prescribed drugs, and threatened suicide (jumping from a high place, jumping in front of a car, overdosing on medication, and slashing his veins on the forearm). Due to the lack of interest from his mother, there are problems at school and pressure to perform duties at home.

The informant has come to hospital with serious disciplinary problems at school, repeated thoughts about suicide and fits of anger. At a time when he does not have to do much (e.g. during the holidays), he feels good, is calm and balanced. Fury arises at home or at school when he is required to do something, to be disciplined and responsible, and accomplish some tasks. The boy looks neat; in future he would like to become a photographer or a hairdresser. He says that at school he is not popular with his classmates or teachers, but that he is to blame for it, as well as for the occasional disagreements with his foster parents at home. He would like to be *normal*, to manage his behaviour. He feels that if he kills himself, everyone around him would be relieved. He thinks his life is useless and that he is a burden to others. He has a good relationship with his assistant at school, but he worries that due to his poor results, he will not be admitted to the secondary school of his choice. He does not sleep well and has nightmares. Both foster parents are very responsible, organised, and cooperative. The boy is slim, athletic and tall, but he does not maintain eye contact for long. During the examination he is restless, shuffling in his seat and making gestures. He speaks quickly, without hesitation, impulsively, with occasional anger or sarcasm. He rather downplays his suicidal thoughts. He tries to perform well, but has no perseverance to fulfil tasks to the end. His attention fluctuates and he is easily distracted. His personality appears deprived, with narcissistic features. The boy's high aspirations are unrealistic, as he is repeatedly exposed to failure to achieve his goals, and he experiences frequent frustration and dissatisfaction. His self-image is negative; in his interpersonal relationships he is repeatedly confronted with the topic of rejection. He tries to hold back negative emotions, but with a stronger impulse, his defence mechanisms fail and he ventilates his emotions externally. This behaviour appears defiant, negativistic, and can also take the form of suicidal thoughts. He is lacking positive feedback and motivation to correct his behaviour.

It is recommended to continue psychotherapeutic treatment and follow-up in the care of a children's psychiatric clinic. In the case of interest, long-term psychotherapeutic support is also being offered to the foster parents. The informant has participated in psychotherapeutic groups, ergo therapy, drama therapy, and music therapy. His medication has been modified, but education outside the family (foster and biological family) is more important. Cooperation with the Educational Care Centre seems to be optimal. The boy's prognosis is uncertain due to his hereditary psychiatric burden. However, through appropriate educational help, he is able to lead a full life thanks to his high intellectual abilities.

Case study 6

A 16-year-old girl was admitted to the children's psychiatric ward after a suicide attempt. She swallowed 12 tablets of paracetamol allegedly without the intention of killing herself; she just wanted to be subdued and not think about anything. As a reason for this, she speaks about unbalanced relationships. For the last two years, she has been under the care of a psychiatrist who diagnosed her with post-traumatic stress disorder with anxious depressive and somatoform features (e.g. a history of long-term school bullying, emotional deprivation in the family environment, and incest stigma in the family). The girl comes from a socially disadvantaged environment. Since the beginning of 2018, there has been a predominance of the symptoms of anorexia nervosa, decreased self-esteem, repeated self-harm and depressed mood.

The mother of the girl is healthy, graduated from high school, and is currently on maternity leave. Her parents have already died; her mother died of breast cancer and her father of myocardial infarction. The girl's own father is well educated. His mother died of breast cancer; his father is being treated for heart ailments and asthma. The girl has four siblings – a brother and a sister, a half-sister on her mother's side and a sister born from the father's incest with his daughter. The brother was hospitalized at the psychiatry ward in his childhood because of his violence, and is now on a disability pension due to psychiatric problems. In the extended family there have been repeated suicides (jumping in front of a train, hanging). The daughter of the incest is undergoing care for ADHD and mild mental retardation.

The informant comes from her mother's third pregnancy; the birth was physiological, on term, and the postpartum adaptation was good. She had mild neonatal jaundice and was breastfed for 4 months. Psychomotor development progressed in accordance with the norm. The development of speech was delayed; for a year she attended speech therapy because of problems with some sounds. She had chicken pox, and was vaccinated properly. There have not been any surgeries, but she has had a concussion. She was hospitalized at a paediatrics ward because of digestive problems and recurrent pre-collapse conditions due to a restrictive diet. According to her mother, she is hypersensitive and indecisive. She denies being abused. She has had her period since she was 14, occasionally irregularly. She is registered at neurology due to headaches, and at the internal medicine ward due to chronic inflammation of the stomach.

The informant now lives in an apartment with her mother and sisters; her parents divorced in 2011 because of her father's incest and gambling. The mother found another boyfriend, who the girl does not like. Her mother inherited the family house; unfortunately, she had to move out of it and they are now renting. The informant lived with her aunt (her father's sister) for several months, and then, suddenly, her mother took her to her place without giving any reason. The girl became closed into herself and communicates with her mother only to a limited extent.

The girl started attending kindergarten at the age of 3 and adapted without difficulty. She started elementary school at the age of 6 years old, from which time she experienced long-term unresolved bullying in connection with being overweight and having incest in her family. She used to be beaten and insulted, and people destroyed her things. At middle school, there was mainly psychological bullying and nobody stood up for her. She felt ignored and undervalued. From 7th grade, there were neurotic somatic problems, morning anxiety, and truancy from school. A year ago she started studying at a secondary school specialized in natural science, but she did not manage the separation of staying at a boarding school, and again suffered from anxiety. She transferred to a vocational school where she is doing very well. She enjoys computer science, scouting and Asian culture; she has a blog where she puts

her sci-fi stories, and is an active member of an Internet group of people interested in Asia. She has a good friend with whom she writes on the social network; in real life she rarely sees her, but she has other friends in scouts. She does not consider her childhood happy.

Thanks to the crisis centre, she was hospitalized after a suicide attempt by overdosing on paracetamol. Her intention was self-harm, not suicide. It was due to her unbalanced family relationships and disagreements with a female friend. During the examination, the girl cooperated minimally, was negativistic, and responded briefly. She mentioned long-term bad mood, anxiety, and self-harming behaviour by cutting her left forearm with scissors. She wonders if her life has any sense at all. She is in contact on the Internet with people who are considering or have already attempted suicide, which is where she found inspiration for her actions. She describes her ambivalence to life and does not see her future. She does not know if it is good that she did not die; she is not critical of her behaviour. She sleeps badly, is haunted by nightmares, suffers from appetite loss and is losing weight. She is sad and cries about not having her mobile phone. Therefore, she cannot contact her female friend and is afraid she may do something to herself, which she had done earlier when there was a gap in their communication.

According to the mother, the daughter has difficulties coping with the father's incest; she is hypersensitive and neurotic, especially under stress. She hates her mother's boyfriend. The daughter has a great sense of justice and would often run away from home to her aunt's place. During the school year, she stayed at boarding school; she had difficulty attending school, often skipping school because of stomach pain. She spends a lot of time with her online friends and on social networks. She is involved in an online community of people who support her in harming herself, especially one female friend of hers. For the last two years, she and her mother have been attending psychotherapy sessions.

The girl reported that she has been feeling bad for several years; recently she has not been eating much, as she does not feel hungry. She suffers from stomach ache and vomits, especially under stress. She does not like talking to strangers, as she is afraid of them. She has no vision of her future; she does not want to grow up and take responsibility. She finished her secondary school, even though she missed a lot of classes, and she will attend vocational secondary school. Now she has few real friends, but a large number of them are online friends. With hindsight, she sees her suicide attempt as stupidity and self-failure.

The informant was then re-hospitalized twice upon the recommendation of a child psychiatrist. She has recently changed schools; she stopped hurting herself. She experienced a crisis, felt fat, and drastically reduced her food intake. She drastically lost weight, but feels overweight. She does sports intensely, and secretly purges the food she consumes. At school she used to be mocked for her figure. Because of her pre-collapse state, she was admitted to the paediatrics ward, then to the psychiatric ward, where she wanted to be. She sees herself as disgusting and useless. Her suicidal thoughts returned temporarily, and she broke up with her boyfriend. Psychotherapeutic interviews have been helping her. She expects to improve her condition and to stop being anxious about food. During hospitalization, her medication was adjusted, dietary measures were taken, and she underwent intensive individual and group psychotherapy, as well as ergo and drama therapy. The condition of the girl gradually improved, so she was released and allowed to go home.

At the time of the second rehospitalisation, the girl did not go to school for 3 weeks; she was very upset, had conflicts with her classmates, she was sick and dizzy, and vomited at night. She anxiously monitors her food intake, chooses food carefully, takes pictures of it and publishes them on a social network. In her opinion, the nausea is attributed to stomach inflammation and the quarrels with classmates are because of her greater study activity; she

does not agree with the hospitalisation. She has left the Internet community and has practically no interest in anything. She does not like herself, or how she looks. In stressful situations, she repeatedly cuts herself on the legs, choosing those places where she can easily hide the cuts. Her mother left her boyfriend, is nervous, and argues with her daughter. The girl does not want to lose weight anymore, but to eat healthily; she compares herself with her classmates. The medication remained unchanged, but regular intensive individual and group psychotherapy was prescribed. It is recommended that she have a regular, varied and balanced diet and appropriate drinking regime. The condition of the girl is good at the time of release; she is calm and without suicidal thoughts.

Evaluation of the research questions

The meaning of the symbols used in the tables summarizing the evaluation of the research questions is given in Table 1.

Table 1

The legend to the symbols used in the tables

Symbol	Meaning
I1 – I6	designation of individual informants
-	the characteristic is not expressed
- / +	the characteristic is on the border
+	the characteristic is expressed weakly
++	the characteristic is expressed with medium strength
+++	the characteristic is expressed strongly

The first research question mapped the adolescent informants' access to the Internet (Table 2). The informants used the Internet most often for communication with peers and for various activities on social networks, especially for engagement with interest groups, presentations, sharing photos and videos and chatting. Their behaviour was in some cases compulsive; they spent a lot of time online and used modern technologies too much, occasionally showing signs of dependence on those technologies (e.g. increasing online time, procrastination, bad moods when abstaining, escaping into cyberspace, unwillingness to solve everyday problems, unsuccessful effort to control oneself).

Table 2

Adolescent informant access to Internet use

Online activity	I 1	I 2	I 3	I 4	I 5	I 6
Gaming	+	-/+	-	-	++	-
Communication	++	+++	+++	+++	++	+++
Social Networking	++	++	+++	+++	+++	+++
Risk of dependence	-/+	+	+	++	-	+

The second research question examined how the monitored informants' activity online influences their behaviour (Table 3). In most of the sample, it was strongly associated with the occurrence of suicidal thoughts, and in half the cases, in attempted suicides. Virtually no informant felt shy communicating in cyberspace, but most of them had serious communication problems in the real world and face-to-face, such as distrust in confiding and unwillingness to reveal their views. Almost all the informants in the sample had a large number of friends in various social networks with whom they shared very sensitive information (e.g. texts, photos, videos). They all had some real friends, but to a lesser extent than those in the virtual world; they were usually peers or best friends. Half of the respondents reported the use of alcoholic beverages and tobacco, as well as experiments with illegal drugs, especially cannabis and ecstasy, about which they gained information from online communication.

Table 3

Impact of on-line activities on the behaviour of the adolescent informants

Informant behaviour	I 1	I 2	I 3	I 4	I 5	I 6
Suicidal thoughts	-	++	+++	-	+++	+++
Suicide attempt	-	+++	+++	-	-	+++
Shyness in online communication	-	-	-	-	-	-
Shyness in communication in real life	+++	+++	++	-/+	-	++
Existence of virtual friends	++	++	+++	+++	++	+++
Existence of real friends	+	+	+++	+	++	+
Alcohol and tobacco use	+	+	++	-	-	-
Use of illegal drugs	+	++	+	-	-	-

The third research question addressed the causes of risky behaviour of the adolescent informants online (Table 4). In the case of all informants, there was a very strong role played by the family environment with different intensities, as well as the school and class environment. More than half of the adolescents did not really enjoy the school they had chosen. The current health problems of the sample and the genetic family burden should be considered as very strong negative factors. Adaptation disorders and difficulties in face-to-face communication, and in some cases also a peer group with dangerous instructional actions, also played a strong negative role. None of the informants was bored.

Table 4

Causes of risky online behaviour of adolescent informants

Cause of risky behaviour	I 1	I 2	I 3	I 4	I 5	I 6
Family environment	+	+	-/+	+	++	+++
School and class environment	+++	+++	+++	++	+++	+++
Attractiveness of the school	+++	-	-	+++	+	+
Peer group with negative impact	-	-	+++	-	-	+++
Present health problems	++	+++	++	+++	+++	+++
Genetic family burden	-/+	+++	+	++	+++	+++
Adaptive disorders	++	-/+	-	-/+	+	+++
Problems with real communication	++	++	-/+	-/+	-	++
Boredom	-	-	-	-	-	-

The fourth research question examined what signs should be emphasized that lead to the adjustment of the state of informants in connection with their risky online behaviour (Table 5). In some cases, harmonization in the family environment helps (if possible), and interventions in the classroom and school (positive motivation, appreciation, daytime regime, lifestyle, and support for adaptation, addressing bullying and reducing potentially addictive behaviour) certainly help. Appropriate emotional relationships are also important positive aspects. Medication, changes of medication (if necessary) and appropriate forms of individual and group psychotherapy significantly contribute to adjusting the state of the informants.

Table 5

Characteristics suitable for adjustment in the psychotherapeutic treatment of adolescent informants in relation to their risky online behaviour

Suitable characteristic to be adjusted	I 1	I 2	I 3	I 4	I 5	I 6
Family environment	-/+	++	+	++	+	+++
School and class environment	+	++	+++	+	+++	+++
Intimate relationships of the informant	+++	+	+	+	+	++
Adjustment of medication/mode	+	+	+++	+++	+++	+
Individual psychotherapy	++	+++	+++	+++	+++	+++
Group psychotherapy	+++	+	+	+++	+++	+++

Discussion and conclusion

These results show that the behaviour of informants being online might be very risky for them, for some of them, there are already signs of internet dependence (e.g. excessive preference of online activities, withdrawal symptoms, conflicting behaviour). Overuse or dependence on modern communication technologies is one of the causes of the informants' risky behaviour, especially suicide attempts, substance abuse, and pathological manifestations in face-to-face communication and interpersonal relationships.

Compulsive behaviour in the case of online addiction is similar to that of addiction to drugs and substances. In the brain of those affected, there are neural connections being created that are resistant to extinction and thus result in potentially risky behaviour. Social networks as well as other online activities are attractive to users because they bring challenge, fun, surprise and, above all, the satisfaction of their needs. Actions leading towards the use of modern means of communication are rewarded and consequently the need to regain this pleasant feeling increases. Risky behaviour diminishes as long as they can trust other people and establish safe relationships that they can experience in the real world, rather than just the virtual one. (de Abreu, 2017; Kimáková, 2018a; Kimáková, 2018b).

It is apparent from the presented case reports on the informants that there are a number of serious moments, including incest conditions. They all come from incomplete families, have witnessed since childhood domestic violence, quarrels, breakups, and the changing of their parent's partners. They lacked support, positive motivation, trust, warmth and enough time from their loved ones, as well as the opportunity to experience success and be rewarded for it, and thus were emotionally deprived. The reason for the frequent escape into cyberspace and their inability to return from it is not only the need for social contact and communication with peers in adolescence, but also the additional search for certainty and support that the informants lacked during childhood.

The pleasant feelings experienced by the adolescents in the virtual world were associated not only with the implementation of specific online activities, but also with the possibility to experience closeness with others (albeit remotely) and share their experiences, thoughts and opinions with them. Overuse of Internet services and relationships established within them can negatively affect the mental health of informants and worsen the already present symptoms of mental illness, which also appeared in the monitored group.

The findings correspond to the results of the study by Ko et al. (2014), who investigated addiction on a research sample of nearly 2,300 Thai adolescents (average age 12–13 years) and the association among depression, hostility, social anxiety and Internet addiction. Upon a scale designed to measure Internet addiction, respondents were divided into two groups: Internet addicts and adolescents without this addiction. In both groups the examination was repeated one year apart. Increased depression and hostility were demonstrated in the internet addicts, while no increase in the observed traits were observed in the individuals without this addiction. Internet addiction leads to procrastination, truancy, social withdrawal from the real world and limiting encounters with parents, which is reflected in increasing depression and hostility. A vicious circle is emerging which once again is increased by the inclination to the Internet and by addiction to online environments. Protective factors, especially social support and suitable ways of spending leisure time are reduced or eliminated. Adolescents seek support, closeness, and understanding in social networking environments; they want to experience success and increase their self-esteem in online environments and social networks; however, this fails. Online activities do not help to kick-start the recovery process that the user expects of them. It is girls who are exposed to greater risk; it has also been proven that reducing excessive internet use leads to reduced depression and behavioural change. Respondents are more inclined to family, peers, and teachers, as long as they receive greater appreciation and acceptance from them. There is evidence of hostility being decreased due to reduced online time, which is related to lower exposure to violence while browsing the web or gaming. The level of social anxiety worsened in the online environment; however, it remained virtually unchanged in its intensity depending on the Internet access.

Similarly, in the presented survey, the psychological difficulties of the informants due to cyberspace relations worsened, leading to risky behaviour. The support found by the adolescents on the Internet did not meet their needs to find a stable and trustworthy person. Together with the absence of strong and secure social links in the real world, these facts led to their risky behaviour and subsequent hospitalization.

We should pay some attention to the interpretation of the results and their generalization, as this is a small set of intentionally selected informants. A deeper understanding of the issue would require a larger study which may be based on the research presented here. Getting in touch with them and talking openly about their problems was not always easy; more time and a sense of mutual trust was needed. There is also no clear correlation between the psychiatric symptoms of the informants and their activity in cyberspace, but we can better understand the risks to which adolescents with psychiatric diagnoses are exposed online. In addition to the therapist's work, it is necessary to emphasize the role of the counselling system and school counselling centres to provide appropriate types of interventions and re-socialization.

The use of modern information and communication technologies is already inherently connected with today's advanced society. Adolescents perceive them naturally and are able to orientate well in cyberspace. The new means of communication bring them a certain saturation of their needs, stress relief, entertainment and education. Persons with a psychiatric diagnosis turn to them for temporary relief from their difficulties. However, in the long run, this is a risk because they lack good foundations, relationships and support in the real world. One possible solution is psychotherapeutic and counselling work that patiently deals with their Internet use, family, school and personality issues.

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Inclusive Sports Leisure Clubs as a Means of Promotion of Psycho-Social Health¹

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Abstract: The paper presents a project whose aim was to introduce inclusive sports clubs into schools in Brno to promote psycho-social health of pupils. First, we describe the theoretical links between physical and mental health and the process of inclusion. Next, we present the process of organising the clubs in Brno, the management, logistics and content of the clubs, as well as the results. The teams from the Faculty of Sports Studies and Education are designing an e-learning programme for the instructors of inclusive activities.

Key words: mental health, inclusion, leisure-time activities, pupils with special needs

The topic of this paper is based on a two-year project of Masaryk University in Brno *Quality Inclusive Education of Pupils with Special Education Needs at Primary and Secondary Schools OPVVV č. CZ.02.3.62/0.0/0.0/16_037/0004872* (project manager Prof. M. Vítková). It builds on a thought presented at the conference Life in Health 2018: Research and Practice. (Proceedings of the International Conference held on 6–7 September 2018) called *Inclusion in Leisure-time activities with respect to physical and mental health*. It included an intended project to organise leisure time sports clubs as after-school activities. In this paper we present the process of implementation of the project and its results.

To put it simply, health is understood as a state of complete physical, mental and social wellbeing. It can be defined as capability and balance of certain determinants: intake and expenditure of energy, movement and rest, overcoming mental problems. Health can also be defined as a type of force enabling us to recover from an illness (Williams & Collins, 1995). An increasing number of experts in the Czech Republic emphasise the aspect of psychosocial wellbeing, power and competences (Hošek, 2016). Individual health is a result of a healthy family, community and society in the world. Just like the health of each cell in body, as was recently found, depends on the overall health of the person, a person depends on the whole society. Health is characterised as a potential of a person's abilities and skills in coping with the demands of the surroundings and a capability to lead a socially and economically productive life (Bureš, 1981; Křivohlavý, 2001; Míček, 1988).

The holistic perspective includes other areas into the definition of health: physical, social, mental and spiritual. We can talk about perfect health only when we feel well in all the areas.

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However, the individual areas of health have not always been given the same attention. Mental health is an important aspect of general health and although there is ambivalence surrounding its definition, the significance of the mental component of health is increasingly more emphasised. The Czech pioneers of the concept, that is the acceptance of the mental and social dimension are Bartko (1975) who defined the area of psychosomatics as early as the 70s of the last century, also Baštecký, Šavlík and Šimek (1993), Křivohlavý (2001), Míček (1988), in the school context Havlínová (1999), Kašpárková (2003), Kohoutek (1998) and Řehulka, the founder and ambassador of the conferences *Život ve zdraví* (Life in Health) in Brno (Řehulka & Řehulková, 2004).

Mental health is understood as one of the main determinants of health by Bartko (1975), Kebza (2007), Křivohlavý (2001), Míček (1988), Marková (2012), Řehulka (2016). Although all of the above are proponents of the holistic approach, they agree on the formulation of overlapping determinants of mental and physical health:

- Physical health: genetic predispositions, lifestyle, i.e. physical activity, diet and sleep, physiological functions – perception, mobility, other abilities – competences, skills.
- Mental health: psychosocial context – socioeconomic status, relationships, spiritual life, value system, coping strategies.

Inclusion and mental health

What is the role of inclusion in mental health? It is a significant one as at the core of the process of inclusion the stress is on the psycho-social component, it is a means to achieve the goal, which is mutual understanding of otherness, tolerance, optimal coexistence of the majority and minority. Inclusion has to be understood as one of the means for mutual acceptance. Secondly, it plays a role in the promotion of mental health. Unfortunately, in practice inclusion has become a goal, it has been reduced to physical integration of individuals with “otherness” into the mainstream education which is competitive and defined by standards.

When emphasising inclusion solely in school education, the main principles are marginalised, i.e. the fact that successful inclusion is a process associated with everyday life throughout the whole life and is an important part of mental health of all participants.

The statistics about the numbers of pupils included into the mainstream education differ across years, however, according to the current Czech minister of education they show a considerable increase (MŠMT, 2018).

The current practice shows that the highest number of included pupils are not pupils with mobility problems as generally in the population the percentage of children with mobility issues is lower than children with other types of disabilities. Children with mobility issues can be looked after by various aids or adjustments of the environment, which means that pupils can be integrated into the academic problems without major problems. There is a low percentage of number of pupils with perception problems as common schools as not equipped with specific aids these children need and therefore their parents often do not strive for integration. The greatest proportion of integrated pupil is comprised of pupils with mild cognitive impairment. They have problem to achieve academic standards (Table 1).

Then pupils with specific learning difficulties, communication disorders and ADHD and disorders of the autistic spectrum.

Table 1

Structure of the potential of people with mental disorders to achieve standards of movement literacy

Bio-physiology potential	Technical potential	Cognitive potential	Dynamic emotion/motivation potential
Anthropometry somatotype	Individual skills	Concentration	Affective stability
Physical – Physiology functioning	Task chain (2–3)	Anticipation Imagery Remembrance Situation reading Decision making Problem solving Anticipation	Motivation Effort
Yes	Can learn more time	Cannot learn	Weak

Note: Adapted from Van Biesen, Mactavish, & VanvandeWijck (2013).

A significant contribution into this discussion was Titzl’s argument (2016). He argues that there are problems with achieving standards due to misunderstanding instructions, content and relationships because of cognitive limits, which influences the result of learning and aptitude of these integrated pupils who cannot experience success and thus enjoy this part of mental health. He also points out that there are other options for inclusion within extracurricular activities. In this context Válková (2003, 2019) mentions the potential for inclusion through Unified Sports both in regular or special schools. It is not the aids that matter but the motivation and communication, an insight into the situation. Is it then out-of-school activities that are more suitable for the process of inclusion rather than the competitive environment of cognitive academic education? Unfortunately, there has been very little research in this area.

Project IVČA (ILSA)

The project of leisure-time sports activities (ILSA) (project number OPVVV č. CZ.02.3.62/0.0/0.0/16_037/0004872) aimed to test the suitability of various activities in practice, manage the activities in terms of the personnel and logistics and ensure implementation into practice. The project is based on an assumption that out-of-school activities in the school contribute to so-called inclusive culture regardless of the type of content, be it visual arts, music or sports (Lazarová et al., 2015; Řehulka, 2016). These activities make it possible for the participants to meet and communicate, present their skills, they are closely linked to the life of the community. The main principles are:

- voluntary basis (consent of parents);
- smaller motivated groups;
- emphasis on health and psychosocial parameters rather than performance;
- emphasis on formation of positive attitudes while gradually building skills;
- respect to the standards determined within the heterogenous group;
- greater flexibility and space for modifications;
- a platform for presentation of individual skills;
- application of games for emotional and social learning;
- less administration.

The specific pillars of sport activities are:

- 1) Sport as a human right: accessibility, modification, variability of activities and sports.
- 2) Acceptance of individual differences: the phenomenon of otherness, simulation, adaptation.
- 3) Respect to individual performance: effort to be active, push one's boundaries.
- 4) Psychosocial support: involvement of the family, being an active member of the school and community.

The aim of the project was to develop pupils with special need by means of leisure-time activities in out-of-school clubs, educate school staff, test models of these activities with regard to the specific situation and design a tool-kit for further use. The first step was to establish the clubs in schools which promote inclusion as part of their policy. Several meetings were held with the management of the schools prior to the recruitment of participating teachers and enrolment of pupils. Next, documents including the financial support for the project were elaborated including the ethical consent of all participating pupils. At the same time recruitment of student instructors for the clubs was done. This stage took over half a year (2018). Despite initial problems 7 schools and 8 clubs from Brno decided to participate. There were 15–18 pupils in each club and in total there were 18 pupils with special educational needs, mainly specific learning disorders, autistic disorders, ADHD and one wheelchair user. The lessons were 50–60 minutes long, held once a week all through the school year 2018–19. The instructors were trained students of the Faculty of Sports Studies supervised by faculty members. The students were motivated by the prospect of gaining experience, credits for teaching practice, using the material for their diploma thesis (3 students) and also financial award. Every 4–6 weeks there were meeting of the team at the Faculty of Sports Studies.

The inspiration for the content of the activities was drawn from literature, however, it is necessary to point out that there is little research on sports activities for inclusive groups (Válková, 2012). The findings on the key principles of sports activity were more relevant for our purposes (Lokšová & Lokša, 1999; Winnick, 2011), as well as information from practitioners and our own practice.

Winnick (2011) recommends three basic approaches in work with children with specific learning disorders, ADHD and dyspraxia:

- *multisensory approach;*
- *behaviour management;*
- *multifaceted approach.*

Another recommendation is frequent *changing of familiar activities* as these children have limited attention span. Whenever longer time is needed to train a particular skill, it is advisable to at least change the position, etc. It is very important to include relaxation and *structured space* and *instruction*. This type of instruction means that the child is well oriented in activity, time and space.

The key activities should focus on:

- improvement of the body scheme perception;
- improvement of spatial orientation and laterality;
- perception of rhythm and rhythm repetition;
- improvement of motor and visual-motor coordination;
- improvement of concentration and movement control through relaxing;
- improvement of individual skills and confidence;
- relay team work and cooperation (2–3 tasks or persons).

An important element of the project was participation of the pupils in public events such as runs in Brno, skating, swimming or bouldering. This participation in public events contributed to the enhanced sense of community and the fulfilment of the goals of inclusion, in particular the psychosocial component of health.

Conclusion

The final event of the project was a sports day at each school, which signalled and symbolised the inclusive culture of the school. All the participating pupils were awarded a diploma and a badge with the logo of the project, the schools obtained a diploma of cooperation with the Faculty of Sports Studies. Apart from meeting the goals of the project we believe that the project helped enhance the quality of life of the participants. The feedback, although not statistically processed yet, indicates mainly positive response from not only pupils and teachers, but also from the parents who express their wish for the project to continue next year. Our know-how will be published in an e-learning form, available to the public. The question that remains unanswered is financing of these activities in the future.

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Monitoring of Selected Physiological Parameters of Athletes during Sports Leads (Rhabdomyolysis, Hyponatremia, Upper Respiratory Tract Infection, Hepatocyte Damage)

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Abstract: This thesis deals with ultra-endurance events, number of which raised over the last decade and that became very popular. There are not many scientific papers published concerning the influence of ultra-endurance exercise on human health. Therefore, *objective of the study* was to monitor ultra-endurance athletes in order to define the influence of strenuous exercise on selected diagnostic markers. Selected physiological markers are connected to adverse effects of strenuous exercise – rhabdomyolysis, hyponatremia, upper respiratory tract infections and liver damage. Tested subjects (total number of 116 athletes) were ultra-runners and ultra-cyclists who participated in 24-hour races and multi-stage races. Blood samples were obtained from cubital vein and following markers were analysed: Blood samples were obtained to determine leukocrit. From plasma pre- and post-race CK, [Na⁺], [K⁺], and urine creatinine and from sera LDH and ALT enzymes and immunoglobulins levels were measured by spectrophotometric method using assay kits. Creatine kinase levels increased after the race (2.9 ± 1.7 to 38.7 ± 78.9 $\mu\text{kat/l}$, $p \ll 0.01$), which refer to possible muscle damage. This was supported by increased potassium levels (pre-race 4.4 ± 1.2 ; post-race 5.0 ± 0.8 mmol/l, $p = 0.19$). Based on increase in post-race white blood cell counts (pre-race 5.6 ± 1.6 , post-race $10.2 \pm 3.3 \times 10^9/l$, $p \ll 0.01$) and decrease in serum immunoglobulin A levels (156.0 ± 35.1 vs. 148.8 ± 34.2 mg/dl, $p \ll 0.01$), we confirm the hypothesis concerning post-race immunosuppression. Decreased immunoglobulin M levels (pre-race 169.4 ± 85.9 ; post-race 150.5 ± 76.9 mg/dl, $p \ll 0.01$) refer to acute inflammation. On the other hand, we reject the hypothesis of increased incidence of hyponatremia in ultra-endurance athletes. It can be assumed, that due to increased levels of alanin aminotransferase (pre-race 0.5 ± 0.3 ; post-race 1.0 ± 0.5 $\mu\text{kat/l}$, $p \ll 0.01$) and lactate dehydrogenase (pre-race 1.8 ± 0.7 , post-race 3.0 ± 1.1 $\mu\text{kat/l}$, $p \ll 0.01$), liver damage can be involved.

Key words: URTI, rhabdomyolysis, hyponatremia, liver damage, ultra runners, ultra cyclists

Physical activity is recommended for preventing various diseases, controlling weight or delaying the onset of chronic disorders. When physical activity is done regularly, the body enhances fuel utilization by adapting its metabolism to increased energy expenditure. However, sport-induced metabolic changes can alter the serum concentrations of numerous laboratory parameters. These modifications, and especially increases in these parameters, can often get out of the normal range, leading to further examinations, moreover – to training and competition termination. When unusual values are detected, athletes should be warned about potential danger associated with physical activity. All these aspects then create the dilemma

about the benefits and hazards of sport. It is important, therefore, that clinical chemists and sport physicians are aware of the changes in metabolism in athletes and that the altered values are counted. Aminotransferases are commonly analyzed in serum to assess and monitor liver and muscle damage and possible viral infections of the liver. Alaninaminotransferase (ALT) is found mainly in the liver but also in smaller amounts in the kidneys, heart, muscles, and pancreas (Banfi et al., 2012; Lippi et al., 2011). The investigation of lactate dehydrogenase (LDH) provides additional information not only on the state of the muscle but also on its biochemical adaptation to the physical load. The amount of enzyme efflux from muscle tissue to serum can be influenced by physical exercise (Brancaccio, 2010).

The production of secretory immunoglobulin A (IgA) is the major effector function of the mucosal immune system providing the “first line of defence” against pathogens. The majority of exercise studies have assessed IgA as a marker of mucosal immunity, but recently the importance of other antimicrobial proteins in saliva (e.g. α -amylase, lactoferrin, lysozyme) has gained greater recognition (Gillum et al., 2013). Depressed secretion of IgA during periods of intensified training and chronic stress can result in inhibitory effects on IgA synthesis and/or transcytosis. There is a certain evidence, that reduced levels of IgA in ultramarathoners are associated with increased risk of upper respiratory tract infections (URTI) during heavy training (“open window” theory), that is likely to enhance their susceptibility to infections. A relationship between training loads and infection risk has been modeled in the form of a J-shape curve (Nieman, 1994; Klentrou et al., 2002). Moderate loads reduce the infection risk and heavy, intense exertions increase that risk. It has been well established that prolonged endurance exercise is associated with muscle cell damage and local inflammation. It has been hypothesised that immunoglobulin M (IgM) may be used to assist macrophages in disposal of muscle cell breakdown products. This could occur either by IgM binding to breakdown products present in the blood, followed by their clearance from the circulation or it is possible that these antibodies may leave the circulation to carry out this same function in tissues (Nieman & Nehlsen-Cannarella, 1991). It was reported already in the early 20th century (Larrabee, 2002), that leukocyte differential (WBC – white blood cell) counts were increased after a marathon run and in connection to URTI, leukocytosis of the inflammatory type was taken into consideration. Although strenuous exercise may lead to leukocytosis, all changes are completely reversed 24 hours thereafter (Lippi et al., 2010).

Methods

The data from 232 samples from 116 athletes were collected from 2011 to 2013 during individual two ultra-running and two ultra-cycling races. At each race, blood was collected from an antecubital vein for haematological and chemical analysis using an S-Monovette tube (plasma gel, 7.5 ml) (Sarstedt, Praha, Czech Republic) and an S-Monovette (EDTA, 2.7 ml) (Sarstedt, Praha, Czech Republic) before the start and within 1 hour after the race. The collected samples were stored under cold conditions and sent to the laboratory, where they were analysed within six hours. Blood samples were obtained to determine pre- and post-race plasma $[\text{Na}^+]$, plasma $[\text{K}^+]$, plasma creatinine and plasma CK. Plasma $[\text{Na}^+]$, plasma $[\text{K}^+]$, plasma creatinine and plasma CK were determined using biochemical analyzer Modular SWA P300 (Roche, Basel, Switzerland). Estimation of enzymes was performed using reagent sets for determination of LDH/ALT catalytic concentration (ERBA LACHEMA, Brno). IgA/IgM levels were estimated using SENTINEL DIAGNOSTICS kit for determination of Ig concentration. Both enzyme and immunoglobulin levels were measured turbidimetrically using ELISA reader – Rainbow (SLT Instruments). Bürker chamber was used for leukocrit determination.

Participants

Institutional review board approval was granted for this study by the local institutional ethics committee. Participants were from the MUM (7 Moravian ultra marathon) (12 runners), the “Sri Chinmoy Self-Transcendence Marathon 24-h race” in Kladno city in 2012 (13 runners), “Bike Race Marathon Rohozec 24 h” in Liberec city in 2011 (14 cyclists), the “Trilogy Mountain Bike Stage Race” in Teplice nad Metují in 2012 (14 cyclists).

MUM is an international running stage race of 301 km, which is 7 times 43 km in 7 consecutive days. It is the longest running and most difficult stage race held in the Czech Republic. Czech 24 Hour Championships took place in Kladno with 1km course lap around an athletic stadium, almost flat with 1m rise.

MTB Trilogy is a mountain bike stage race which takes place in Broumovsko region, Teplice nad Metují. The race consists of a prologue and three stages, each of a completely different character and profile. MTB Rohozec Bike Race Marathon is the largest and the oldest 24 hour race in the Czech Republic with 12,6 km in one round with 250m rise.

Subjects were informed of the experimental procedures and provided their informed written consent before participation.

Statistical analysis

The results were presented as mean and standard deviation (SD). Shapiro-Wilkův test was applied to assess the normality of the data. If the data had a normal distribution, the differences between pre- and post-race values were evaluated by paired sample Student’s *t*-test. If the data had not a normal distribution, then data were analysed using Wilcoxon and paired *t*-test. The pre- and post-race values were compared and $p < 0.01$ was accepted as significant.

Results

Rhabdomyolysis

These data suggest that there is a correlation between these markers in relation to rhabdomyolytic muscle injury. The CK concentration increased on average from the resting 2.9 ± 1.7 to the 38.9 ± 78.9 $\mu\text{kat/l}$ ($p \ll 0.01$), K^+ concentration from 4.4 ± 1.2 to $5, 0 \pm 0.8$ mmol/l ($p = 0.19$) and LDH concentration from 1.8 ± 0.7 to 3.0 ± 1.1 $\mu\text{kat/l}$ ($p \ll 0.01$). Post-race CK values were several times higher than the maximum reference range, post-race K^+ values were at the upper end of the reference range, and LDH values were normal (Table 1).

Table 1

Changes in rhabdomyolysis markers before and after the race

	CK [$\mu\text{kat/l}$]		K^+ [mmol/l]		LDH [$\mu\text{kat/l}$]	
	PRE	POST	PRE	POST	PRE	POST
Diameter \pm SD	2.9 ± 1.7	38.7 ± 78.9	4.4 ± 1.2	5.0 ± 0.8	1.8 ± 0.7	3.0 ± 1.1
%		$\uparrow 1237.7$		$\uparrow 15.2$		$\uparrow 65.2$
		$p \ll 0.01$		$p = 0.19$		$p \ll 0.01$

Hyponatemia

These data suggest that there is no correlation between all of these markers in relation to hyponatraemia. K⁺ concentration increased on average from quiescent 4.4 ± 1.2 to 5.0 ± 0.8 mmol/l (p = 0.19), Na⁺ concentration decreased from 140.0 ± 2.8 to 138.3 ± 2.8 mmol/l (p << 0.01) and creatinine concentration increased from 77.9 ± 9.8 to 98.1 ± 30.7 μmol/l (p << 0.01). All marker values were normal. Concentrations of Na⁺ did not show values less than 135 mmol/l, and therefore hyponatraemia due to ultra-long-term stress cannot be concluded (Table 2).

Table 2

Changes in hyponatraemia markers before and after the race

	K ⁺ [mmol/l]		Na ⁺ [mmol/l]		Kreatinin [μmol/l]	
	PRE	POST	PRE	POST	PRE	POST
Diameter ± SD	4.4 ± 1.2	5.0 ± 0.8	140.0 ± 2.8	138.3 ± 2.8	77.9 ± 9.8	98.1 ± 30.7
%	↑15.2 p = 0.1956		↓1.2 p << 0.01		↑26.0 p << 0.01	

URTI

These data suggest that there is a relationship between increased post-competition leukocyte count and decreased serum IgA concentration. IgM concentrations also show reduced levels, which could support the hypothesis of URTIs in ultra-long-trail athletes. The value of leukocyte count increased on average from resting 5.6 ± 1.6 to 10.2 ± 3.3 x10⁹/l (p << 0.01), IgA concentration decreased from 156.0 ± 35.1 to 148.8 ± 34.2 mg/dl (p << 0.01) and IgM concentration decreased from 169.4 ± 85.9 to 150.5 ± 76.9 mg/dl (p << 0.01). Immunoglobulin values were normal, but post-race leukocyte levels were higher than the maximum reference values (Table 3).

Table 3

Changes in URTI markers before and after the race

	Leukocyty [x10 ⁹ /l]		IgA [mg/dl]		IgM [mg/dl]	
	PRE	POST	PRE	POST	PRE	POST
Diameter ± SD	5.6 ± 1.6	10.2 ± 3.3	156.0 ± 35.1	148.8 ± 34.2	169.4 ± 85.9	150.5 ± 76.9
%	↑81.1p << 0.01		↓4.6 p << 0.01		↓11.2 p << 0.01	

Hepatocyte Damage

These data suggest that there is a correlation between these markers in relation to liver damage. LDH concentration increased on average from resting 1.8 ± 0.7 to 3.0 ± 1.1 μkat/l (p << 0.01), ALT concentration increased from 0.5 ± 0.3 to 1.0 ± 0.5 μkat/l (p << 0.01). LDH

values were normal, with initial ALT values above the upper limit of the reference range (Table 4).

Table 4

Changes in liver damage markers before and after the race

	<i>LDH [μkat/l]</i>		<i>ALT [μkat/l]</i>	
	PRE	POST	PRE	POST
Diameter \pm SD	1.8 \pm 0.7	3.0 \pm 1.1	0.5 \pm 0.3	1.0 \pm 0.5
%		\uparrow 65.2 p << 0.01		\uparrow 111.4 p << 0.01

Discussion

To diagnose rhabdomyolysis, we decided to determine creatine kinase, which is its most sensitive laboratory test (Vanholder et al., 2000; Warren, Blumberg, & Thompson, 2002). Potassium and lactate dehydrogenase concentrations were determined as supportive parameters, as elevated concentrations of this enzyme may be observed in the diagnosis of rhabdomyolysis (Brancaccio, Lippi, & Maffulli, 2010) and hyperkalaemia is considered to be the greatest complication (Bagley, Yang, & Shah, 2007). Our research suggests that there is a link between these markers in relation to rhabdomyolytic muscle damage. Creatine kinase concentration increased from pre- race 2.9 ± 1.7 to post-race 38.7 ± 78.9 ukat/l (p << 0.01), potassium value from 4.4 ± 1.2 to 5.0 ± 0.8 mmol/l (p = 0.19) and lactate dehydrogenase concentration from 1.8 ± 0.7 to 3.0 ± 1.1 ukat/l (p << 0.01). In particular, creatine kinase concentrations, which were increased more than 13-fold on average after the race, could be reliable indicators of muscle damage.

Recent studies have shown that creatine kinase levels under the influence of ultra-endurance sport continue to rise 12 hours after muscle damage and remain elevated for 1–3 days, then gradually decrease (Huerta-Alardín, Varon, & Marik, 2005). The increase in potassium concentration occurs at most 12–36 hours after muscle damage (Visweswaran & Guntupalli, 1999). As a result of muscle damage, acute inflammation occurs, in which CRP and IL-6 are released into the bloodstream in addition to the crease of creatine kinase (Huerta-Alardín et al., 2005). In our study, post-race creatine kinase levels were several times higher than the upper limit of the reference range, and potassium and lactate dehydrogenase levels were in normal range, although they increased.

Due to the extreme burden of ultra-long-lasting character, great demands are also placed on the activity of internal organs. In the case of hyponatraemia, these are the kidneys as a key organ of sodium homeostasis (Trojan, 2003). Despite the high incidence of hyponatremia (EAH) in ultra-long-athletes, its etiology is not clearly established. It is now believed that excessive fluid intake leads to increased body weight after the race and is a major cause of decreased plasma sodium concentration, as confirmed by several recent studies (Rosner, 2009; Knechtle et al., 2012; Noakes et al., 2005). Physical exercise hyponatremia (EAH) is defined as a condition in which the plasma sodium concentration is less than 135 mmol/l (Noakes et al., 2005). We evaluated EAH by monitoring changes in sodium, potassium and creatinine concentrations. In our case, the potassium concentration increased on average from 4.4 ± 1.2 to 5.0 ± 0.8 mmol/l (p = 0.19), the sodium concentration decreased from 140.0 ± 2.8 to 138.3 ± 2.8 mmol/L (p << 0.01) and creatinine concentration increased from 77.9 ± 9.8 to

$98.1 \pm 30.7 \mu\text{mol/L}$ ($p \ll 0.01$). All marker values were normal. The Na^+ concentration was not less than 135 mmol/l and therefore it cannot be concluded that the ultra-long-time athletes studied suffer from EAH.

The most widespread health complications of ultra-long-term athletes are upper respiratory tract infections (URTIs). Changes in leukocyte counts after prolonged endurance workouts, combined with sleep deprivation and excessive stress stimuli, can support the open-window hypothesis of increased susceptibility to URTI (Nielsen, Hagberg, & Lyberg, 2004; Gleeson, 2007). The ultra-long-term athletes in our study experienced a statistically significant increase in leukocyte count by 81% (from 5.6 ± 1.6 to $10.2 \pm 3.3 \times 10^9/l$, $p \ll 0.01$). Up to four-fold increase in leukocytes after marathon performance was documented at the beginning of the 20th century (Larrabee, 2002). One mechanism leading to leukocyte elevation is the production of catecholamines, which are responsible for the induction of mature leukocytes. Another is that leukocytes are released into the bloodstream from the bone marrow under the influence of cortisol (Lippi et al., 2010; Gleeson, 2007).

Immunoglobulin A concentration decreased from pre-race 156.0 ± 35.1 to $148.8 \pm 34.2 \text{ mg/dl}$ ($p \ll 0.01$). Based on the results of serum IgA measurements, we can confirm that we have an “open-window” theory regarding the increased susceptibility of ultra-endurance to upper respiratory tract infections. This hypothesis is supported by Nieman (1994), Klentrou et al. (2002) and McKune et al. (2005). McKune et al. (2005) also reported that the return to basal IgA occurs several hours after the end of the procedure. This fact cannot be confirmed in our study, as the sampling was done only immediately after the race, not with a time lag. Despite this deficiency, post-immunosuppression can be inferred because this immunoglobulin A is part of the first line of defense in combating pathogens and as such is mainly responsible for the mucosal immunity of the upper respiratory tract (Gillum et al., 2013).

For class immunoglobulin M, there was an initial decrease of 11.2%, from 169.4 ± 85.9 to $150.5 \pm 76.9 \text{ mg/dl}$ ($p \ll 0.01$). The ultra-long-lasting load is associated with the formation of local inflammation (Lippi et al., 2010). Levels of these antibodies could be altered either as a result of the secondary antibody response or by the involvement of innate immune elements – complement, in response to tissue damage due to extreme stress on the body. IgM moves to tissues where it assists macrophages in clearing damaged cell debris and therefore cannot be fully detected in blood serum after exercise (Nieman & Nehlsen-Cannarella, 1991). Concentrations of enzymes signaling hepatocyte damage in the liver increased sharply after surgery in both LDH and ALT. The ALT concentration increased from 0.5 ± 0.3 to $1.0 \pm 0.5 \mu\text{kat/l}$ ($p \ll 0.01$) and the LDH concentration increased on average from resting 1.8 ± 0.7 to $3.0 \pm 1.1 \mu\text{kat/l}$ ($p \ll 0.01$). These results are consistent with previous studies (Banfi et al., 2012; Lippi et al., 2011). ALT was taken as a major marker of liver injury, LDH served as a complementary marker (Masopust, 1998).

Conclusion

Despite the fact that the number of sports events of an ultra-endurance races in the Czech Republic and abroad is increasing, the physiological impacts on the organism under the influence of extreme long-term stress are still little studied, even due to the practical difficulties of field research. Although the ultra-long-distance race can be seen as a challenge primarily from the perspective of physical stress, athletes often compete mainly with their own will and motivation during the race. In the years 2011–2013 we managed to collect and analyze 116 blood samples (before and after the race, ie 232). The test persons took part in ultra-long-distance races, namely the 24-hour cross-country and cycling races and the cross-country and cycling stage races. We were able to confirm the relationship of such extreme load of the organism with muscle fiber damage based on the determined parameters, as well

as to confirm the theory of the “open window” concerning increased susceptibility to upper respiratory tract infections and temporary immunosuppression. We also confirmed the hypothesis of possible damage to hepatocytes and refuted the fact that ultramarathons would have a high degree of hyponatremia.

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Effect of Motivational Movement Programme on the Expressed Physical Fitness and Measured Psychomotor Tempo of Hospitalized Psychiatric Patients²

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Abstract: Our research dealt with influence of a motivational movement programme (MMP) on the expressed level of physical fitness (PF) and measured psychomotor tempo of hospitalised psychiatric patients.

Aim of this research is to verify whether conducting motivational interviewing (MI) during a standard motion program (SPP) in hospital has a higher positive impact on the expressed level of PF of psychiatric patients.

The research used ten-point scales to measure the level of the expressed PF and the Path Test measuring the psychomotor tempo. MMP is based on motivational interviewing (MI) conducted in the course of a standard movement programme (SMP).

The study population included patients with diagnosed mental and behavioural disorders due to psychoactive substance use, schizophrenia, mood disorders and anxiety disorders.

The obtained data confirmed significant influence of MMP on the expressed level of overall PF and its measured components including endurance, muscle strength and dexterity in exercising. The patients attending the SMP in the course of their hospitalisation did not show any statistically significant improvement in their PF as a whole and in its components either.

Data confirmed a significant effect of MMP. A significant effect was not observed in the control group of patients. On the measured psychomotor tempo of psychiatric patients. A significant effect on psychomotor tempo was observed in experimental group of patients.

Lower effect was observed in the control group of patients.

Keywords: motivation, physical fitness, psychomotor tempo, psychiatry

Mental health directly affects physical health and quality of life. According to the World Health Organisation (WHO) mental health is a condition of satisfaction under which man recognises their own capabilities, is able to cope with normal life stress, work productively and contribute to the activities of their community.

An important value of life is perceived personal wellbeing. Experience of wellbeing may acquire two dimensions: subjective perception and objectively observable signs. The concept of subjective personal wellbeing is dominated by emotional and cognitive dimensions:

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a feeling of balance, problem management and place in the society. Objective personal wellbeing is supported by socioeconomic status and perceived health condition (Hošek, 2013).

The relationship between physical exercise and psychic health has been more and more often in the centre of attention recently. Knowledge obtained by physiological research emphasizes benefits of physical exercise for body health since the latter half of 20th century. However, research studies dealing with the relationship between physical exercise and mental health have revealed more complex relations (Taylor, Sallis, & Needle, 1985). Since 1990s the role of physical exercise in improvement of psychic wellbeing in general population as well in mental hospital patients has been increasingly studied (Scully et al., 1989; Martinsen, 1990; LaFontaine et al., 1992; Hátlová, 1992; Taylor, 2000; Biddle et al., 2000). Research statements based on evidence focus on the relationship between physical exercise and psychotic disease, bringing evidence on the existence of a relationship between physical exercise and anxiety, depression, psychotic disease, response to stress, mood, self-respect and body image (Taylor, 2000; Biddle et al., 2000; Faulkner & Biddle, 2001; Biddle & Faulkner, 2003; Faulkner, 2005; Louková, Hátlová, & Adámková Ségard, 2015).

What makes physical activity different from traditional therapies focusing on mental health issues is the potential to affect physical and mental health simultaneously. This is based on the fact of vital importance of physical activity. Movement is vital for man. Its instrumental nature makes it one of the basic conditions of quality of life. Movement reflects the whole intention of human being. Movements are targeted, based on an idea, intention, which controls the movement as an accomplishing stimulus. This is enhanced by movement experience of man and his feelings. The kinetic anthropological essence of movement points out the relationship between physical activity and personality of man. Man moves according to their nature, meaning both their current psychic condition and their structural aspect (Hošek, 2013).

A patient with a mental disorder may subjectively perceive quality of their life on a high level and on the other hand a relatively healthy individual may feel their quality of life to be on a low level. The term of wellbeing is used as the evaluation criterion for assessment of the outcomes of medical procedures. This criterion mainly studies how the patients perceive their condition, how they manage an ordinary day and their social relations (Bullinger, 2002; Gimmler, Lenk, & Aumueller, 2002; Džuka, Dalbert, & Schmitt, 2013). Beginning of the width of the effect of physical activity on human well-being was presented by K. R. Fox (1999) in his study summarising available research outcomes concerning the effect of physical activity on well-being. The author's data in his opinion confirm the effect of physical activity on physical self-perceptions a self-esteem. Zamani et al. (2016) in a study of adult population (N = 264, M = 38.10 years) focused on the relationship between physical activity (PA) and self esteem (SE) followed perceived physical fitness (PPF) as one of the factors. His findings revealed that PPF (perceived physical fitness) was directly related to self esteem (SE). It was documented that PA and PPF performed a significant role especially in adults reporting lower SE. Also the group of adolescents with a psychiatric disorder was found to have their self-conscience closely related to physical self-esteem and the role of self-conscience appeared to be very important especially in adolescents with mental issues, regardless the diagnosis (Simons et al., 2017). According to Fox (1999), physical activity also positively affects cognitive functions, especially the speed of reactions.

Physical activity (PA) and exercise is increasingly being recognised as an efficacious component of treatment for various mental disorders (Rosenbaum et al., 2016). Epidemiological studies have shown that physical activity exercise (PA) has therapeutic benefits when used as adjunct treatment in mental disorders (Zschucke, Gaudlitz, & Andreas Ströhle, 2013). The effectiveness of this intervention has not yet been adequately compared with other established therapies (Hovland et al., 2013).

Rosenbaum published in 2016 the narrative synthesis of systematic reviews and clinical trials were conducted. He gave evidence supporting the inclusion of physical activity programs as an adjunct to treatment psychiatric patients. In light of the available evidence, the inclusion of clinical physical activity programs within mental health treatment is an effective and acceptable adjunct to usual care for a variety of mental disorders (Rosenbaum et al., 2016).

Objectives and Hypotheses

The objectives of this research focus on two areas. First the research tries to find whether attendance of MMP affects the expressed individual components of PF, namely endurance, muscle strength and dexterity in exercise. And second the research studied the assumed effect of MMP on psychomotor tempo of performance of visual-motor activity.

- H1: MMP attendance significantly affects the expressed level of physical fitness of hospitalised psychiatric patients.
- H2: MMP attendance significantly affects the measured psychomotor tempo of hospitalised psychiatric patients.

Method

The research was conducted as an experiment focusing on a check of the correlation between the selected variables. In particular between the physical activity programme applied to the hospitalised patients with MI support and PF and psychomotor tempo of performed visual-motor activity.

Study population

The study population included 140 hospitalised patients from two mental hospitals, 81 from facility A and 50 from facility B. The patients suffered from *mental and behavioural disorders due to psychoactive substance use, schizophrenia, mood disorders and anxiety disorders*.

The patients were randomised to an experimental and a control group. The experimental group underwent a six-week motivational movement programme (MMP) and the control group was subjected to a standard movement programme (SMP) in the course of the patients' hospitalisation.

The total number of collected and processed patient questionnaires was 131 (including 83 male and 48 female patients). The mean age of the respondents was 40.5 ranging from 21 to 74 years (Table 1).

Table 1

Demographic data

Diagnoses	MMP attendants		SMP attendants		Total	
	Male/ female	Summary	Male/ female	Summary	Male/ female	Summary
Addicted	18/16	34	13/5	18	31/21	52
Schizophrenia	19/9	28	21/4	25	40/13	53
Mood or anxiety disorders	5/9	14	7/5	12	12/14	26
Total	42/34	76	41/14	55	83/48	131

Applied Methodology

The values showing the levels of physical fitness of the patients were obtained by administration of a ten-point scale where 0 represented the lowest and 10 the highest possible level of the expressed physical fitness. The measured components of PF included endurance, muscle strength and dexterity in exercise.

The values showing the levels of psychomotor tempo were obtained by administration of the Path Test. This test measures the level of psychomotor tempo in performance of a visual-motor activity.

For the nature and type of data the individual hypotheses were evaluated by non-parametrical methods. The effect of MMP on the expressed levels of PF and the measured psychomotor tempo was evaluated by the Wilcoxon's pair value test.

Procedure

Before the research commencement the selected exercise instructors were trained in MI conducting. After that all patients randomised for MMP were provided with a short questionnaire and the Path Test. Some of the patients could not be enrolled in the research for their current psychic condition (acute psychosis), physical condition (decided by their attending physician) or unwillingness to be involved in the activity. The enrolled patients were randomised to MMP and SMP groups.

The patients taking part in the MMP in the context of their therapy attended 45-minute PA sessions held twice a week by instructors trained in MI conducting. The patients enrolled in the SMP group were guided in their PA by MI untrained instructors. After six weeks the experimental and the control group patients were tested again.

Results

- 1) Effect of MMP on the expressed levels of PF and its individual components, namely; endurance, muscle strength and dexterity in exercise (Table 2, Table 3, Table 4).
- 2) Effect of MMP and SMP on measured psychomotor tempo in visual-motor activity (Table 5, Table 6).

Table 2

Basic descriptive analysis – experimental group

	First measurement				Second measurement			
	Endurance	Dexterity	Strength	Sum	Endurance	Dexterity	Strength	Sum
Mean	4.276	4.736	4.907	13.92	5.065	5.276	5.407	15.75
SD	2.726	2.749	2.649	7.454	2.368	2.491	2.362	6.680

Table 3

Basic descriptive analysis – control group

	First measurement				Second measurement			
	Endurance	Dexterity	Strength	Sum	Endurance	Dexterity	Strength	Sum
Mean	4.527	4.581	4.872	13.981	4.618	5.054	4.981	14.654
SD	2.379	2.529	2.365	6.668	2.305	2.830	2.520	6.878

Table 4

P-values for PF

	MMP attendees	SMP attendees
Physical fitness	p < 0.000	p < 0.000
Endurance	p < 0.000	p < 0.145
Dexterity	p < 0.000	p < 0.002
Muscle strength	p < 0.001	p < 0.077

Table 5

Basic descriptive analysis

Psychomotor tempo	MMP attendees		SMP attendees	
	Before	After	Before	After
Mean	46.158	33.307	47.815	40.844
SD	25.719	17.118	25.184	20.607

Table 6

P-values for psychomotor tempo

	MMP attendees	SMP attendees
Total	p < 0.000	p < 0.000
Addicted	p < 0.000	p < 0.145
Schizophrenia	p < 0.00	p < 0.002
Mood or anxiety disorders	p < 0.001	p < 0.077

Discussion

The research studied the effect of a movement programme supported by MI on hospitalised psychiatric patients and their expressed levels of PF and measured psychomotor tempo. The work in particular focused on the effect of a movement programme supported by MI on the individual components of PF including endurance, muscle strength and dexterity in exercise and on psychomotor tempo in performance of a visual-motor activity of hospitalised psychiatric patients. The patients selected for the experiment suffered from *mental and behavioural disorders due to psychoactive substance use, schizophrenia, mood disorders and anxiety disorders*.

The obtained data confirmed a significant effect of MMP on the expressed PF (Table 4). This result was significant for all measured components including endurance, muscle strength and dexterity in movement. The patients attending the SMP in the course of their hospitalisation did not show any significant improvement, neither in PF as a whole not in its individual measured components (Table 4).

The results suggest that a MI-supported movement programme can positively affect perceived PF in general. The results were mainly supported by data obtained from patients suffering from *schizophrenia, mood disorders, and anxiety disorders*. The MI and PA combination significantly affects perceived PF of these patients. In the case of patients suffering from *mental and behavioural disorders due to psychoactive substance use* this result was statistically insignificant. The reason may be that these patients commence their therapy usually after a certain period of abstinence, already perceiving their PF much more positively.

The obtained data allow for the conclusion that MMP may be used as an effective therapeutic method affecting perceived PF in psychiatric patients in general. This effect is the strongest in patients suffering from *schizophrenia, mood disorders, and anxiety disorders*. Our outcomes generally confirm and extend knowledge obtained by the study performed by Zamani et al. (2016) and focusing in the relationship between PA and self-esteem (SE) where perceived PF was one of the studied factors.

The results further confirmed that the measured psychomotor tempo was much improved in all patients after the MMP completion in comparison to the baseline before the programme start (Table 6). This result was statistically significant also for the individual diagnoses (Table 6). Reduced psychomotor tempo was noted in the patients of the control group as a whole. The results for the control group were mainly supported by data from *schizophrenic* patients. In the case of patients suffering from *mental and behavioural disorders due to psychoactive substance use, mood disorders and anxiety disorders* any significant reduction of the reaction time was not found, though.

In this case too a conclusion may be drawn that MMP in comparison to SMP may be considered an effective therapeutic method of improvement of psychomotor tempo in visual-motor activity of patients suffering from *mental and behavioural disorders due to psychoactive substance use, mood disorders and anxiety disorders*. Our results this to a certain extent confirm and specify in more detail the outcomes achieved by Fox (1999) in connection with a positive effect of PA on cognitive functions, especially in measurement of the speed of reaction.

Overall, the combination of MI and PA may be used as an effective therapeutic method affecting PF of hospitalised psychiatric patients. MMP in comparison to SMP also appears to be an effective method of improvement of psychomotor tempo in performance of visual-motor activity by patients suffering from *mental and behavioural disorders due to psychoactive substance use, mood disorders and anxiety disorders*.

Conclusions

The research studied the effect of MMP on the individual components of PF, including expressed endurance, muscle strength and dexterity of movement as well as on psychomotor tempo in performance of visual-motor activity of hospitalised psychiatric patients. They were patients suffering from *mental and behavioural disorders due to psychoactive substance use, schizophrenia, mood disorders and anxiety disorders*.

The obtained data confirmed a significant effect of MMP on the expressed PF. This result was significant for all measured components, endurance, muscle strength as well as dexterity of movement. The patients attending SMP in the course of their hospitalisation did not show any statistically significant improvement in their expressed PF as a whole nor in its individual measured components.

The obtained data further confirmed that the measured psychomotor tempo of performance of a visual-motor activity was much quicker after MMP completion than before. This improvement was also shown by the patients in the control group as a whole.

The resulting data allow for the conclusion that MMP may be used as an effective therapeutic method with effect on perceived PF. MMP in comparison to SMP also appears more effective in connection with effect on the psychomotor tempo of performance of visual-motor activity by patients suffering from *mental and behavioural disorders due to psychoactive substance use, mood disorders and anxiety disorders*.

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Investigation of Influence of Living and Educational Conditions on Czech Children Nutrition Risk Factors

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Abstract: Eating habits are influenced by many aspects, which in the case of primary school pupils, are formed primarily in the family environment. Knowledge of eating habits is essential in targeted nutritional education.

The aim of the research is to specify the eating habits of pupils of selected primary schools in the South Moravian Region of the Czech Republic with regard to the characteristics and geographical location of the school they attend and their family and socio-economic profile.

A deliberate selection was made of seven primary schools that represent indicators with different values (e.g. differentiation of geographical location, different size category of municipalities, different size and number of classes, use of preventive programs, different socio-economic groups, single-parent families, families of foreigners and ethnic minorities etc.). A total of 628 questionnaires from pupils aged 11 years old (5th grade pupils) and 15 years old (9th grade pupils) were assessed in total. The total proportion of boys was 51.1% and girls 48.9%. Responses were evaluated according to the level of intensity of age and gender dependence and eating habit indicators (correlation coefficient and Pearson contingency coefficient).

The connection between the eating habits of primary school pupils and the geographical location, the character of the housing development and the size category of the municipality in which the school is located has not been confirmed. The results show that there is a very strong relationship between the eating habits of adolescents and the characteristics of (co) pupils, and between eating habits and the influence of the family environment.

It has been shown that the school, as an institution of conscious instillation of values and its school educational program, as well as a number of preventive actions, does not play a significant role in shaping eating habits.

Key words: eating habits, family environment, primary school, questionnaire survey, correlation coefficient

Nutrition along with exercise are among the most important lifestyle factors that affect the health of the population. According to the World Health Organization, healthy nutrition, adequate physical activity and non-smoking could prevent type 2 diabetes from 90%, coronary heart disease from 80% and tumors from 30%. Other chronic non-infectious diseases that are abundant in our population, such as obesity, cardiovascular disease, osteoporosis, tooth decay, etc., are also clearly related to nutrition and eating habits. Dietary habits are formed from childhood and their formation is influenced by many aspects, the most important being the family environment. The effect of nutrition on human health is usually manifested in the longer term. Poor nutrition in childhood and adolescence, together with the

confirmation of unsuitable eating habits, often have clear health effects only at adult age. However, influencing the nutritional behavior of children, adolescents and adults is not an easy matter. Designing nutritional education that effectively changes the nutritional behavior of the population requires cooperation not only by health professionals and educators, but also in many other ministries, especially in the food industry.

Background

When evaluating the nutritional behavior of children and adolescents in our conditions, the most frequently monitored are regularity in the diet, nutritional diversity (according to the food groups) and the drinking regime.

Regularity in eating is a basic nutritional recommendation that should be applied from early childhood. Children and adolescents should eat approximately 5 times a day and the meals should not be more than 3 hours apart. When eating regularly, the human body has the ability to manage well the received energy and nutrients and thus reduces the risk of being overweight, obesity and other diseases. In relation to regularity in nutrition and school attendance, it is necessary to focus on breakfast. Pupils who do not eat breakfast and then go to school hungry and thirsty appear to be tired, restless, and fidgety due to the exhaustion of liver glycogen. In addition, various studies point to the fact that those who do not eat breakfast have a higher risk of being overweight and obese.

The issue of school children's breakfast has been the subject of international research studies on the health and lifestyle of children and school-aged children – Health Behavior in School-aged Children (HBSC) (e.g. Kalman, 2011; Kalman & Vašíčková, 2013; Madarasová Gecková et al., 2016; HBSC 2019). According to a survey from 2018, only 49% of schoolchildren aged 11–15 years had breakfast in the Czech Republic every school day. More boys than girls started their day with breakfast. With increasing age, this habit weakens. While 57% of children regularly had breakfast for eleven-year-olds, at the age of 15 only 42% of children had breakfast. The HBSC study also points out that regular breakfast is very closely related to the socio-economic status of their families. Children from more well-to-do families start the day with breakfast more often. On the other hand, the worst-situated families have the highest proportion of children who never eat breakfast at all. A look into the regions of the Czech Republic shows that breakfast is eaten the least regularly in the Ústí and Liberec regions, while it is most often eaten in Prague and Central Bohemia. (HBSC, 2019).

Nutritional diversity is the most important indicator of the quality of our diet. Thanks to it, there is usually no shortage or excess of carbohydrates, fats, proteins, vitamins, minerals or other nutrients. The diversity of the diet also reduces the risk of the intake of undesirable substances into the body. Variety affects individual food groups and nutrient sources. The consumption of fruit and vegetables is the most frequently evaluated in relation to variety in children's nutrition. Fruit and vegetables play an irreplaceable role in nutrition as a source of fiber, vitamin C, minerals (potassium, magnesium, calcium) and many other important bioactive substances. These substances do not serve directly as nutrients, but can play an important role in disease prevention. The lack of fruit and vegetables in nutrition in the Czech population is pointed out by the material of the World Health Organization (World Health Organization, 2013) or the Report on the Health of the Czech Population (Kodl, 2014). The recommended consumption of fruits and vegetables ranges from 400 to 600 grams per day. The WHO recommendations contained in the Population Health Report read: "... it is desirable for children to consume 2 servings of fruit and 3 servings of vegetables each day" (Kodl, 2014, p. 97). According to the Czech Society for Nutrition (Společnost pro výživu,

2012), the daily intake of fruit and vegetables should reach 600 grams, including cooked vegetables, while the ratio of vegetables and fruits should be approximately 2:1. The World Health Organization (2013) recommendation mentioned above also mentions 600 grams of fruit and vegetables per day (including starchy tubers). Studies to assess the consumption of fruit and vegetables in school-aged children agree on the total under-consumption of these foods. A study by the National Health Institute for Children's Health 2016 states that children from pre-school age to adolescents still consume a small amount of vegetables, a quarter of children less than one serving of vegetables a day. The eating habits of children aged 5–17 years were evaluated in this study based on a frequency questionnaire. It was investigated how often children included fruits and vegetables, sweet drinks, sweets and fast food in their diet. According to this study, 15.1% of children eat less than one serving of fruit per day (from 10.0% for 5-year-olds to 20.2% for 17-year-olds). An even worse situation is in the consumption of vegetables: 24.4% of children eat less than one serving of vegetables a day (19.8% of five-year-olds and 28.6% of 17-year-olds). In boys, consumption is worse than in girls (28% of boys and 20% of girls eat vegetables less than 1 time per day). Only 8% of boys and 11% of girls aged 5 to 17 consume the recommended amount of three servings a day. (Health status. Results of the study "Children's Health 2016", 2017).

HBSC studies produce similar results, but at the same time draw attention to an improving trend and connection with the socio-economic status of the family. In 2010, more than half of children aged 11–15 did not eat fruit or vegetables even once a day. At least one piece of fruit a day was eaten by 37% of boys and 44% of girls. In 2018, 39% of boys and 52% of girls at 11–15 years of age consumed at least one piece of fruit per day. Younger children are more likely to reach for fruit than older ones: while in eleven-year-olds, more than half of them eat fruit every day, at fifteen it is only 37% of children. Only 37% of children consumed vegetables every day, but this is an improvement of 10 percentage points compared to 2014. Fruits and vegetables tend to be consumed significantly more by children with economically stronger families. On the contrary, among children who hardly eat fruits or vegetables, more than half of them are from poor circumstances.

The habits of sweets and sugared drinks can significantly influence the regularity and variety of the children's diet. They usually supply the body with excess energy in the form of sugar and, in the case of sweets, unsuitable fats. There is no official recommendation for the consumption of sweets, but the WHO recommends reducing the added or so-called free sugars, which sweets largely contain. According to the materials Movement and Nutrition: six priorities in the movement and nutrition regime of pupils at primary school (Pohyb a výživa: šest priorit v pohybovém a výživovém režimu žáků na 1. stupni ZŠ, 2014), the daily sugar dose for school children should not exceed 35 grams per day. In the context of the WHO recommendation, it should not exceed 45 grams for adults and a reduction to 25 grams of sugar per day would be beneficial for the health. Beverages that are suitable for school vending machines and cafeterias must contain less than 5 grams of sugar per 100 ml of drink³.

In the context of sweets, it is sometimes difficult to distinguish between what children consider to be sweets and what they consider to be a normal breakfast or snack. Children do not consider many common foods, such as breakfast cereals, milk snacks, croissants and other sweet snacks or breakfast, to be sweets. It is similar to the content of sugar in fruit juices, juices, teas, yoghurt drinks, where the amount of sugar is hidden in concentrated fruit or suppresses the original acidic taste. Studies that attempt to assess the consumption of sweets

³ The Regulation is based on the applicable legislation of the Czech Republic: Decree on requirements for foodstuffs for which advertising is permitted and which can be offered for sale and sold in schools and school facilities.

and sugary or sweetened beverages may produce different results or the results may be quite distorted. The Report on the health of the Czech population in 2014 shows an excess of simple sugars in the diet for all ages (including children and adolescents). On the other hand, the HBSC study of 2018 in relation to the consumption of sweets in the children monitored found that only one fifth of children had sweets daily, and that about a third of Czech children never eat sweets or only sporadically. In addition, an almost one-third drop in the daily consumption of sweets was recorded in 13- and 15-year-olds compared to the 2010 results. Other results point to the fact that regular consumers of sweets are more inclined to supplement their diet with soda. In relation to the drinking regime, the study notes that 72% of children drink water daily. For sweet drinks, the Children's Health 2016 study states that 11.1% of children aged 5–17 years old drink three or more sweet drinks a day. In addition, the study highlights other contexts, such as overweight and obese children having significantly fewer fruits and vegetables and more sweet drinks in their diet than normal children (Health status. Results of the study "Children's Health 2016", 2017).

In our research, we focused on factors that are nutritionally important and easy to evaluate in school conditions: a regular breakfast, eating fruits and vegetables, eating sweets and drinking sweet drinks.

Objective and research questions

The main objective of the research was to specify the eating habits of pupils at selected primary schools in the South Moravian Region of the Czech Republic. The research questions are based on this objective:

- Is there a connection between the eating habits of pupils and the geographical location of the school within the region?
- Is there a connection between eating habits and the size of a settlement?
- Is there a connection between the eating habits of pupils and school characteristics (size, number of classes, preventive programs, integrated pupils, school groups, etc.)?
- Is there a connection between the eating habits of pupils and their family and socio-economic profile (different socio-economic and ethnic groups, single-parent families, families of foreigners, extracurricular activities, etc.)?

Methodology of data collection and processing

In the school year 2016/17, a total of 28 primary schools in the South Moravian Region of the Czech Republic were addressed. A positive response to the planned survey was from 15 schools, of which 7 schools were deliberately selected and involved in a questionnaire survey. Intentionally selected primary schools represent a spectrum of schools, which represent indicators with different values: differentiation of geographical location, different size category of municipalities, different size and number of classes, integrated pupils, use of preventive programs, different socio-economic groups, single-parent families, families of foreigners and ethnic minorities, extracurricular activities or cooperation between parents and school.

After the deliberate selection of schools, deadlines for the distribution of questionnaires were set with school management and teachers, followed by collection, editing, statistical data processing and the overall evaluation of case studies. In order to ensure anonymity, individual schools use a letter code throughout the research. Data were collected using an anonymous questionnaire. The questionnaire contained descriptive statistics in the introductory part.

The items related to eating habits focused on the frequency of breakfast, consumption of fruits, vegetables, sweets and sweetened drinks. The objectivity of the assignment was ensured by the uniform form of the questionnaire (printed form). There were also uniform instructions for the elaboration of questions, both for supervising teachers and pupils. The time of filling in the questionnaire and the agreed time allocation were also the same.

The next phase after the collection of the questionnaires was data cleaning, when those who did not meet the required criteria in terms of the age of children, and incorrectly completed or incomplete questionnaires were discarded. After cleaning the data, the research sample (Table 1) consisted of a total of 628 pupils (out of the original 840), who were further divided by sex and age categories of 11 (5th grade pupils) and 15 years old (9th grade pupils). The total proportion of boys was 51.1% and girls 48.9% (Table 2).

Table 1

Description of questionnaire samples

Primary school code	Original sample		Sample after cleaning		Discarded due to age/incorrect completion	
	N	%	N	%	N	%
A	182	21.7	153	24.4	29	13.7
B	80	9.5	63	10.0	17	8.0
C	189	22.5	112	17.8	77	36.3
D	106	12.6	66	10.5	40	18.9
E	100	11.9	88	14.0	12	5.7
F	97	11.5	79	12.6	18	8.5
G	86	10.2	67	10.7	19	9.0
total N	840		628		212	

Table 2

Description of the research sample (in %)

Primary school code	11 years old		15 years old	
	Boys	Girls	Boys	Girls
A	26	46	38	29
B	41	34	38	28

C	35	33	33	23
D	52	43	26	34
E	29	39	33	17
F	29	27	29	38
G	48	30	19	40

Data from the questionnaire survey were processed by statistical methods: correlation coefficient (r) and contingency coefficient (Pearson contingency coefficient P) were used to determine the intensity of age and sex dependence and indicators of eating habits. The coefficients were assessed according to the degree of dependence: 0 no dependence; < 0.3 low dependence; $0.3 \leq \text{value} < 0.5$ slight dependence; $0.5 \leq \text{value} < 0.7$ medium dependence; $0.7 \leq \text{value} < 0.9$ high dependence; $0.9 \leq \text{value} < 1$ very high dependence; 1 functional dependence.

The above research questions were then verified through case studies of selected types of primary schools. The interpretation of results was based on case studies of individual schools and a detailed description of individual primary schools, respectively cases was devoted (Table 3). School profile data were obtained from publicly available school documents (annual activity reports published annually), from which it was possible to specify the number of pupils, school educational programs (SEPs), the numbers of integrated pupils and pupils in the care of pedagogical-psychological counseling centers (PPCs), preventive programs, lectures, etc. On the basis of structured in-depth interviews with school management, personal field research and observations at individual schools (also in the order of several weeks), the characteristics of other school activities and activities outside the school itself, parents/school cooperation, social, economic and ethnic structures of families, or cases of the inappropriate behavior of pupils, truancy, prevention of their occurrence, etc. were added.

Case study results

A detailed profile of individual primary schools (Table 3) and the results of the questionnaire survey focused on eating habits, according to age, sex and characteristics of the primary school are presented.

Table 3

Localization, characteristics and specifics of primary schools

Primary school code	Position	Characteristics and specifics of the primary school
	Character of the housing development	
	Municipality size category	

A	<p>in the center of the county town</p> <p>a school in the lower housing development of residential buildings in the city center,</p> <p>category over 100 thous. resident</p>	<ul style="list-style-type: none"> – altogether 611 pupils, average per class 23.5 pupils – SEP with extended teaching of mathematics, science, informatics – 45 pupils in the care of PPC⁴ (of which 19 exceptionally gifted), 31 integrated pupils, participation in 2 preventive events, 20 groups – catchment concentration of pupils from socially disadvantaged groups, single-parent families with lower educational and economic status – truancy problems, lack of parental cooperation, inappropriate behavior, drug distribution – families of foreign nationals and ethnic minorities
B	<p>outskirts of the county town, with a shorter time access to the center</p> <p>housing estate school</p> <p>category over 100 thous. resident</p>	<ul style="list-style-type: none"> – altogether 305 pupils, average per class 19.1 pupils – SEP for primary education – 43 pupils in the care of PPC, 26 integrated pupils, special dyslexic classes, participation in 3 preventive events, 15 hobby groups – pupils participate in a number of extracurricular sports activities, parents participate in school events – sports complex and cinema open to the public, building a “community school”
C	<p>close proximity to the county town center</p> <p>a school in the lower housing development of residential buildings of the city center,</p> <p>category over 100 thous. resident</p>	<ul style="list-style-type: none"> – altogether 705 pupils, average per class 27.1 pupils – SEP focused on foreign languages, primary schools with a reputation of a prestigious school and demanding quality teaching (selective language classes from the 1st grade). – 0 pupils in PPC care, 1 integrated pupil, participation in 2 preventive events, 49 groups – most school pupils come from complete, economically secure families – pupils’ participation in extracurricular activities, parents participate in school events, sponsorship
D	<p>outskirts of the county town, with a shorter time access to the center</p> <p>housing estate</p>	<ul style="list-style-type: none"> – altogether 299 pupils, average per class 18.7 pupils – SEP creative school – 68 pupils in PPC care, 36 integrated pupils, participation in 9 preventive events, 24 hobby groups

⁴ PPC – pedagogical-psychological counseling.

	school category over 100 thous. resident	<ul style="list-style-type: none"> – problems with truancy, smoking outside the school, aggression among pupils, a lack of cooperation from the parents of problematic pupils – 2nd generation of children of parents from blue-collar professions
E	<p>hinterland of the county town (suburbia)</p> <p>a predominance of family houses, only 3 so-called apartment buildings</p> <p>category 2–5 ths. residents</p>	<ul style="list-style-type: none"> – altogether 352 pupils, average per class 22.1 pupils – SEP focused on the preparation of practical skills – 8 pupils in PPC care, 1 integrated pupil, participation in 2 preventive programs, 15 hobby groups – Since 2000, the village has grown due to suburbanization, the migration stream from the core to the hinterland is profiled as the migration of younger economically active inhabitants.
F	<p>outside the hinterland of the county town and other important core (the so-called inner periphery)</p> <p>only family houses</p> <p>category 500–1 ths. residents</p>	<ul style="list-style-type: none"> – altogether 322 pupils, average per class 20.1 pupils – SEP school for life – 7 pupils in PPC care, 1 integrated pupil, participation in 16 preventive programs, 33 hobby groups – dealt with cases of bullying, suspicion of truancy, violations of school regulations, vandalism – the commuting time of the economically active (parents) is more time consuming due to the location of the municipality
G	<p>district town, location of the town rather close to the core part of the region</p> <p>housing estate school</p> <p>category 20–50 ths. residents</p>	<ul style="list-style-type: none"> – altogether 289 pupils, average per class 19.3 pupils – SEP Healthy school, support of healthy lifestyle acquisition (3 hobby groups focused on healthy lifestyle, project health days) – 55 pupils in PPC care, 7 integrated pupils, participation in 5 preventive events, 16 hobby groups – problems with the dropping of results – single-parent families, children from ethnic foreign-language minorities

In total, the answers to five questions that were asked to students with the option of choosing only one answer are evaluated.

How often do you usually have breakfast (on weekdays)?

The question focused on the frequency of breakfast on weekdays, i.e. on days when pupils regularly attend primary school.

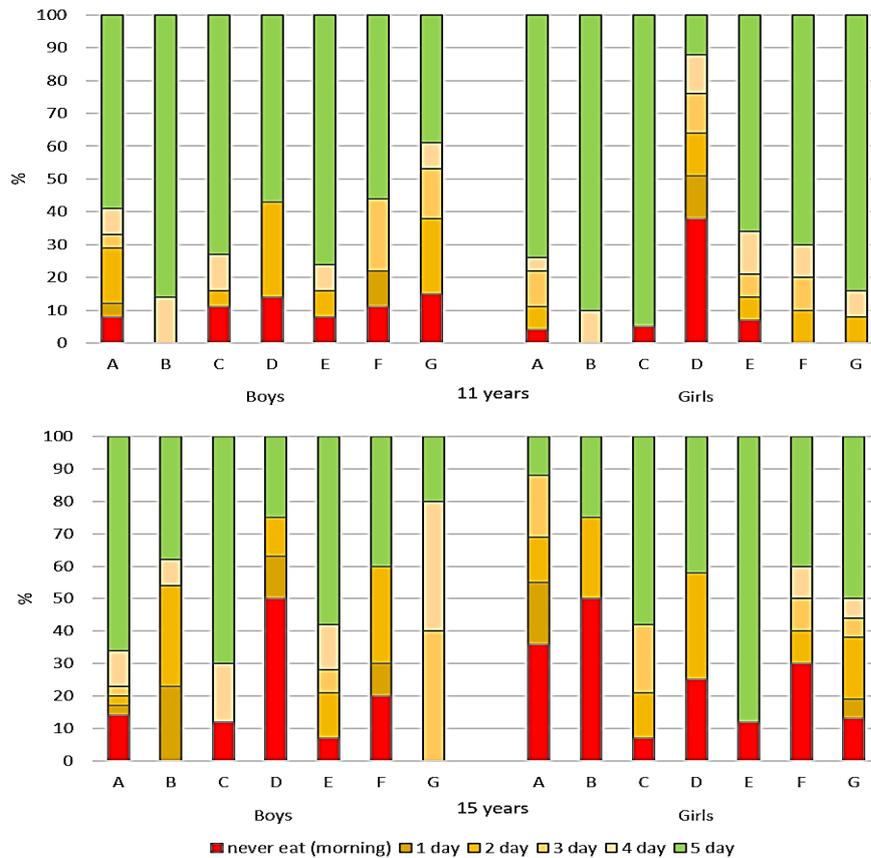


Figure 1. Frequency of breakfast of respondents on weekdays, aged 11 and 15 (%). Source: Questionnaire survey data, own processing.

On average, almost 10% of 11-year-old boys do not eat breakfast in the morning (9.6%), while on average 63.7% of them eat breakfast every day. The situation of 11-year-old girls is slightly more favorable, of which 7.7% do not have breakfast at all and 70.1% eat breakfast daily. Eating habits in the form of breakfast deteriorate with increasing age, as 14.7% of boys and 24.7% of girls do not have breakfast at all for 15-year-olds, while only 45.3% of boys and 45.0% of girls eat breakfast daily on weekdays.

The differences among the schools are considerable (Figure 1). Most 11-year-olds from School G, which teaches under the SEP “Healthy School”, only eat breakfast 2–3 days a week. Every day, there are 20 percentage points less pupils eating breakfast there than the average of all schools, with another significant drop in the age group of 15 years old (by 30 p.p.). In school B, on the other hand, the vast majority of 11-year-olds eat breakfast every day, but the negative change observed especially in 15-year-olds is all the more significant. School D is far below the average (only 12% of 11-year-old female pupils and 25% of 15-year-old male pupils eat breakfast daily). The most significant generational differences are seen in 11-year-old respondents, such as school G, where 84% of female pupils eat breakfast daily and only 39% of male pupils.

Breakdown by frequency of daily breakfast for 11-year-olds:

- 1) The above-average (positive) group includes male pupils of schools *B, C, E* and female pupils of schools *A, B, C* and *G*.
- 2) The average group includes male pupils of school *A* and female pupils of schools *E, F*.
- 3) The below-average (negative) group includes the male pupils of schools *D, F, G* and the female pupils of school *D*.

Breakdown by frequency of daily breakfast for 15-year-olds:

- 1) The above-average (positive) group includes male pupils of schools *A, C, E* and female pupils of schools *C, E* and *G*.
- 2) The average group includes male pupils of school *F* and female pupils of schools *D* and *F*.
- 3) The below-average (negative) group includes male pupils of schools *B, D, G* and female pupils of schools *A, B*.

The closeness of the sex dependence and the frequency of breakfast on weekdays is high according to the correlation coefficient r , the approaching very high closeness ($r = 0.86$). The intensity of age and frequency of breakfast according to Pearson's correlation coefficient reaches medium dependence in boys and girls ($P = 0.69$; respectively $P = 0.58$). The surveyed sample shows both a decrease in the proportion of daily breakfasts with age and a deepening change to the detriment of girls, with a relatively marked increase with the age of those who do not eat breakfast at all (at the age of 11 it was a weak 8%, while at the age of 15, already a quarter of these girls).

How often do you eat fruit a week?

The question focused on the frequency of average fruit consumption over one calendar week.

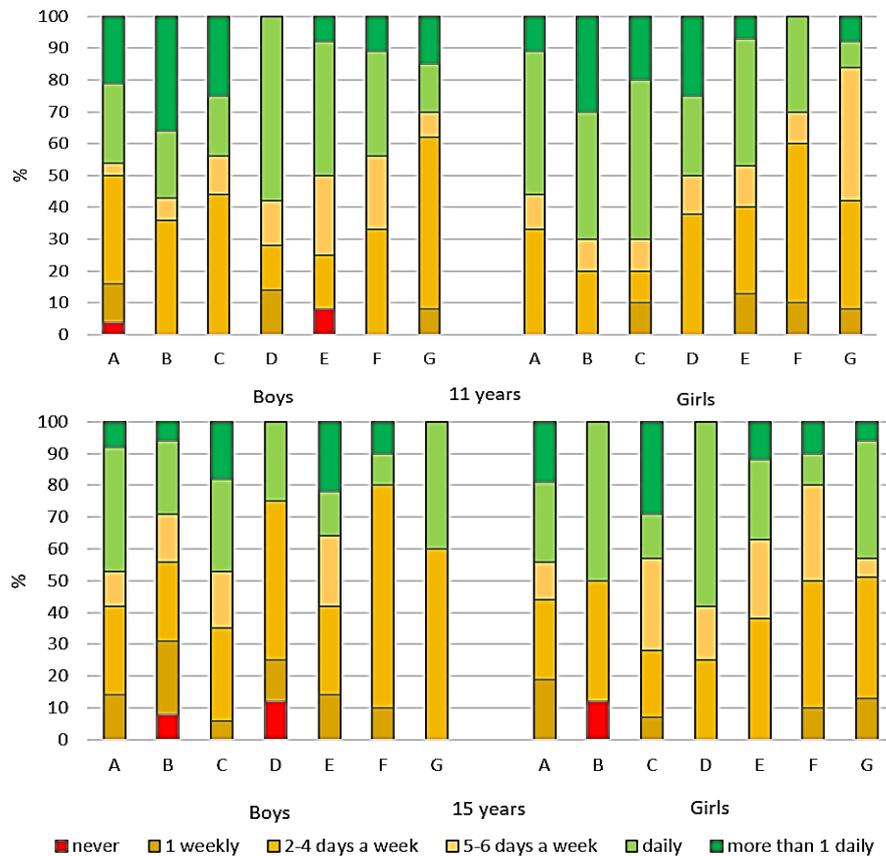


Figure 2. The frequency of fruit consumption by respondents aged 11 and 15 (%). Source: Questionnaire survey data, own processing.

In the age group of 11, the vast majority of pupils consume fruit several times a week. On average 14.4% of children eat fruit more often than once a day (boys in 16.6% and girls in 14.4%). More than a third reported that they consume fruit every day (32.2% on average). Only 1.7% declared that they never eat fruit and 4.9% of male pupils and 5.9% of female pupils eat fruit only 1 time per week. In the age category of 15 years, there are obvious changes in the consumption of fruit, especially a general decrease in the frequency of this consumption. In particular, the share of the category decreased more frequently than once a day (to 9.4% for boys and 10.9% for girls). Daily consumption of fruit at the age of 15 is 4 pp lower than that of the age category of 11 years old (28.2% on average). Children who do not eat fruit remain at a similar rate (2.3%), but the ratio of those who eat fruit only 1 x week increased (to 11.4% for boys and 7.0% for girls).

The differences among the schools are not very significant, as are gender differences. These tend to fade away with age. Also, the proportion of pupils who do not eat fruit at all is relatively low among schools (Figure 2).

Breakdown by frequency of fruit consumption several times a day for 11-year-olds:

- 1) The above-average (positive) group includes male pupils of schools *B, D, C* and female pupils of schools *B, C, D*.
- 2) The average group includes male pupils of school *G* and female pupils of school *A*.
- 3) The below-average (negative) group includes male pupils of schools *E, F* and female pupils of schools *E, F, G*.

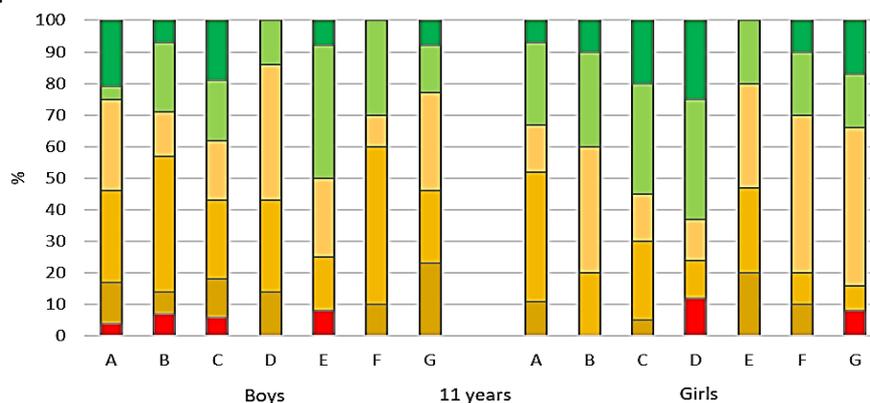
Breakdown by frequency of fruit consumption several times a day for 15-year-olds:

- 1) The above-average (positive) group includes male pupils of schools *C, E* and female pupils of schools *A, C*.
- 2) The average group includes male pupils of schools *A, B, F* and female pupils of schools *E, F*.
- 3) The below-average (negative) group includes male pupils of schools *D, G* and female pupils of schools *B, D, G*.

The closeness of sex dependence and frequency of fruit consumption in the calendar week is medium according to correlation coefficient r ($r = 0.63$). The intensity of the age and frequency of fruit consumption according to the Pearson correlation coefficient reaches medium dependence in boys ($P = 0.56$) and slight dependence in girls ($P = 0.50$). The results show that the preferences for fruit consumption are decreasing with age, although there are no significant differences between sex and school.

How often do you eat vegetables a week?

The question focused on the frequency of average consumption of vegetables during one calendar week.



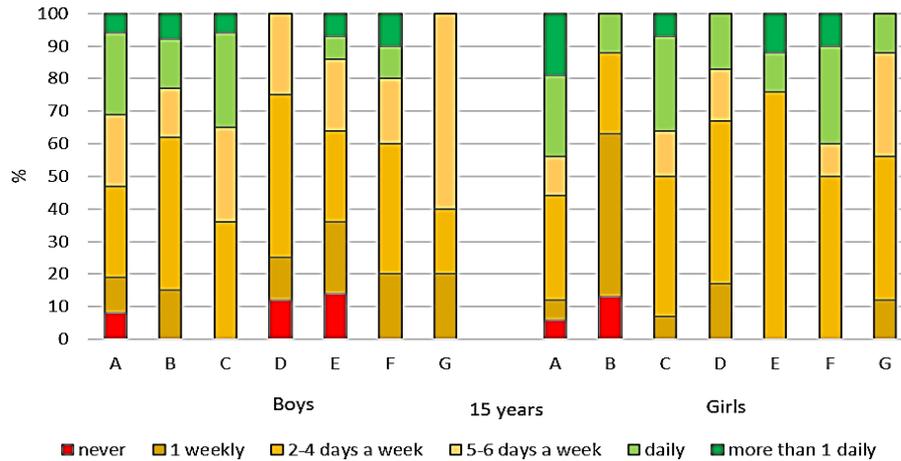


Figure 3. Frequency of vegetable consumption of respondents aged 11 and 15 (%). Source: Questionnaire survey data, own processing.

In the 11 year old age group category, most male and female pupils consume vegetables several times a week. On average, 6.1% of children eat vegetables more often than once a day and 17.8% eat vegetables every day. One fifth of children declare vegetables 5 to 6 times a week (19.8%). 3.8% of children do not eat vegetables at all and 13.8% of children eat vegetables 1 time per week. In the age category of 15 years, there is not a noticeable decrease in the consumption of vegetables, as in the case of fruit consumption, which may be due to a higher preference for fruit in younger age groups. At the age of 15, as much as at age 11, 6.1% of children eat vegetables more than once a day. On average, it is 15.9% of 15-year-old respondents a day, and 19.7% 5-6 times a week. 2.6% never eat vegetables and 13.9% of these children 1 times per week.

There are greater differences in the consumption of vegetables among the schools than in the consumption of fruit (Figure 3). At school *E* 50% of pupils consume vegetables 5–6 times per week and 25% have vegetables in their diet 7 times per week. The answer that they never eat vegetables was chosen only by pupils of schools *A* and *B* in 4%, resp. 7%. For female pupils, 12% at school *D* and 8% at school *G* selected this answer. In the 15-year age category at school *E* these male pupils make up 14%, at school *D* 12%. For girls, the situation is generally slightly better than for boys, with the exception of school *B*, where 50% of girls report that they only eat vegetables 1 time per week. As in the other age categories, pupils most often choose the answer “2–4 days a week” (e.g. for girls of school *E* it is more than 75%).

Breakdown by the frequency of consumption of vegetables several times a day for 11-year-olds:

- 1) The above-average group includes male pupils of schools *D*, *E*, *F* and female pupils of schools *C*, *D*, *F*.
- 2) The average group includes male pupils of schools *A*, *B*, *G* and female pupils of schools *A*, *E*, *G*.
- 3) The below-average group includes male pupils of school *C* and female pupils of school *B*.

Breakdown by frequency of consumption of vegetables several times a day for 15-year-olds:

- 1) The above-average group includes male pupils of schools *B, E, F* and female pupils of schools *A, E, F*.
- 2) The average group includes male pupils of schools *A, C* and female pupils of school *C*.
- 3) Below-average group includes male pupils of schools *D, G* and female pupils of school *B, D, G*.

The closeness of the dependence of sex and the frequency of vegetable consumption in the calendar week is low according to the correlation coefficient r ($r = 0.25$). The intensity of dependence of age and frequency of vegetable consumption according to Pearson's correlation coefficient reaches medium ($P = 0.60$) in boys, while low in girls ($P = 0.16$). The results of this question show that boys eat vegetables less often than girls and the differences between the frequency of eating at 11 years and 15 years are more pronounced than in girls. In general, compared to the previous question, it is clear that children prefer more fruit than vegetables.

How often do you eat sweets a week?

The question focused on the frequency of average sweets consumption per calendar week.

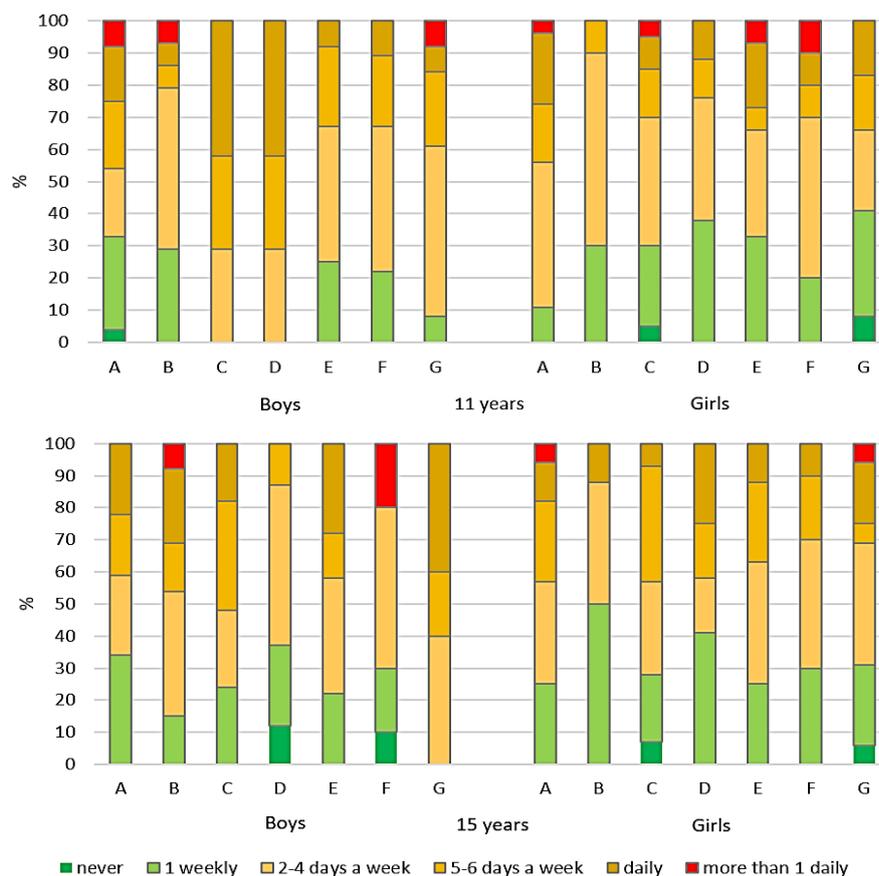


Figure 4. Frequency of consumption of sweets in respondents aged 11 and 15 (%). Source: Questionnaire survey data, own processing.

The vast majority of 11-year-old male pupils (38.4%) and female pupils (41.6%) report the consumption of sweets 2-4 times a week. In boys, the most frequent consumption is 5–6 times per week (22.3%, in girls it is 12.7%), while girls have the second most frequent response 1 time per week (27.1%, in boys it is 16.1%). Boys show a higher proportion in the ‘every day’ response (19.3%, 13.0% for girls) and, on multiple occasions, the consumption of sweets is very similar for both sexes (3.3% boys and 3.7% girls). For 15-year-olds, the frequency of responses remains very similar - the most common is consuming sweets 2–4 times per week (37.7% boys and 33.1% girls). Girls and boys have the second most frequent response of 1 time per week (20.0% of boys and 31.0% of girls). Very similar to the age of 11, the response rates are “daily” (18.7% boys and 13.9% girls). For girls, this time it is preferable to consume 5–6 times a week than for boys (16.4% of boys, 18.4% of girls). A decrease can be seen in more frequent than daily sweets consumption, especially in girls (4.0% boys and 1.7% girls).

There are quite significant differences in the consumption of sweets in individual schools (Figure 4). Male pupils of school *A* report sweets 1 time per week in the first place. 2% of male and female pupils state that they never consume sweets (for boys it involves schools *A* and *C* and for girls schools *C* and *G*). On average, 16% of children eat sweets 7 times per week and more often. However, this value varies greatly from school to school (e.g. 42% for 11-year-old boys at school *D*, but only 7% for boys at school *E*).

Breakdown by frequency of sweets consumption every day for 11 years old:

- 1) The below-average (positive) group includes male pupils of schools *B*, *E*, *F*, *G* and female pupils of school *B*.
- 2) The average group includes male pupils of school *A* and female pupils of schools *C*, *D*.
- 3) The above-average (negative) group includes pupils of schools *C*, *D* and female pupils of schools *A*, *E*, *F*, *G*.

Breakdown by frequency of sweets consumption every day for 15 years old:

- 1) The below-average (positive) group includes male pupils of schools *D*, *F* and female pupils of schools *C*, *F*.
- 2) The average group includes male pupils of school *C* and female pupils of schools *A*, *B*, *E*.
- 3) The above-average (negative) group includes pupils of male schools *A*, *B*, *E*, *G* and female pupils of schools *D*, *G*.

The closeness of sex dependence and frequency of sweets consumption in the calendar week is medium according to correlation coefficient r ($r = 0.59$). The intensity of the age and frequency of sweets consumption according to the Pearson correlation coefficient reaches medium dependence in boys ($P = 0.60$) and high dependence in girls ($P = 0.78$). In female pupils, the percentage of those who never eat sweets has dropped significantly, and the percentage of those who eat sweets more often than once a day has increased. Overall, however, girls aged 15 years old consume sweets less often than younger female pupils. Especially the number of those consuming sweets only 1 time a week increased significantly at all the monitored schools. At the same time, the number of pupils who consume sweets every day has also decreased significantly. The differences in boys are not nearly as pronounced.

How often do you drink sweet drinks a week?

The question focused on the frequency of average consumption of sweet drinks during one calendar week.

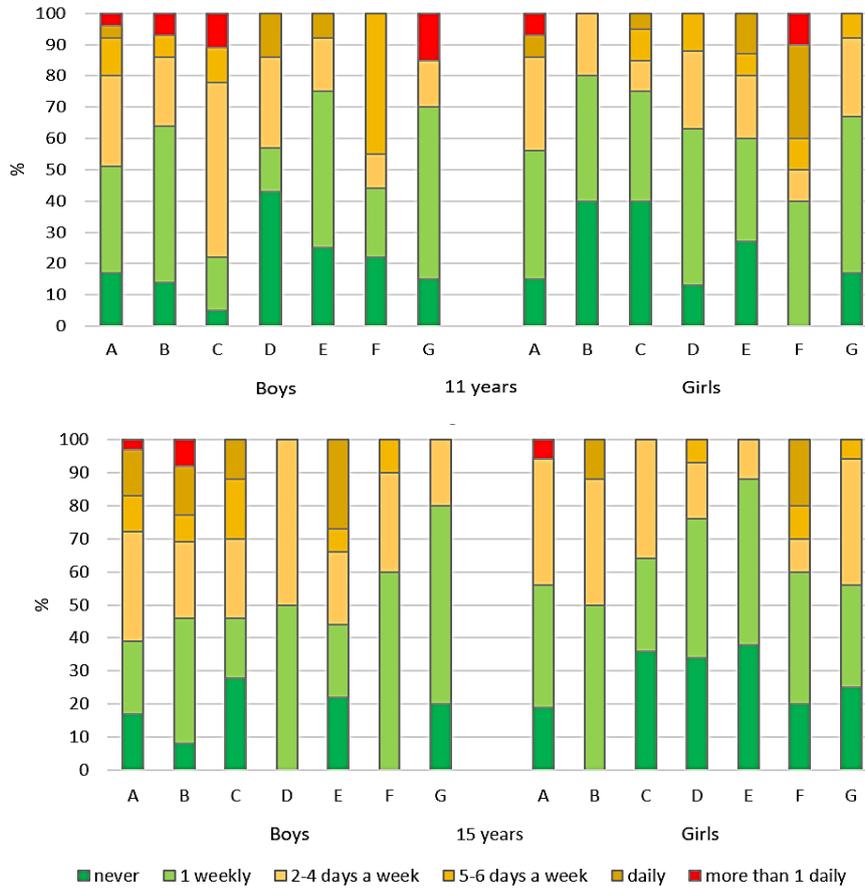


Figure 5. Consumption of sweet drinks by respondents aged 11 and 15 (%). Source: Questionnaire survey data, own processing.

At age 11, the most frequent response according to the frequency of sweet beverages is 1 time a week (average 37.9%) and the second most preferred response is 2–4 times a week (average 22.8%), followed by the proportion of respondents who say they do not drink sweet drinks at all (average 20.9%), with proportions similar for both boys and girls. 5.8% of children consume sweet drinks every day and 3.9% of children consume multiple times a day. Similar response rates occur in 15-year-olds: 39.0% 1 time per week, 27.9% 2–4 times per week, 27.9%, 19.1% do not drink sweet drinks at all, while the proportions are again similar for boys and girls. 7.1% of the 15-year-olds consume sweet drinks every day and 2.1% multiple times a day.

Again, there are considerable differences among the schools (Figure 5). For example, 14% of boys in 11-year-old respondents in school B never drink sweet drinks, while in school D there are 43% of such boys. In school C, 62% of pupils drink sweet drinks 1 time per week, while in school D only 14%. The results of the responses in girls are similar on average, but there are also quite large differences among the schools, for example 40% of pupils never drink sweet drinks in schools B and C, but in other schools the proportion is between 0–27%. There are also differences in the comparison of schools among the 15-year-olds. For example, all

boys in school *D* shared their responses between the possibilities '1 x per week' and "2–4 days a week", while for most other schools the answers are more or less equally distributed across all answer options.

Breakdown by frequency of sweet drinks consumption every day 11 years old:

- 1) The below-average (positive) group includes male pupils of school *B* and female pupils of schools *B, G*.
- 2) The average group includes male pupils of schools *A, C, E, F, G* and female pupils of schools *C, D, E, F*.
- 3) The above-average (negative) group includes male pupils of school *D* and female pupils of school *A*.

Breakdown by frequency of sweet drinks consumption every day, 15 years old:

- 1) The below-average (positive) group includes male pupils of schools *B, C, F, G* and female pupils of schools *B, C, D, G*.
- 2) The average group includes male pupils of school *A* and female pupils of school *A*.
- 3) The above-average (negative) group includes pupils of schools *D, E* and female pupils of schools *E, F*.

The closeness of dependence of sex and frequency of sweet drink consumption in the calendar week is slight according to correlation coefficient r ($r = 0.45$). The intensity of dependency of age and frequency of consumption of sweet drinks according to the Pearson correlation coefficient is also slight in boys and girls (boys $P = 0.43$, girls $P = 0.49$).

Summary of the results

Using case studies, it is possible to interpret the characteristics of eating habits in comparison to individual primary schools, which created the order of quality of eating habits (Table 4). The criterion for ranking schools was the proportion of negative responses in the overall evaluation of all responses.

Table 4

Eating habits of pupils and the order of quality of eating habits

Order	Primary school code	Primary school characteristic	Eating habits
1.	B	<ul style="list-style-type: none"> – altogether 305 pupils, average per class 19.1 pupils – SEP for primary education – 43 pupils in the care of PPC, 26 integrated pupils, special dyslexic classes, participation in 3 preventive events, 15 circles – pupils participate in a number of extracurricular sports activities, parents participate in school events – sports complex and cinema open to the public, building a “community school” 	<ul style="list-style-type: none"> – pupils achieve the best results in almost all questions – in the 11-year-old category, eating habits are the best of all schools – in the 15-year-old category they are positively above average
2.	C	<ul style="list-style-type: none"> – altogether 705 pupils, average per class 27.1 pupils – SEP focused on foreign languages, primary schools with a reputation of a prestigious school and demanding quality teaching (selective language classes from the 1st grade). – 0 pupils in PPC care, 1 integrated pupil, participation in 2 preventive events, 49 hobby groups – most school pupils come from complete, economically secure families – participation of pupils in extracurricular activities, parents participate in school events, sponsorship 	<ul style="list-style-type: none"> – pupils declare more above-average positive eating habits – only 11-year-old boys show an increased consumption of sweets – for 15-year-olds, the results are almost the best

3.-4.	F	<ul style="list-style-type: none"> - altogether 322 pupils, average per class 20.1 pupils - SEP school for life - 7 pupils in PPC care, 1 integrated pupil, participation in 16 preventive programs, 33 hobby groups - dealt with cases of bullying, suspicion of truancy, violations of school regulations, vandalism - the commuting time of the economically active (parents) is more time consuming due to the location of the municipality 	<ul style="list-style-type: none"> - eating habits show marked differences by age - The eating of 11-year-olds is rather average to below average - eating habits of 15-year-olds are rather positively above average
	E	<ul style="list-style-type: none"> - altogether 352 pupils, average per class 22.1 pupils - SEP focused on the preparation of practical skills - 8 pupils in PPC care, 1 integrated pupil, participation in 2 preventive programs, 15 hobby groups - Since 2000, the village has grown due to suburbanization, the migration stream from the core to the hinterland is profiled as the migration of younger economically active inhabitants. 	<ul style="list-style-type: none"> - the level of eating habits is around average values - 11-year-old boys perform better than girls who declare rather some of the worst eating habits of all schools - there are no gender differences in 15-year-olds

5.	A	<ul style="list-style-type: none"> - SEP with extended teaching of mathematics, science, informatics - 45 pupils in the care of PPC (of which 19 exceptionally gifted), 31 integrated pupils, participation in 2 preventive events, 20 hobby groups - catchment concentration of pupils from socially disadvantaged groups, single-parent families with lower educational and economic status - truancy problems, lack of parental cooperation, inappropriate behavior, drug distribution - families of foreign nationals and ethnic minorities 	<ul style="list-style-type: none"> - eating habits have rather improved with the age of children, from very below average values - In the 11-year-old category, eating habits are among the worst - 15-year-old boys achieve average to below-average results, while girls are among the best eating out of the monitored schools
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6.-7.	G	<ul style="list-style-type: none"> – altogether 289 pupils, average per class 19.3 pupils – SEP Healthy school, support of healthy lifestyle acquisition (3 hobby groups focused on healthy lifestyle, project health days) – 55 pupils in PPC care, 7 integrated pupils, participation in 5 preventive events, 16 hobby groups – problems with the dropping of results – single-parent families, children from ethnic foreign-language minorities 	<ul style="list-style-type: none"> – in most of the respondents' answers, they show rather inappropriate eating habits – for 11-year-olds there are no gender differences and eating habits are almost the worst among the selected schools – there are also no gender differences in the category of 15-year-olds and the results are (along with school D) the worst
	D	<ul style="list-style-type: none"> – altogether 299 pupils, average per class 18.7 pupils – SEP creative school – 68 pupils in PPC care, 36 integrated pupils, participation in 9 preventive events, 24 hobby groups – problems with truancy, smoking outside the school, aggression among pupils, a lack of cooperation from the parents of problematic pupils – 2nd generation of children of parents from blue-collar professions 	<ul style="list-style-type: none"> – in most of the respondents' answers, they show rather inappropriate eating habits – in the case of 11-year-olds there are gender differences, girls eat much better than boys – there are also no gender differences in the category of 15-year-olds and the results (along with school G) are the worst

According to the results of the case studies, it is possible to state that the family environment and the characteristics of classmates have the most significant influence on the eating habits of pupils. The worst-performing primary schools (*A*, *D* and *G*) concentrate children from socially underprivileged groups, who usually have a lower level of education, which may affect their nutrition knowledge and their relationship to healthy eating as well as the money spent on such nourishment (cf. Table 3). For this reason, the mapping of the situation in families and close cooperation between the family and the school seems to be very desirable, but this is often complicated, especially for problem pupils and limited due to the lack of parents' interest in school.

Discussion

According to the HBSC Study 2018 (HBSC, 2019), more boys than girls started their day with breakfast. With increasing age, this habit weakens. While 57% of children regularly ate breakfast for eleven-year-olds, at the age of 15 only 42% of children ate breakfast. In our questionnaire survey, pupils achieved slightly better results: at 11 years old 66.6% of children eat breakfast and at 15 years old 45.2% of children. The attenuation of the habit with age was confirmed, but the higher proportion of boys regularly eating breakfast was not confirmed. In contrast to the results of the HBSC study, our sample showed a lower proportion of children per day of at least one piece of fruit (HBSC 11-year majority and 15-year-old 37% of children; case study results of 11 year olds 32.2% and 15 years old 28.2%). Pupils also achieved lower values in the case of eating vegetables every day compared to the HBSC results (HBSC 37% of children; case studies 16.9%).

An HBSC study of sweets consumption states that only a fifth of children eat sweets daily. In the case of our questionnaire survey, respondents declared a lower proportion at 16.3% of daily consumption of sweets and only 6.5% of children drink sweet drinks daily.

Conclusion

The case studies and data gathered made it possible to answer the research questions in a broader context:

- The connection between the eating habits of primary school pupils and the geographical location, the character of the housing development and the size category of the municipality in which the school is located has not been confirmed.
- The number of integrated male or female pupils in the care of a pedagogical-psychological counseling center is partly reflected in eating habits (the only exception being school B, which achieved the best results with a relatively high proportion of the pupils in question).
- The results show that there is a very strong relationship between adolescents' eating habits and the characteristics of (co) pupils. Poor behavior and worsened benefits are also reflected in poorer eating habits.
- The results confirm that there is a strong relationship between adolescents' eating habits and the influence of the family environment. An unfavorable family environment and higher representation of families of foreign nationals and ethnic minorities lead to worsened eating habits. Conversely, good communication with parents, their involvement in school and extracurricular activities is reflected in schools with better results.

It has been shown that the school as an institution of conscious instillation of values and its school educational program, as well as a number of preventive events, lectures or discussions, do not play an important role in shaping eating habits (for example, school G, which has a healthy school education program promoting healthy lifestyles, healthy lifestyle hobby groups, and project health days, recorded some of the worst values).

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Dedication

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Overweight and Obesity among University Students

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Abstract: Obesity is a serious worldwide multi-factorial medical condition which is associated with a wide range of debilitating, chronic and life-threatening conditions affecting people of all age groups.

The aim of this study is to determine the prevalence of obesity among university students at Pavol Jozef Šafárik University in Košice. Moreover, we aim to explore the differences between male and female and the differences between two university faculties. Finally, we make a comparison of the results obtained with those from other studies and propose the recommendations in prevention of obesity.

The research sample consisted of 287 college students of medical and non-medical fields aged range 20–28 years. In our research we used the questionnaire method. Processing the data obtained, we used statistical program Microsoft Excel.

Males have higher average value body mass index than females. It has been confirmed that there is no statistical differences between group of students of Faculty of Law and group of students of Faculty of Medicine regarding four classes of body mass index. It has been confirmed that there is statistical difference between group of females and group of males regarding four classes of body mass index.

Obesity should become a major target for prevention since its consequences are clearly the development of cardiovascular diseases, type 2 diabetes mellitus, musculoskeletal disorders, gallbladder diseases, respiratory diseases, digestive disorders, certain types of cancer (breast, uterine, colon) and some other diseases. Research on dietary composition, physical activity and gut microflora plays an important role for future prevention and treatment of overweight and obesity.

Key words: overweight, obesity, students, prevention, recommendations

Overweight and obesity urgency have been addressed since the 1980s regardless of race, ethnicity, gender or age, however data from all countries indicates that obesity has become a worldwide epidemic nowadays. Obesity prevalence has climbed across the decades despite increasing knowledge about obesity's health risks and strategies for prevention. The researchers put emphasis to identify approaches for promoting healthy weight, however associated factors are difficult to declare and no single solution exists (Wyatt, Winters, & Dubbert, 2006; Williams et al., 2015; Hruby et al., 2016).

Overweight and obesity are defined as abnormal or excessive fat accumulation that may impair health. Overweight and obesity are classified with respect to specified weight categories calculated by formula for body mass index – person's weight in kilograms divided

by the square of his height in meters (kg/m^2). A healthy weight constitutes a body mass index between 18.5 and 24.9. A body mass index between 25 and 29.9 is considered overweight, and a body mass index of 30 or greater is considered obese. Investigators have identified also other variants associated with weight, including waist circumference, waist to hip circumference ratio, height, and macronutrient intake (Williams et al., 2015; Hruby et al., 2016; WHO, 2018).

In 2016, more than 1.9 billion adults aged 18 years and older were overweight. Of these over 650 million adults were obese. In 2016, 39% of adults aged 18 years and over (39% of men and 40% of women) were overweight. Overall, about 13% of the world's adult population (11% of men and 15% of women) was obese in 2016. The worldwide prevalence of obesity nearly tripled between 1975 and 2016. Most of the world's population lives in countries where overweight and obesity kills more people than underweight. The prevalence of overweight and obesity among children and adolescents aged 5–19 has risen dramatically from just 4% in 1975 to just over 18% in 2016. The rise has occurred similarly among both boys and girls: in 2016 18% of girls and 19% of boys were overweight (WHO, 2018).

In this paper, we present the basic review of prevalence, factors and consequences of a growing public health problem – overweight and obesity. We compare obesity of two groups of students at Pavol Jozef Šafárik University in Košice, Slovakia – students of Faculty of Law and students of Faculty of Medicine. Moreover, we compare obesity of group of females and group of males. Finally, we make a comparison the results obtained with those from other studies and propose the recommendations for prevention of obesity.

Factors Contributing to Obesity

On a basic level, weight gain results from a positive energy balance, i.e. consumption is in excess of expenditure. However, physiological systems are more efficient in protecting against weight loss than weight gain. Limiting calories promotes hunger and fatigue for many individuals resulting in more calories consumed and less physical activities. Focus should be oriented on reducing fat intake, in order to preserve health benefits in olive oils, nuts, avocado, fish and lean meats (Wyatt et al., 2006; Williams et al., 2015).

A comprehensive analysis shows that people who increased intakes of potato chips and potatoes, refined grains, processed and unprocessed red meats, sweets or desserts, sugar-sweetened beverages, butter or fried foods obtained greater weight gain over a 4-year period, on average. In contrary, people who increased intake of vegetables, fruits, whole grain, nuts, diet soda or yoghurt obtained less weight gain in the same period (Qi et al., 2014; Hruby et al., 2016).

Higher levels of physical activity are associated with prevention of weight gain and long-term weight maintenance after intentional weight loss. For example, jogging or running appear best for limiting weight gain, although brisk walking and bicycle riding are also inversely related to weight gain. In contrary, sedentariness plays an important role in weight gain. Television watching and other sedentary activities at home or work increased the risk of becoming obese. Regarding gene-lifestyle interaction, sugar-sweetened beverages intake interacts with the genetic risk of obesity. A genetic risk score interacts with fried food consumption, showing that frequent consumption of fried food magnified genetic risk. A genetic risk interacts also with television viewing, physical activity, and, most recently, vitamins B intake on obesity risk (Qi et al., 2014; Minárik et al., 2016; Hruby et al., 2016).

In the areas of physiology and genetics, the changes in hormone called leptin are assessed by brain. The leptin monitors the amount of fat in the body. Research activities are oriented also

at gut microbes. Hereditary factors play a role in weight and body size with an estimated 40 to 70% contribution. Obesity should be viewed in a comprehensive manner which includes the genetic and physiological factors interacted with internal drives and environmental conditions (Wyatt et al., 2006; Williams et al., 2015).

Contextual factors include geography, food preferences, physical and social environment, gender, age, and family composition. Characteristics of environment, such as walkability, presence of sidewalks, green space, urban sprawl or traffic density, also affect weight for children and adults. Cultural practices (family, friends, work, celebrations, social connection) can also lead to unhealthy eating practices. Increased chance of becoming obese has been confirmed if an individual had an obese friend. The effect on weight gain was strongest for same gender as opposed to opposite gender friends. The similar results were found for family relationships, mainly for siblings and spouses (Wyatt et al., 2006; Williams et al., 2015; Hruby et al., 2016).

The social changes of the last decade have affected the dietary but also the behavioral habits of children. There is an increasing prevalence of obesity, which has an impact on healthy adulthood. The motorized transport, leisure time in a passive manner is preferred in childhood, reducing the time spent on physical activity. These circumstances contribute significantly to reduced energy expenditure and thus to the creation and maintenance of overweight and obesity. In the puberty period, there is observed a decrease in physical activity, mostly in the group of girls (Buková et al., 2014; Uher et al., 2016; Buková et al., 2017; Hagovská et al., 2017; Uher et al., 2018).

Health and Psychosocial Consequences of Obesity

Obesity is a serious worldwide multi-factorial medical condition which is associated with a wide range of debilitating, chronic and life-threatening conditions affecting people of all age groups. Most of studies have focused on weight gain in relation to major non-communicable diseases like cardiovascular diseases, type 2 diabetes mellitus, and cancers. However, weight and weight gain have also been linked to a host of other diseases, including sleep apnea, liver and gall bladder disease, osteoarthritis, gallstones, infertility, asthma, cataract, psoriasis and other problems. Associations were found between obesity and poor quality of life, poor school performance, altered pre-pubertal hormones and various disorders in children. Newborns of overweight and obese mothers are at increased risk for overweight and obesity, fatty liver disease and sleep apnea. Spiral of obesity can be illustrated by following cycle: obesity → health consequences → health-limiting behaviors (decreased physical activity) → increasing obesity (Reilly et al., 2003; Wyatt et al., 2006; Minárik & Mináriková, 2012; Williams et al., 2015; Hruby et al., 2016; Minárik et al., 2016; Poráčová et al., 2017; Minárik, Belovičová, & Mináriková, 2018; Mináriková, Fazekaš, & Stanko, 2019).

Perceived weight discrimination can be associated with depression, body dissatisfaction, low self-esteem, and anxiety. Overweight and obese children are less likely to participate in physical activities. Obese patients were more likely to gain negative attitudes by healthcare providers leading to prejudice. Obese females have worse results regarding depressed mood and self-esteem than males (Reilly et al., 2003; Wyatt et al., 2006; Williams et al., 2015).

The recent epidemic of childhood obesity should be also taken into account because of the possible clinical and public health consequences. The evidence from various studies fell into two categories: co-morbidities of childhood obesity in childhood (cardiovascular and psychological risk factors) and consequences for the adult who was obese as a child or adolescent (cardiovascular risk factors, adult morbidity, premature mortality, socioeconomic

effects). Several studies present associations between paediatric obesity and asthma, low grade systemic inflammation, abnormalities of foot structure and a more than twofold risk of developing type 1 diabetes (Reilly et al., 2003; Wyatt et al., 2006; Williams et al., 2015).

Objectives

Our objective is to compare obesity of two groups of students at Pavol Jozef Šafárik University in Košice, Slovakia – students of Faculty of Law and students of Faculty of Medicine. Moreover, we aim to compare obesity of group of females and group of males. Finally, we make a comparison of the results obtained with those from other studies and propose the recommendations for prevention of obesity.

Methods

The research sample consisted of 287 university students of medical and non-medical fields with age ranged from 20 to 28 years. In our research we used the questionnaire method. Processing the data obtained, we used statistical program Microsoft Excel.

We compared obesity of two groups of students at Pavol Jozef Šafárik University in Košice, Slovakia:

- students of Faculty of Law (81 females and 64 males);
- students of Faculty of Medicine (102 females and 40 males).

In order to compare four classes of body mass index classification (categorical variable) between group of students of Faculty of Law and group of students of Faculty of Medicine, the means of a chi-square test were identified. Similarly, chi-square test was applied to compare four classes of body mass index classification (categorical variable) between group of females and group of males.

Results

A total of 287 university students were analyzed. Average values of body mass index for university students are shown in Table 1. The values of standard deviation are included.

Table 1

Average body mass index of university students

	Faculty of Law	Faculty of Medicine
Females	22.2 ± 3.4	21.4 ± 3.2
Males	24.2 ± 2.9	23.2 ± 3.1
Total	22.8 ± 3.4	22.0 ± 3.3

The presence of obesity of students at Pavol Jozef Šafárik University in Košice, Slovakia is shown in Table 2. In total, we found that 16.7% of students are underweight, 67.2% of students are normal weight, 12.5% of students are overweight and 3.5% of students are obese.

Table 2

Obesity classification of university students

	Faculty of Law			Faculty of Medicine		
	Females	Males	Total	Females	Males	Total
Underweight	22	3	25	19	4	23
Normal weight	54	42	96	71	26	97
Overweight	3	16	19	9	8	17
Obesity	2	3	5	3	2	5

The chi-square statistic for differences between group of students of Faculty of Law and group of students of Faculty of Medicine is 0.1683. The p-value is 0.982539. The result is not significant at $p < 0.05$. It has been confirmed that there is no statistical differences between group of students of Faculty of Law and group of students of Faculty of Medicine.

The chi-square statistic for differences between group of males of Faculty of Law and group of males of Faculty of Medicine is 1.3053. The p-value is 0.72788. The result is not significant at $p < 0.05$. It has been confirmed that there is no statistical differences between group of males of Faculty of Law and group of males of Faculty of Medicine.

The chi-square statistic for differences between group of females of Faculty of Law and group of females of Faculty of Medicine is 3.366. The p-value is 0.338562. The result is not significant at $p < 0.05$. It has been confirmed that there is no statistical differences between group of females of Faculty of Law and group of females of Faculty of Medicine.

The chi-square statistic for differences between group of females and group of males is 25.0715. The p-value is < 0.00002 . The result is significant at $p < 0.05$. It has been confirmed that there is statistical difference between group of females and group of males.

Proportion of underweight females is 22.4%, proportion of underweight males is 6.7%. Proportion of overweight females is 6.6%, proportion of overweight males is 23.1%.

Discussion

We supposed that students of the Faculty of Medicine acquire knowledge about the importance of healthy eating and overall diet during their studies. Thus, we expected that students of medical branches have better results in obesity than less educated students of technical fields. The results show that 13.1% of students are overweight and 3.4% of students are obese at Faculty of Law. The same results were found at Faculty of Medicine, 12.0% of students are overweight and 3.5% of students are obese at Faculty of Medicine.

In total, we found that 16.7% of students are underweight, 67.2% of students are normal weight, 12.5% of students are overweight and 3.5% of students are obese.

Hertelyova et al. (2016) studied lipid profile and anthropometric parameters of obesity in a sample of 419 students from Faculty of Medicine in Košice, including 137 men and 282 women. In their study, men had significantly higher body mass index than women. The average value of BMI was 24.41 ± 3.69 for males and 21.94 ± 3.75 for females. They argue that male students care less about a balanced diet, more men eating second helpings at meals. In our results, males had also higher average value body mass index than females.

A non-randomized cross-sectional study in high school students from the Prešov (Slovakia) region was conducted by Vadasova et al. (2016). The research sample consisted of 1014 participants (466 boys and 549 girls) aged from 14 to 21 years. 8.1% of students were overweight and 11.3% of students were obese. It means that they found higher proportion of obese students in comparison with our study. We can argue about various differences between group of high school students and group of university students.

Fatima, Doi & Mamun (2016) found from the systematic review that poor sleep quality seems to be associated with overweight and obesity, and some studies indicate this association to be independent of duration.

Higher education plays an important role in shaping a healthy lifestyle with regard to proper nutrition or sufficient physical activity. Students are exposed to various negative influences during university studies. Improper diet and inappropriate dietary composition leads to increased intake of risk nutritional factors and insufficient intake of necessary micronutrients. Adequate physical work also has a positive effect on the psyche of each person (Hrubá & Kachlík, 1997; Hrubá & Kachlík, 1998, Kachlík & Havelková, 2007; Kachlík, 2008; Kachlík & Klech, 2010; Račková, 2016; Račková, 2017; Kachlík, 2016; Belovičová, 2018; Belovičová & Vansač, 2019).

Physical activity can be defined as any bodily movement produced by skeletal muscles which results in energy consume, which may be unstructured. We can take into account an everyday life activity, an exercise that includes prearranged, deliberate and repetitive activity, grassroots and competitive sports and a regular physical activity of moderate intensity such as walking, cycling or sports that brings significant health benefits (Simioni et al., 2018).

Conclusions and recommendations

Research on dietary composition, gut microflora, pharmacologic interventions and surgical procedures plays an important role for future prevention and treatment of overweight and obesity. We should also put emphasis to the awareness of the roles of personal, family and health providers (Williams et al., 2015).

The healthy and sustainable dietary guidelines are presented by U. S. Department of Health and Human Services and U. S. Department of Agriculture (2015), Gonzalez Fischer and Garnett (2016). Although the specific foods or nutrients that are part of advice to the public may vary, recommendations are very similar over countries (Ridder et al., 2017). Public Health Authority of the Slovak Republic (2016) recommends ten rules of a healthy plate:

- 1) Eat regularly 5 times a day: breakfast, morning snack, lunch, afternoon snack and dinner.
- 2) Reduce intake of salt to less than 5 g of salt per day.
- 3) Avoid consuming a lot of foods or drinks with added sugar.

- 4) Consume at least 5 portions of fruit and vegetables each day.
- 5) Drink at least 2 liters of liquids per day, prefer water and drink with non-added sugar.
- 6) To increase your fiber intake you could: go for whole grains breads, pastries or wholemeal.
- 7) Replace saturated fats by virgin oils (e.g. sunflower seeds oil, olive oil).
- 8) Choose a variety of proteins, which include fish, lower-fat meat and poultry, eggs, beans and peas, natural seeds and unsalted mixed nuts.
- 9) Increase intake of skimmed milk, low fat yoghurt and reduced fat cheese.
- 10) Eat smaller food portions.

Diet, eating habits and physical activity are the most important factors to be a part of lifestyle (influenceable) risk factors. Physical exercise is considered to be one of the beneficial factors of a proper lifestyle and is nowadays seen as an indispensable element for good health, able to lower the risk of disorders of the cardiovascular, endocrine and osteomuscular apparatus, immune system diseases and the onset of potential neoplasms.

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Selected Factors of Fluid Intake Behavior among University Students in the Czech Republic

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Abstract: The amount of fluid which the human body needs each day depends on several factors, e.g. gender, age, physical activity and other living conditions. Excessive alcohol intake is considered to be a risk factor for high blood pressure and some types of cancer. There are numerous negative associations with excessive alcohol intake and many nutrition guidelines recommend removing alcohol from the diet completely.

The aim of this paper was to investigate the fluid intake behavior among university students regarding alcohol, beer, wine and coffee consumption.

The anonymous questionnaires with 26 open or semi-open questions were administered and collected individually in order to examine the fluid intake behavior of university students.

The research file consisted of 1506 participants. 68% of respondents experienced drinking alcohol, 14% of participants drink alcohol at least once a week. 63% of participants experienced caffeine intake. Out of these, 36% of respondents drink caffeine daily in the form of coffee. We put emphasis on monitoring and effective policy options to prevent disease from alcohol and caffeine use.

Key words: fluid intake, alcohol, caffeine, university students

The core principle of fluid balance is that the amount of water lost from the body must equal the amount of water taken in. Sufficient intake of fluids enables the transport of nutrients and is closely associated with nutrition. The average water output of an adult is approximately 2 to 2.5 liters per day, whereby 1 to 1.5 liters is urine, 0.6 liters is sweat, and 0.3 to 0.4 liters is processed in the body. The amount of fluid which the human body needs each day depends on several factors, e.g. gender, age, physical activity and other living conditions. The same importance is given to ensure continuous and regular fluid intake (Kunová, 2004; Kožíšek, 2005; Zifko & Kiefer, 2008; Astl, Astlová, & Marková, 2009; Hrmová, 2011).

The health effects of alcohol and caffeine intake have received considerable attention from scientific and public communities. Excessive alcohol drinking promotes mammary cancer in women and deleterious effects to testes in males. Alcohol is a pure liquid which is produced by carbohydrate fermentation. Different alcoholic drinks contain different amount of alcohol. Long-term consumption of a higher amount of alcohol can cause brain and liver damage. Alcohol dehydrates the body and contains a lot of energy. It feels pleasant to the central nerve system, raises appetite and also has hypnotic effects. The effect of alcohol depends on the consumed amount and other factors (Kunová, 2004; Machová, 2008; Astl et al., 2009).

Beer is made by the fermentation of young barley, water and processed or unprocessed hops. Malt is made of barley or wheat grain. The next component of its production is brewery yeast (MZeČR, 2013). Beer is usually bitter. The main disadvantage of drinking beer is high glycaemic index, which causes storing of fat in the abdomen area (Carr, 2004; Kunová, 2004;

Kunová & Poštulka, 2006). Wine consists of 80 to 85% water and ethyl alcohol produced by sugar fermentation (Kohout et al., 2010). In Czech Republic, legislation on drinking alcohol, spirits and other alcoholic beverages is implemented in Regulation No. 335/1997 Sb. on foodstuffs and tobacco products and amending and supplementing certain related laws, for soft drinks and concentrates for the preparation of non-alcoholic drinks, fruit wines, other wines and mead, beer, potable alcohol, spirits and other alcoholic beverages.

The most common source of caffeine is coffee. Pure caffeine is a solid substance with needle crystals, which are silky and glittering, usually joined together. It is naturally without any smell and of slightly bitter taste (Riedl & Vondráček, 1980). Caffeine has a strong central stimulating effect. That is why it is often placed between psychoanaleptics, which are a group of substances with energizing and stimulating effect (Lüllmann, Mohr, & Wehling, 2004; Pendell, 2005). Nowadays, the effects of caffeine are thoroughly described, however the results of the studies are often arguable. It is especially difficult to separate the pure effects of coffee from the factors of lifestyle, which can be associated to coffee consumption. Thus, it is essential to monitor the consumption of caffeine by university students.

Objectives

The objective of this paper was to investigate the fluid intake behavior among university students regarding alcohol, beer, wine and coffee consumption.

Methods

The anonymous questionnaires with 26 open or semi-open questions were administered and collected individually in order to examine the fluid intake behavior of university students. The data were obtained online in the spring of 2017. The response time was approximately 5 minutes. The questionnaire was the same for males and females and for all age categories of university students. The research sample consisted of 1506 participants (772 females and 734 males) from all types of universities around in Czech Republic.

Results

We have analyzed data obtained from 1506 respondents. Figure 1 illustrates the proportion of students who drink alcohol. We found that 68% of students experienced drinking alcohol.

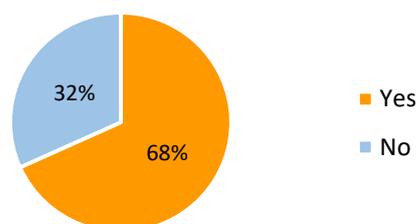


Figure 1. Do you drink alcohol? (n = 1506)

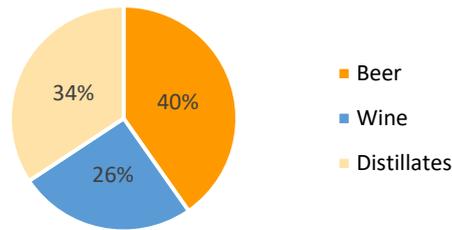


Figure 2. What kind of alcohol you prefer?

We have investigated the preferable type of alcohol. The results are shown in Figure 2. The most popular alcoholic drink among university students is beer (40%). The least popular alcoholic drink among university students is wine (26%).

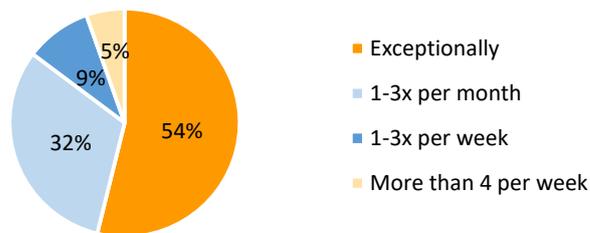


Figure 3. How often do you drink alcohol?

The frequency of alcohol drinking among university students is shown in Figure 3. 14% of respondents drink alcohol at least once a week. More than one half of students (54%) drink alcohol exceptionally. 32% of respondents consume alcohol 1 to 3 times per month.

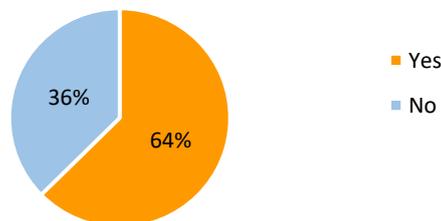


Figure 4. Do you drink coffee? (n = 1506)

Regarding coffee consumption, the results are shown in Figure 4, Figure 5 and Figure 6. We found that 64% of students drink coffee. If we take into account students who drink coffee, 36% of them drink coffee daily and 40% weekly. 9% of students drink three or more cups of coffee per day.

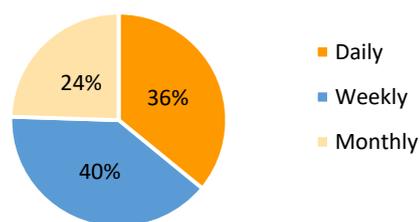


Figure 5. How often do you drink coffee?

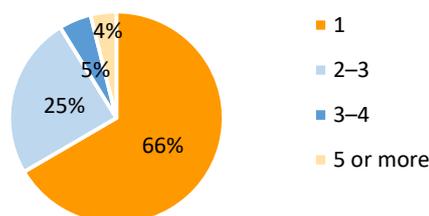


Figure 6. How many cups of coffee do you drink per day?

Discussion

We found that 68% of respondents experienced drinking alcohol. If we will take into account the age of respondents and the effects of alcohol, it is an alarming information. According to the Czech legislation, students of the first three years of high should not have a legitimate access to alcohol. After the consumption, body starts to absorb alcohol very quickly, first in the stomach and later in the small intestine. Alcohol quickly reaches body organs with good blood supply like brain, lungs, liver and (Kunová, 2004). In the small intestine, it negatively influences the body's ability to absorb many essential nutrients. 95% of alcohol in the body is used as an energy source, rest is excreted from the body. 20% of alcohol is absorbed in the body directly from the stomach (Stránský & Ryšavá, 2010). Metabolism of alcohol takes place in the liver. It first oxidises to acetaldehyde alters to acetate (Maughan & Burke, 2006). It is first catalysed by the liver enzymes. Liver degrades alcohol with enzymes alcohol dehydrogenase a aldehyde dehydrogenase. The by-product of alcohol degradation is acetaldehyde, which is toxic to central nervous system. The process also has a negative impact on the liver, where the basic functions can be disturbed, the production of glucose is slowed down, exploits glycogen in the liver. The process can lead up to hypoglycaemia (Machová, 2008).

The most popular alcoholic drink among university students was beer. The oldest evidence of beer is believed to be a 6,000-year-old Sumerian tablet in Mesopotamia depicting people consuming a drink through reed straws from a communal bowl. In Czech Republic, beer was first mentioned in 993 (Kukačka, 2010; Pikartová, 2016; Kudlová, 2016). Higher consumption negatively influences mainly central nervous system, liver and pancreas (Kohout et al., 2010). Serious diseases can occur, e.g. liver cirrhosis, or inflammation, inflammation of digestive system mucosa and also mental disorders (Machová, 2008). Beer contains also

B vitamins, protein, enzymes and minerals. However, many experts claim that the positive effect of beer on human body is arguable.

We found that 14% of respondents drink alcohol at least once a week. This can be considered as a regular consumption and probably a certain form of addiction. The students who drink alcohol several times a week are capable of developing the more serious addiction in the future. The major feature of the addiction syndrome are cravings (usually strong, sometimes overwhelming) to use psychoactive substances – alcohol or tobacco (Nešpor, 2005). 32% of respondents consume alcohol 1–3 times per month. Taking into account the age of students, this is a high proportion of consumers.

The main source of caffeine in the fluid intake is naturally coffee. We found that more than one half of the respondents drink coffee. From this point of view, coffee has become a certain form of a drug, when a significant part of the Czech population cannot imagine spending their mornings without their morning cup of coffee. Caffeine belongs between methyl xanthine. These are substances which stimulates all the central nervous system. It influences the activity of neurotransmitters and effects catecholamine neurons in both, peripheral and central nervous system (Fraňková & Dvořáková-Janů, 2003). The question arises if it is suitable to load the human body of this age with the intake of one alkaloid. The opinions about the effect of caffeine on human body are mostly positive. Caffeine removes fatigue, raises alertness and concentration. It increases body and mind efficiency. The excitation effect of caffeine lasts about 15–45 minutes. After 6 hours, half of the caffeine is excreted from the body (Fraňková & Dvořáková-Janů, 2003). However, we can also find negative impact of caffeine on human body. Higher amount of caffeine (over 500 mg/day) increases the risk of cardiovascular diseases, disfunction of central nervous system, digestive system and metabolism (Kohout et al., 2010). Caffeine negatively influences the brain, where it decreases the level of zinc, which is essential to maintain the structure and function of the cell membrane. Caffeine can also influence the foetus, therefore drinking coffee is not recommended to pregnant women (Fraňková & Dvořáková-Janů, 2003). Páleníková (2016) states that is possible to drink coffee during pregnancy and it is recommended to drink 2 to 3 cups a day.

We found that 36% of university students drink coffee every day. We can consider this proportion to be high. Regular drinking of coffee and therefore the caffeine intake in the age when the body is not fully developed might not have positive effects. Coffee popularity in the Czech Republic can be derived from the number of sales, which is 19,500 tons of coffee per year, worth CZK 6.5 billion. Average adult drinks 3–4 cups of coffee per day (Rakovan, 2019). In comparison with adults, only 5% of respondents reaches the average of the adult population, which means 3–4 cups of coffee per day. 4% drink more than 4 cups a day. This is an interesting finding, since 5 cups of coffee per day and more is also above the recommended average dose. High level of caffeine can cause insomnia, higher sensitivity to stress, anxiety and depressions of the child (Pendell, 2005). In general, along with long a term use, caffeine can lead to higher stress sensitivity, anxiety and depression. This is caused by a higher production of cortisol after caffeine consumption. Cortisol is stored in hippocampus and other important brain centres. It results in chonical deregulation of the stress system, depression and short-term memory damage (Magazínzdraví.cz, 2013).

Conclusions

A high alcohol and coffee intake among university students may grow on social and health issues in the future. The negative effects of the alcohol and caffeine intake depend on the amount and its frequency. Younger people are less resistant against developing addiction. We should put emphasis to the awareness of the roles of personal, family and health providers. We also put emphasis on monitoring and effective policy options to prevent disease from alcohol and caffeine use.

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Posture and Functional Condition of Muscles in Child after Commencement of School Attendance (case study)

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Abstract: The objective of the paper was to develop a case study focusing on posture and functional condition of muscles in a child after commencement of school attendance (after 6 years of age).

The results were obtained by means of posture tests and functional muscle condition tests.

The testing was performed every six months for a period of three years. The researchers also focused on the school environment and the child's leisure activities. These data were obtained by means of a questionnaire survey and observation. According to the results of the research, the child with a regular physical activity regimen after school enrolment did not show significant changes in posture or functional condition of selected muscles. This corresponds with children's usual somatic development.

Keywords: posture, muscle imbalance, posture test, test of functional condition of selected muscle groups, younger school age

When children enter school, the decrease in physical activity causes a deterioration of posture and leads to muscle imbalances... Statements like these appear in publications focused on posture, health-oriented fitness, health promoting physical education, physical education, and other publications of a similar focus. The authors (e.g. Hálková et al., 2005; Vilímová, 2009; etc.) do not usually attempt to analyse the statement and consider it a bare fact. It is a fact that changing the physical activity regimen as a result of school enrolment is the only and the most important factor that so significantly affects the development of children's posture after they start compulsory education.

Background

The basic concepts used in the paper are posture, correct posture, poor posture, and muscle imbalances.

The upright posture is unique to humankind, and depends on the shape of the body axis, muscle condition, genetic factors, and internal and external environmental factors. This is an individually programmed pattern of nervous regulation of the upright posture, the expression of which is a distinctive posture (Demetrovič, 1988; Čermák et al., 2005; Kopřivová & Kopřiva, 1997).

The definitions of correct posture and poor posture are inconsistent and are based on various perspectives (e.g. Frejka, Kendall, Lomíček and Jaroš, etc. in Kolář, 2009). Correct posture is defined as a body posture in which all segments are in an optimum position to maintain balance with minimum engagement of antigravity muscles (Bursová & Rubáš, 2001), as active holding of body segments against the effect of external forces controlled by the central

nervous system (Zumr, 2019), as a physical activity habit which is economical, aesthetic, and convenient for optimum muscle work and the activity of other body systems (Srdečný, 1972). Due to the uniqueness of every person there is no absolute standard of correct posture. The literature usually refers to the so-called optimum posture, which defines the position of individual body parts and which everybody should try to approach as closely as possible (Berdychová, 1972; Hálková et al., 2005; Dostálová, 2013; Janošková, Šeráková, & Mužík, 2019; etc.) On the other hand, poor posture is understood as a deviation from correct posture stemming from CNS or periphery (Hnízdilová, 2006; Hálková et al., 2005), bad habit (Berdychová, 1972), postural function disorder, or impaired postural stereotype (Kopřivová & Kopřiva, 1997).

Muscle imbalances (muscle balance disorders) are disorders of the locomotor system, deviations from normal muscle functions, or imbalances of muscles acting against each other. Their manifestations include pain, poor posture, muscle harmony disorder, etc. (Hnízdilová, 2006; Hálková et al., 2005; Čermák et al., 2005).

There are much fewer scientific articles on posture and muscle imbalances in younger school-aged children compared with the target group of older school-aged children. Zachrla (2001) performed a case study aimed at repeated testing of muscle imbalances in children in grade two divided in two groups; one group was subject to targeted compensation exercise, while the other (control) group did not undergo any intervention. A comparison of both groups revealed a significant deterioration of muscle imbalances in the control group as opposed to the intervention group. Posture was also analysed by Vrbas (2010), who tested a total of 590 younger school-aged children and observed perfect posture in 1%, good posture in 48%, poor posture in 52%, and very bad posture in 1% of children. Šeráková (2009) performed a test of 377 children and observed poor posture in 49% of children in grade one, 75% of children in grade three, and 38% of children in grade five. Polish experts (Wojna et al., 2010) concluded that among six-year-old children, posture disorders occurred more frequently in the sagittal plane, while in seven-year-old children more in the frontal plane. Kratěnová et al. (2005) reported poor posture in 10% of preschool children and 30% of younger school-aged children. In Health Study 2016 (Puklová, 2017), the National Institute of Public Health states that the proportion of poor posture increases from 27% in five-year-old children to 54% in thirteen-year-old children. No studies have been identified that would analyse specific individuals of these age categories.

Objective of the paper

The objective is to develop a case study addressing posture and functional condition of selected muscle groups in a child after school enrolment (in the course of three years).

In accordance with the objective of the research study, the following research questions were formulated:

- 1) Does the overall posture of the child change after school enrolment?
- 2) Does the posture of different body parts of the child change after school enrolment?
- 3) Are the changes the child's posture positive or negative?
- 4) What is the functional condition of selected muscles and muscle groups of the child at the beginning, during and at the end of testing?
- 5) Is the child involved in extracurricular physical activity and for how long?
- 6) Do selected school factors (weight of the school bag and amount of physical activity) affect the posture of the child?

Methods

The examination of the child's locomotor system (posture and functional condition of muscle groups and muscle imbalances) was performed in the paediatrician's office and was supervised by a paediatrician, physiotherapist, and instructor of health promoting physical education. The child was examined in underwear. The testing was performed every six months for a period of 3 years. The first test took place when the child was six years old and was in the last month of kindergarten. The second and subsequent tests were carried out after the child entered school. Posture tests were adopted from the Guidelines for children's locomotor examination in general practice (SZÚ, 2003); muscle functional tests were adopted from a publication by Janda (2004) and their modified versions from a publication by Kopřivová and Kopřiva (1997).

In the school environment, the researchers performed direct observation, recorded data into prepared record sheets, and weighed school bags using a digital scales with an accuracy of one tenth of a kilogram. The survey was performed for a period of 14 days in the school that the child attended.

The child's parents completed questionnaires on the day of each testing in the paediatrician's office. The questionnaire survey analysed extracurricular physical activity of the child, health status, and spending leisure time during a specific period.

Participant description

The information was obtained by means of questionnaires for parents, interviews with parents, and observation during the research. A brief summary of the information is provided below.

The participant monitored throughout the period of three years was a girl (age 6 to 9 years) of normal to greater stature (child's somatic growth is in Table 1, Figure 1, Figure 2 and Figure 3). At around 5 years of age the girl had slight shoulder asymmetry, which spontaneously improved after 3 months. Since 6 years of age the girl has worn glasses due to astigmatism. According to her parents the girl is optimistic, cheerful, perfectionist, and very cautious in case of uncertainty. She is almost never ill (sometimes she has a viral infection or tonsillitis). She is physically active, prefers swimming (45 to 135 minutes per week), versatility exercise (60 minutes per week), riding a scooter and a bicycle, and skiing. She likes painting and plays the fipple flute. She spends 1 to 2 hours per day sitting or lying (school preparation, television, painting, board games, and construction kits).

Table 1

Child's somatic growth

Testing	1	2	3	4	5	6
Age	6 years and 0 months	6 years and 7 months	7 years and 0 months	7 years and 7 months	8 years and 0 months	9 years and 0 months
Height in cm	122	125	126.5	130	133	133
Weight in kg	23.3	22.4	23.6	24.4	26.8	26.8
BMI	15.63	14.36	14.75	14.44	15.14	15.14

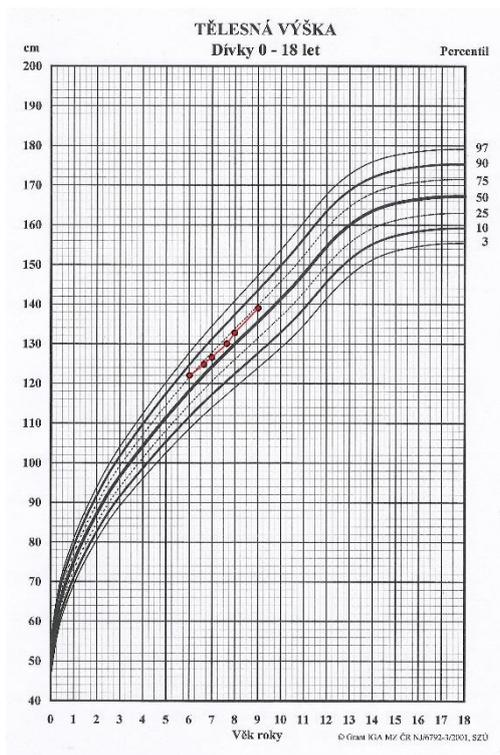


Figure 1. Height of the tested child (graph adapted from SZÚ, 2001).

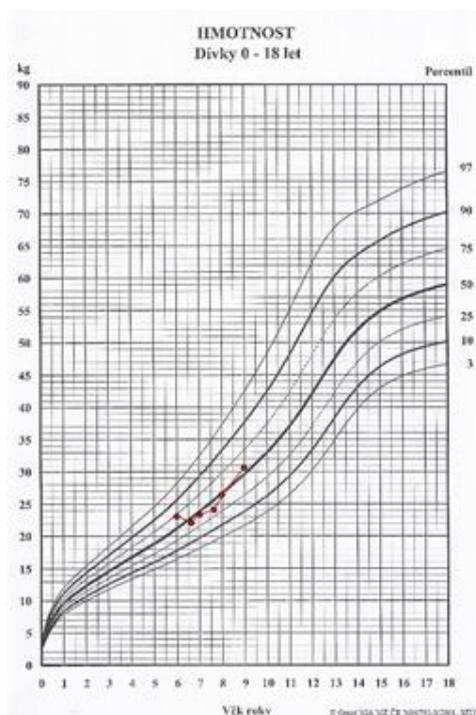


Figure 2. Weight of the tested child (graph adapted from SZÚ, 2001).

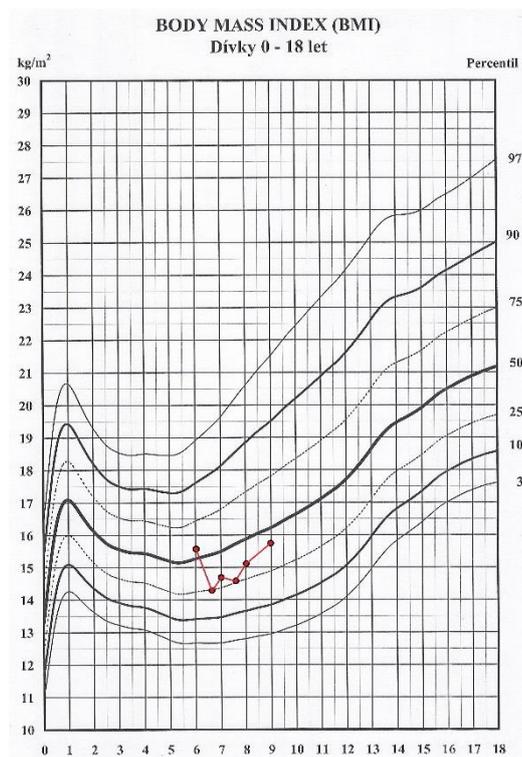


Figure 3. BMI of the tested child (graph adapted from SZÚ, 2001).

Results and discussion

Visual examination of posture at rest (front, side, back)

The examination of posture at rest was performed in accordance with the Guidelines for children's locomotor examination in general practice (SZÚ, 2003) based on the posture tests by Jaroš and Lomíček. The child was tested in the paediatrician's office in underwear. The position of individual body segments was assessed by grades (points) 1 to 4, where 1 was considered the best and 4 was considered the worst compared with an optimum posture and regarding the age of the child.

The child was examined by a team consisting of a paediatrician, physiotherapist and instructor of health promoting physical education. The results were noted down in prepared record sheets.

Table 2 and the graph in Figure 4 suggest that the child achieved outstanding (1) and good (2) results in most of the monitored segments. Poor results (3) were observed only in the abdominal region from back perspective. Throughout the period of testing, there were deviations by one point, which is not considered a significant deterioration or improvement. The part with the worst assessment was the overall back perspective. This assessment was significantly affected by poor posture and shoulder blade position. The parts with the best assessment were the head and abdomen. In the abdominal region, an improvement by 2 points was observed between the 1st and 3rd to 6th test. In terms of the overall point score in the 5th and 6th test an improvement was observed (assessed as good posture, 6–10 points) as opposed to the 1st and 2nd test (assessed in the lower band of good posture and as poor posture, 11–15 points). It is therefore impossible to conclude that the child's posture deteriorated after school enrolment.

Table 2

Child's posture during the period of three years – visual examination at rest

	Testing 1 June 2016	Testing 2 January 2017	Testing 3 June 2017	Testing 4 January 2018	Testing 5 June 2018	Testing 6 June 2019
Head	2	2	1	1	1	2
Chest	2	2	2	2	1	1
Abdomen	3	2	1	1	1	1
Spinal curvature	1	2	2	2	2	1
Back perspective	2	3	2	3	2	2
Lower extremities	2	2	1	2	2	2
Points total	10/2	11/2	8/1	9/2	7/2	7/2

Legend: Points total = sum of points for head, chest, spinal curvature, abdomen, back perspective/points for lower extremities.

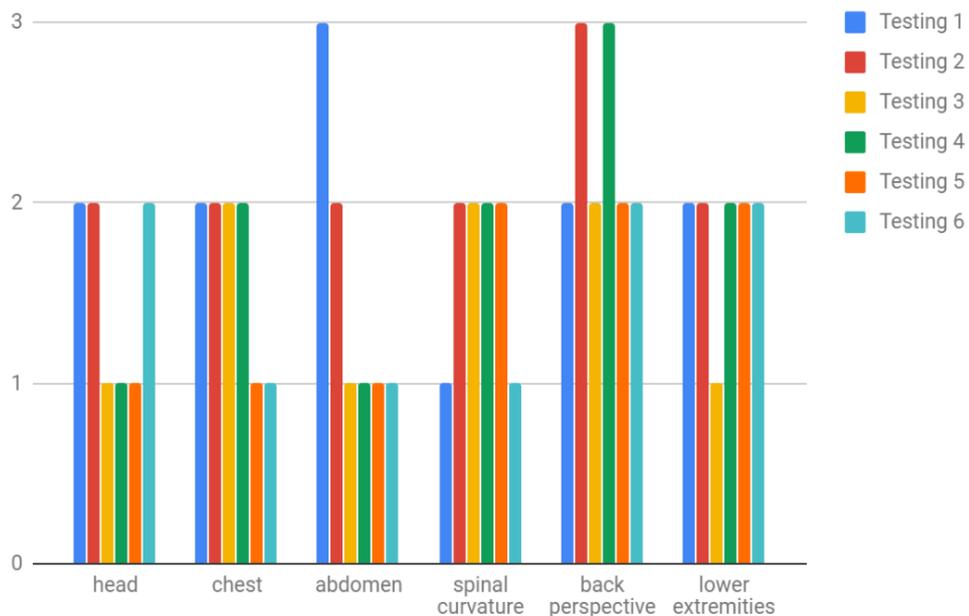


Figure 4. Graph of the child's posture during the period of three years – visual examination at rest.

Visual examination of posture under movement

The examination of posture under movement was performed by means of the forward bend test in accordance with the Guidelines for children's locomotor examination in general practice (SZÚ, 2003). The child was tested in the paediatrician's office in underwear.

As shown in Table 3, visual examination of the child under movement suggested stable results. The slight deviations are probably associated with the child's growth. The child was not recommended orthopaedic examination.

Table 3

Child's posture during the period of three years – visual examination under movement

	Testing 1	Testing 2	Testing 3	Testing 4	Testing 5	Testing 6
Symmetry of paravertebral prominences and chest	slightly asymmetrical	symmetrical	symmetrical	symmetrical	symmetrical	symmetrical
Asymmetrical in the region of chest (close to the left shoulder blade)	-	-	-	-	-	-
Higher side	left	-	-	-	-	-
Spinal curvature smoothness	smooth	Smooth	smooth	slightly flattened	slightly flattened	smooth
Flattened areas	-	-	-	lumbar region	chest	-

Functional condition of the child's selected muscles and muscle groups

The examination of the functional condition of selected muscles and muscle groups was performed by means of tests according to Janda (2004) and their modifications by Kopřivová and Kopřiva (1997). The child was tested in the paediatrician's office in underwear; the results were noted down in prepared record sheets. The examination was attended by a physiotherapist and instructor of health promoting physical education.

Table 4 shows the results of the examination. P in the test means pass, F means fail. During the testing period the nuchal muscles, abdominal muscles, gluteal muscles and iliopsoas appeared functional, while the rhomboid muscles appeared to be weakened throughout the whole period of testing. A significant change was observed in the rectus femoris muscles in both lower extremities, which were shortened after the initial satisfactory examination.

Table 4

Functional condition of the child's selected muscle groups throughout the period of three years

	Right/left; upper/lower extremity	Testing 1	Testing 2	Testing 3	Testing 4	Testing 5	Testing 6
Nuchal muscles	X	P	P	P	P	P	P
Spinal erectors	X	P	P	P	F	P	P
Pectoral muscles	R UE	F	P	F	F	P	P
	L UE	F	P	F	F	P	P
Rhomboid muscles	X	F	F	F	F	F	F
Abdomina l muscles	X	P	P	P	P	P	P
Gluteal muscles	R LE	P	P	P	P	P	P
	L LE	P	P	P	P	P	P
Posterior thigh	R LE	P	F	P	F	P	F
	L LE	P	F	P	F	P	F
Hip flexors – iliopsoas	R LE	P	P	P	P	P	P
	L LE	P	P	P	P	P	P
Hip flexors – rectus femoris muscle	R LE	P	P	P	F	F	F
	L LE	P	P	F	F	F	F

Legend: P = pass, F = fail.

School environment

The child was observed for a period of 14 days in the usual school regimen. The researchers monitored the weight of the school bag, amount of physical activity during lessons, and the sitting position. The school has a standard physical activity regimen including physical recreation breaks (especially during the “main” break).

The child is of a moderate temperament, is 7 years old, and attends the first grade. The child’s desk is in the third row at the window. Wears glasses. The child is friendly, spends breaks at the desk or on the carpet, likes painting or playing board games with peers. Likes to help with setting up notice boards and cleaning the blackboard (regarding the child’s height a chair is needed). During the main breaks the child walks about 70 m to the school canteen for a snack. As a results, the child does not usually have time to use breaks for physical recreation (gym, games in the corridor). Has no problems with the learning content, is clever, sometimes is perfectionist when working on assignments.

The results appear to be positive. The average weight of the child’s school bag was 2.92 kg, which matches the recommended weight of 10–15 % of the child’s weight (Filipová, 2011). The girl walks to school, the distance from home is about 800 m with an elevation difference of 50 m. During lessons (exclusive of physical education and breaks) the girl was in active movement for an average of 19 minutes and 20 seconds. The teacher included a number of physical activity games and other activities. These activities were often performed on the carpet or in free space in the classroom. Compared with the results of Šeráková and Janošková (2017a, 2017b) and other authors, the time devoted to physical activity is above standard. In the sitting position the child’s head was mostly in line with the spine, the shoulders were stooped, the child did not lean against the backrest, used the whole area of the seat, the chest-thigh angle was approximately 90°, the thigh-shin angle was 90° or less, the feet were under the seat with toes resting against the floor. Although in some aspects the sitting position does not match the proper sitting position defined in the literature (e.g. Sedláková, 2010; Botlíková & Kortánek, 2009; Filipová & Faierajzlová, 2010; etc.) it can be considered acceptable.

Conclusions

The researchers found the following answers to the research questions:

RQ1: Does the overall posture of the child change after school enrolment?

The results of the case study do not clearly suggest that the overall posture would significantly change. In the examination of the position of individual body parts, the results were similar throughout the whole testing period. Posture deviations might be influenced by growth.

RQ2: Are the changes in the child’s posture positive or negative?

The results of the case study, in which the child was monitored for a period of three years (from 6 to 9 years), suggested a slight posture improvement between the 1st and 2nd testing (kindergarten, end of the 1st term in grade one) and the 5th and 6th testing (end of grade two and three).

RQ3: What is the functional condition of selected muscles and muscle groups of the child at the beginning, during and at the end of testing?

The results suggest that the muscles that showed to be functional included the nuchal muscles, abdominal muscles, gluteal muscles and iliopsoas, while the rhomboid muscles appeared to be weakened.

VO4: Is the child involved in extracurricular physical activity and for how long?

Outside lessons the child is physically active and is involved in regular and irregular physical activity. The child prefers swimming (45 to 135 minutes per week), versatility exercise (60 minutes per week), riding a scooter and a bicycle, and skiing. The parents encourage the child to acquire versatile physical activity skills.

VO5: Do school factors (weight of the school bag and amount of physical activity) affect the posture of the child?

According to the results the amount of physical activity in lessons and the weight of the school bag did not have a negative effect of the child's posture. The class that the child attends has a standard to above-standard physical regimen (the teacher often uses physical activity learning), children can use breaks for physical recreation, etc. The child walks to school, the weight of the school bag corresponds with the recommended values.

Based on the results, it is impossible to clearly define which of the factors has the greatest effect on posture and muscle imbalances in children after school enrolment. Kolář & Máček (2015) state that child development is not steady and that typical "physiological" deviations include for example uneven growth of the lower extremities, significant lumbar lordosis, knee valgus, etc., which was also confirmed by the present study.

The results suggest that if children's regular physical activity regimen is not compromised after commencement of school attendance, the tendency to poor posture and deterioration of the functional muscle condition will be negligible. If children refrain from a sedentary lifestyle, the deterioration as described by research studies mentioned above need not take place.

During examination of children's posture it is recommended to take into account any growth deviations with respect to children's age. What are the factors that influence posture? Is it psychomotor development, growth, nervous system, genetic or other factors? The present case study did not confirm a negative effect of a change in the physical activity regimen after commencement of school attendance on the child's posture and functional condition.

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Myths in Milk and Dairy Products

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Abstract: A myth is considered to be a false irrational self-delusion based on the subjective feelings of the individual or the mechanical acceptance of unsubstantiated information. The myths described relate to the effect of milk on the human body, milk as a food product, yogurt and cheese.

The main objective of the research was to answer the following question: Do the respondents understand the selected statements about nutrition as true or not?

The research method was a questionnaire of its own design. Among the statements that respondents believe to be true include: yoghurt with a shelf life of one month must contain preservatives; durable milk contains preservatives, so-called “E”; milk cartons contain numbers to indicate how many times the milk has been pasteurized and put on sale again; milk fills up with mucus; not all yogurts contain living cultures; because of the dyeing, beetles are poured into the yoghurt; milk from a shop is thinned by water; fresh milk is healthier than durable, durable milk does not contain any vitamins and minerals; there are no cheeses without “E”; processed cheeses are cheap and therefore have to be of lower quality; milk is not suitable for people. Human is the only mammal drinking milk of some other mammal.

The results of the questionnaire survey are in line with people’s long-term views on milk and dairy products.

Key words: food and nutrition myths, milk, dairy products

Myths are a common part of particular cultures and are accepted in various forms by social groups. Myths affect their behaviour and the decisions of people in society. P. Hartl and H. Hartlová (2000, p. 337) state: “A myth is a term for a mythical interpretation of natural and social phenomena, their cause and origin, associated often with supernatural beings.” We can state that a myth is a false irrational judgement based self-delusion created on subjective feelings of an individual or by a mechanical accepting of baseless information. Nowadays myths are spread among public and in many cases by means of media. According to our opinion there are several reasons why myths come into existence:

- Because of satisfying the need of safety people create their own ideas and opinions about what they eat and what food they buy. These opinions are very often in harmony with their eating habits; in some cases they give rational reasons why to eat particular food. For example: beer is an ion drink, ect.
- The problem of nutrition and food is very complicated. Even if there are many accessible information, for example on the wrapping, internet, technical publication, ect. in many cases, people misinterpret them.
- The information about food is spread by other groups with different hobbies and opinions. It could be supporters of alternative nutrition (for example: nutrition according to blood groups) or the producers and traders of particular food (for example: jelly sweets contain calcium and vitamin C.). (Svoboda, 2018, p. 126–132).

Milk and dairy products can be characterized as follows. Milk, according to Regulation 1234/2007/EC, means the product obtained by milking one or more cows. Dairy products are obtained by processing raw milk. A sour-milk product shall mean a milk item obtained by sour milk, cream, buttermilk or mixtures thereof using micro-organisms, as referred to in Decree 77/2003. The basic and most produced sour milk product is yogurt. The cheese is defined by legislation as a dairy product produced by the precipitation of milk protein from the dairy by the action of rennet or other appropriate reagents, the procurement and separation of the whey fraction. (Čurda & Štetina, 2014, p. 118–135).

Milk and milk products belong to food groups about which many myths spread. It draws attention to this fact J. Kopáček (2010, p. 14–15). This author mentions the following myths:

- Milk fills up with mucus.
- Milk is not suitable for people. Human is the only mammal drinking milk of some other mammal.
- Milk from a shop is thinned by water.
- Milk “directly from a cow” is healthier.
- Present-day yoghurt is not real yoghurt.
- Processed cheese contains cheap margarine (Kopáček, 2010, p. 14–15).

In accordance with J. Kopáček and the Czech-Moravian Dairy Association, we have formulated the following myths about milk and dairy products for the purposes of the research. Some myths were formulated on the basis of statements made by respondents who participated in the pre-research. The choice of myths for research needs is given in Table 1.

Table 1

Selected statements for the needs of the research survey

Number	Myth in milk and dairy products
1.	Milk is not suitable for people. Human is the only mammal drinking milk of some other mammal.
2.	Milk fills up with mucus.
3.	Durable milk contains preservatives, so-called “E”.
4.	Fresh milk is healthier than durable. Durable milk does not contain any vitamins and minerals.
5.	Milk contains hormones and antibiotics.
6.	Milk from a shop is thinned by water.
7.	Milk cartons contain numbers to indicate how many times the milk has been pasteurized and put on sale again.
8.	Not all yogurts contain living cultures.
9.	Yoghurt with a shelf life of one month must contain preservatives.

10. Creamy yogurt contains more calcium.
 11. Yogurt is not a healthy food.
 12. Only yogurts matured in the crucible are real yogurts.
 13. Because of the dyeing, beetles are poured into the yoghurt.
 14. There are no cheeses without “E”.
 15. Processed cheeses are cheap and therefore have to be of lower quality.
 16. Processed cheeses are a repository of leftovers and defective cheeses.
-

Objectives

A research problem was formed for the purpose of the research. It is possible to define it as a formulation that expresses the relationship between two or more phenomena (variables), which are in the focus of the research (Gavora 2000, p. 24). The research problem is:

Do the respondents understand the selected statements about milk and dairy products as true or not?

The aim of the research is to get an answer to the above-mentioned research question.

Methods

The research problem is verified through a questionnaire that contains the range of responses below. Respondents from the response range choose one offered option at their own discretion. The questionnaire was created for the needs of this research. The response options are presented in Table 2.

Table 2

A range of responses from questionnaire research

Totally agree	Rather agree	Rather disagree	Totally disagree
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The respondents of the questionnaire are people in the age between 25 and 60. This range was chosen on the grounds of a conclusion that this age group acquires information about nutrition from ordinary media (television, radio, internet, ect.) and take an active interest in the issues.

The administration was made on the grounds of willingness of the respondents to take part in the questionnaire. It was done in the form of a survey, i.e. direct questioning in the principle of a personal interview. The respondents are from the Pilsner region. The data were collected in the period February–June 2019. Table 3 shows the numbers and composition of respondents by gender.

Table 3

Description of research file

Total number of respondents	308
Men	85
Women	223

Results

The research results are presented through the relative frequency. The results are summarized in Table 4.

Table 4

Relative frequency of the results from the questionnaire

Myth number	Relative frequency			
	Choice of answer			
	Totally agree (%)	Rather agree (%)	Rather disagree (%)	Totally disagree (%)
1.	31	21	12	36
2.	35	23	10	32
3.	13	50	24	13
4.	13	41	24	22
5.	7	34	37	22
6.	12	42	16	30
7.	32	27	19	22
8.	35	23	10	32
9.	56	21	13	10
10.	12	27	38	23
11.	0	7	24	69
12.	9	12	38	41

13.	35	23	10	32
14.	23	30	32	15
15.	23	30	32	15
16.	28	19	16	37

Conclusions

It is clear from the questionnaire that the respondents think that some of the suggested statements about food and nutrition are true. To the statements that the respondents think are true (the sum of the response options “totally agree” and “rather agree” exceeds 50%) belong:

- Yoghurt with a shelf life of one month must contain preservatives.
- Durable milk contains preservatives, so-called “E”.
- Milk cartons contain numbers to indicate how many times the milk has been pasteurized and put on sale again.
- Milk fills up with mucus.
- Not all yogurts contain living cultures.
- Because of the dyeing, beetles are poured into the yoghurt.
- Milk from a shop is thinned by water.
- Fresh milk is healthier than durable. Durable milk does not contain any vitamins and minerals.
- There are no cheeses without “E”.
- Processed cheeses are cheap and therefore have to be of lower quality.
- Milk is not suitable for people. Human is the only mammal drinking milk of some other mammal.

To the statements that the respondents think are not true (the sum of the response options “rather disagree” and “totally disagree” exceeds 50%) belong:

- Yogurt is not a healthy food.
- Only yogurts matured in the crucible are real yogurts.
- Creamy yogurt contains more calcium.
- Milk contains hormones and antibiotics.
- Processed cheeses are a repository of leftovers and defective cheeses.

It is important to mention that the results of the questionnaire can be influenced by factors that negatively affect the validity and reliability of the research. These factors can be: various knowledge of the respondents about food and nutrition, various motivation of the respondents to the filling out of the questionnaire, the way of administration of the questionnaire (questionnaire of own construction and the personality of the administrator), etc.

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B Health education issues

Recency of the Education in the Field of the Health Protection and Promotion in the Czech Republic Hundred Years Ago and Today

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Abstract: Importance of the physical activity as an integral component of healthy lifestyle was widely recognized by educators, doctors and others.

The aim of this article is to compare the recommendations formulated by leading scientific capacities almost a hundred years ago with the current situation.

Health educational publication *Sanitary Reader* was published in 1921 for the general public. In that book a number of leading experts made recommendations on how to prevent illnesses and how to adapt lifestyles to improve health. Current statistical data show that still valid arguments and recommendations of those experts are far from being respected by population.

Despite considerably more compelling arguments gathered, the public's response to healthy lifestyle recommendations remain unheard of by the general public. The high prevalence of non-communicable diseases in the Czech population is directly related to wrong eating habits, drug abuse, harmful habits and especially insufficient physical activity.

Key words: lifestyle, textbook for public, risk factors, non-communicable diseases, physical activity

Importance of the physical activity as an integral component of healthy lifestyle was widely recognized by Jan Amos Comenius (1592–1670) already. He recommended adequate lifestyle including simple healthy food, physical activities, and sufficient rest. In his book *Orbis pictus* number of chapters illustrates selected physical activities such as swimming, fencing, ball games, running and/or children games (Komenský, 2017).

Health importance of physical activity emphasized in 19th century several other personalities, such as Jan Evangelista Purkyně (1787–1869), Vincenc Priesnitz (1799–1850), Karel Amerling (1807–1884), and also Sokol founder Miroslav Tyrš (1832–1884) of course.

Let's introduce some few basic ideas by two of above-mentioned personalities.

Prof. MUDr. Jan Evangelista Purkyně (1787–1869) constructed kinesioskop, which enabled to display the movement and to analyse unfolded phases of action. He warned before the consequences of insufficient physical activity:

People, who are engaged in easy professions, sitting or standing without strenuous movements, get used to short and shallow breathing. This could lead to respiratory and circulatory diseases. Hence, they are advised to take care of deep breathing during their professional activities and from time to time to refresh their thoracic activity by physical movements. (Masák, 1937, p. 256–259)

Founder of Sokol organization Miroslav Tyrš was admirer of ancient Greek kalokagathia and it's principles of both physical and psychical human development. He wrote: “[...] ideas of Sokol movement turn to all stands and social groups to educate and improve all Czechoslovak nation, to develop it's power, bravery, nobility and fitness, and thus must endeavor to include all people into it's members” (Tyrš, 1928).

Objective

The aim of this thesis is to point out the recommendations formulated by leading scientific capacities almost a hundred years ago. The opinions of the experts at that time were comprehensibly formulated in the health education publication *Sanitary Reader*, from which selected passages will be cited.

Sanitary Reader

In 1921, almost a hundred years ago, *Czech Folk Publisher – Josef Springer* (Honl, Thomayer, & Weigner, 1921) published health educational publication *Sanitary Reader* (Zdravotnická čítanka) (Figure 1), designed primarily for schoolchildren and students, but also for the general public. The publication was redacted by well-known experts – professors of Charles University in Prague prof. MUDr. J. Honl (1866–1936 – bacteriology), prof. MUDr. J. Thomayer (1853–1927 – internal medicine) and prof. MUDr. K. Weigner (1853–1927 – anatomy). The book consisted of eighteen chapters, several of them having close relation to lifestyle problems and to harmful life habits. Furthermore, selected passages from this publication related to lifestyle will be quoted. All authors were professors of Charles University in Prague.

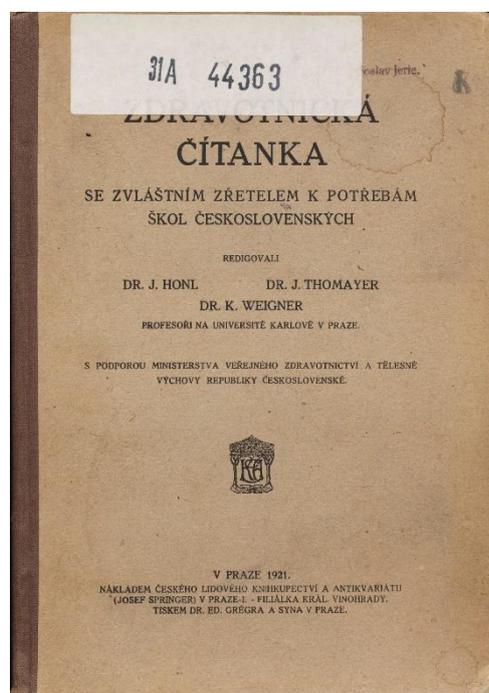


Figure 1. Sanitary Reader (Zdravotnická čítanka).

Josef Thomayer

Introductory word about usefulness to educate wide public in the field of medical sciences:

Health educational instruction about nutrition and education of little children, about physical activity of adolescent youth, about sport, about protection from diseases, about importance of body cleanness, about hygienic discords, and many others certainly can be to thinking leader very beneficial. The reader was assembled and written from this point of view and it can be desired to meet fully this mission in Czech public. (Thomayer, 1921a, p. 3–5)

Karel Weigner

Physical education and it's nationwide importance:

We must educate the whole man, indivisible to body and soul. The summary of all mental perfections is not possible in the body properly undeveloped and unhealthy. Any organ will fully develop if it is fully employed. If heart under any circumstances could supply sufficient oxygen and nutrients to working muscles, it must be to higher performance trained, same as respiratory system. Physical load works favourably on the heart muscle same like skeletal muscles grow and strengthen thanks to physical exercises. In contrast to the machine, which wears out when working, heart muscle trained by physical work will increase it's size, gets flexible, solid, strong and tireless. Training of the heart is one of the main tasks of physical education of youth, mainly because school education, sedentary lifestyle, has adverse influence on the circulatory system. (Weigner 1921, p. 59–72)

Karel Chodounský

Sport:

If we want to live physiological life, we must not anxiously avoid stresses, however, on the contrary we must search the danger in mental and physical regard. Only through victory above them real resistance and real body hardness can be achieved. The more difficult is the sport, the more training it needs to reach the success and to perform relatively safely. It is not enough to have rich food to be strong, but we must be physically active, employ our body systems. Insufficient physical activity weakens also the heart, which is during the same workload more stressed compared to proficient heart. It must be also pointed out that lack of physical activity weakens the muscle layers of the blood vessels, which is also one of the reasons of impaired body fitness. Different pollutants start their pernicious work in such vessels. Number of diseases arise from that. Who intensively exercised in young age and being older suddenly and permanently stopped, all body systems will adopt fast physical inactivity and succumb fatty degeneration. Somebody can become an old man after his 50th year of age, while somebody else remains fit and healthy after his eighty, though both entered their virility age with similar "good root". (Chodounský, 1921, p. 84–92)

Karel Kuffner

The influence of alcohol:

Why the people indulge the spirits? The answer was summarized by Masaryk in few words: they are seeking confusing oblivion. In majority of drinkers alcohol moderates daily stresses: accusations from the past, annoyances from the presence and fears from the future. The effect of drinking one litre beer will not disappear during two hours. It remains until the next days and reduces comprehension, memory, ability to think, reasoning and self-control. (Kuffner, 1921, p. 147–151)

Josef Thomayer

Tobacco:

One of the most marvellous human properties is extremely extended affection to consume some poisons such as alcohol, opium, nicotine in the tobacco smoke, caffeine in coffee and others. Those poisons don't contribute to human nutrition, but only influence individual mood. It is today generally proven that tobacco besides elevated blood pressure evokes chronic changes in arterial wall, both in the main artery coming out of the heart and in the arteries, supplying heart muscle itself. Cruel heart pains called angina pectoris sometimes absolutely disappear if patient stops smoking. (Thomayer, 1921b, p. 151–154)

Current situation

On the beginning of the 20th century the scientists had only relatively limited number of scientific knowledge, based on small patients cohorts, on terrain observations and on own experiences. Today the scientific knowledge lean on the conscientious, explicit, judicious and reasonable use of modern, best evidence in making decisions and conclusions about the care of individual patients, called *evidence based medicine* (EBM). EBM integrates clinical experience and patient values with the best available research information (Masic, Miokovic, & Muhamedagic, 2008).

Recently we can find in scientific literature thousands of scientific works and also meta-analyses based on many thousands samples of probands, documenting negative health impacts of harmful habits (smoking, alcohol, drugs), improper nutrition and insufficient physical activity on one side, and health importance and essential need of physical activity in the human lifestyle.

How is our current population willing to accept these scientific knowledge and to respect them? Compared to the European average the Czech population suffers from higher morbidity and mortality from cardiovascular diseases, overweight or obesity, cancer and other diseases. An important factor affecting the health are the deficiencies in the lifestyle of a significant part of the population: high relative smoking rate, high alcohol consumption, high other other drugs abuse, bad eating habits, and insufficient physical activity. According to data published by Měřínská (2018) half of the Czech population does not include the necessary physical activity in their leisure-time program even twice a week.

How to avoid these unfavourable facts is a problem that is addressed not only by health professionals, but also by economists, politicians and, last but not least, health insurance companies.

Conclusions

According to epidemiological studies, only 10–20% of the patient's fate can be influenced by modern medicine. Health depends almost 70% on lifestyle, influencing risk factors and the state of the environment. It is not wise to rely on the fact that the advancement of medicine in the future will ensure that everybody can cure all kinds of health problems without their own involvement.

According to the former Minister of Health of the Czech Republic Svatopluk Němeček:

[...] it will become more and more demanding to meet the health needs of the population and it cannot be ruled out that all health care will not be reimbursed exclusively as yet from health insurance. No economy can afford to finance the costs of unhealthy lifestyles and the resulting illnesses in the long term. If the incidence of civilization diseases could be reduced by 5%, health care would save 10 billion crowns a year and the benefits for GDP would be another 10 billion. (Ministerstvo zdravotnictví ČR, 2014)

How demanding this task will be results from the conclusions of a sociological study (Jarolímeck & Lustigová, 2018): Health literacy is still very low among young university students.

What to add to the statement that 3.5 million Czechs suffer from chronic non-infectious diseases (cardiovascular diseases, hypertensive disease, diabetes, metabolic syndrome, obesity, dyslipidemia, osteoporosis, arthrosis of the spine and large joints, malignant tumors, COPD, mental disorders, dementia, tobaccoism, alcoholism, drugs and others), often in a polymorbid combination? In all of these disease states (and in many others): physical activity is an important primary and secondary preventive factor. There exist WHO (2010) and other particular recommendations (Novák, Štok, & Votík, 2017) for optimal physical activity. How to “move” the current young, adult and senior population is a problem that is being addressed by experts around the world.

This is a serious task that must be addressed by parents, school, health professionals, the state and interest organizations. However, there has been no significant turnover anywhere in the world, but the situation is still waiting for future solutions.

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The Level of Health Literacy in the Dimension of Disease Prevention among Graduates from the Teaching Study Programme

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Abstract: The level of health literacy in the adult population in the Czech Republic is lower than desirable and therefore, strategic procedures are in place that should increase the level of health literacy among Czech citizens. One of the priority areas defined in *Development of health literacy for 2015–2020* is the area of education and schooling. It is therefore desirable to identify the current level of health literacy among teachers and at the same time develop it so that health literate teachers are able to perform effective interventions and develop health literacy in their students.

The objective of the paper is to evaluate the level of health literacy among future teachers – students in their final year of the Teaching study programme at the Faculty of Education, Palacký University Olomouc in the dimension of disease prevention.

The research was carried out in 2018/2019 and involved 180 respondents in the final year of the Teaching study programme at the Faculty of Education, Palacký University Olomouc. The authors used a research instrument designed by the WHO and provided by the National Institute of Public Health in Prague. Applicable methodology for data analysis and evaluation was observed.

The results of the research suggest that future teachers have an insufficient level of health literacy in the area of disease prevention. Despite the fact that students of Teaching health education for elementary schools show a higher average health literacy index in the area of disease prevention compared with students of different teacher training programmes, the difference is not statistically significant. At the same time, future teachers have a lower level of health literacy compared with Czech adults, as suggested by the results of research studies aimed at the general population.

These findings emphasise the need to search for functional strategic instruments to increase the level of health literacy among teacher training graduates, because these are the ones who will develop health literacy of the young generation.

Key words: health literacy, disease prevention, future teachers, Teaching study programme, Teaching health education for elementary schools

“Health literacy (HL) is an important tool in healthcare and a significant part of Health 2020.” (Holčík, 2016). There is a myriad of definitions of health literacy. The present paper uses the following two definitions proposed by Czech authors: “Health literacy is the ability to adopt adequate decisions in relation to health in the context of everyday life – at home, within the society, in the workplace, in health care facilities, in shops, in politics. It is an important method increasing the effect of people on their own health and strengthening their ability to gain and use information and accept responsibility.” (Holčík, Káňová, & Prudil, 2015). The following definition aptly describes the society-wide benefit of HL: “Health literacy

represents a promising and effective aspect of health strategy, the purpose of which is to achieve the highest possible health of people. Money spent on health is a healthy investment,” as defined in the governmental document *Development of health literacy for 2015–2020. Action plan No. 12. Health 2020 National strategy for health protection and promotion and disease prevention* (2015, p. 34), which is defined in compliance with Health 2020 (2013).

Kickbusch (2004) describes five health activities that should increase health literacy among the population. Specifically, they include health promotion, health protection, disease prevention, healthcare services, and navigation system (patient movement in the healthcare system). A simplified classification includes the following three areas or dimensions of health literacy: (1) health care, (2) *disease prevention*, (3) health promotion. The procedure of shaping health literacy is reflected in the so-called health literacy stages (acquisition and application of health relevant behaviour): (1) availability of health related information, (2) understanding of health-relevant information, (3) evaluation of health-relevant information, (4) application or use of health-relevant information (Sørensen et al., 2012; Kickbusch et al., 2013; Kučera, Pelikan, & Šteflová, 2016).

Many research studies have confirmed that the level of health literacy both in an individual and society-wide context is closely associated with lifestyle and the overall level of health and disease, and that there is a correlation between the level of education or socio-economic status and the level of health literacy (Borgonovi & Pokropek, 2016; Levin-Zamir et al., 2017; Vogt et al., 2017).

However, current research on health literacy among the Czech and European population suggests an insufficient level of health literacy among the current population (Kickbusch et al., 2013; Kučera et al., 2016).

Therefore, activities performed on an interdepartmental level in order to increase the level of health literacy among the population are based on the following factors:

- A high level of health literacy is a benefit for the society.
- A low level of health literacy is a serious health risk factor.
- Health literacy is associated with the social gradient and its low level aggravates undesirable health inequalities.
- Increasing health literacy is a lifelong process.
- Health literacy is associated with the economic and social situation and cultural level.
- A low level of health literacy leads to increased healthcare costs. (Development of health literacy for 2015–2020, 2015, p. 3–4)

The action plan *Development of health literacy for 2015–2020* (2015, p. 1–2) defines the priority areas that can contribute to an increase in the level of health literacy among the Czech population, where the third priority area is care and education.

Since 2007, the educational field Health education has been implemented in the Czech system of education. One of the objectives is to provide space for the development of learners’ health literacy (Framework educational programme for elementary education, 2016). At the same time, more than ten years ago, Czech faculties of education started undergraduate teacher training in order to prepare elementary school teachers qualified in Health education. This is achieved through the educational field Teaching health education for elementary schools. Other steps include the implementation of health education, health promotion, and the development of health literacy into the study plans of the Teaching study programme as part of the so-called teacher qualification module. However, the degree of implementation differs between faculties of education in the Czech Republic (Hřivnová, 2017; Hřivnova, Sofkova, & Chraskova, 2019a, 2019b; Marádová, 2016).

Currently, there is an absence of research studies analysing and evaluating the level of health literacy in future or current teachers. Available research studies aimed at university students emphasise their insufficient knowledge of health education, health promotion, and health literacy (Jarolímek & Lustigová, 2018; Urbánková & Reissmanová, 2013).

Objectives

The objective⁵ of the paper is to evaluate the level of health literacy among future teachers, i.e. students in their final year of the Teaching study programme at the Faculty of Education, Palacký University Olomouc in the dimension of disease prevention.

The partial objectives are divided into the following three areas:

- 1) To evaluate the level of health literacy in the area of disease prevention among future teachers before they enter the teaching process.
- 2) To test whether students of Teaching health literacy for elementary schools have a higher level of health literacy in the area of disease prevention compared with students of other fields of study of the teacher training study programme.
- 3) To compare the level of health literacy in the area of disease prevention among future teachers with the level of health literacy in the area of disease prevention among the Czech adult population in 2015 (Kučera et al., 2016).

Methods

The present research used a standardized method of analysing the level of health literacy among students of Teaching in their final year at the Faculty of Education, Palacký University Olomouc, i.e. future teachers before they enter the teaching process. An identical methodology (description of the research sample and research methods) was published in a paper by Hrivnova, Chraskova and Sofkova: The Level of Health Literacy among Future Teachers before Entering Educational Reality (2019a), which focused on an analysis of the level of health literacy among future teachers in the dimension of health promotion.

Description of research participants

The research sample (research participants) comprised students in the final year of the Teaching study programme at the Faculty of Education, Palacký University Olomouc, i.e. future teachers before they enter educational reality ISCED 1, ISCED 2 and ISCED 3; the total number of respondents was 191. Regarding the fact that 11 respondents did not meet the requirements for questionnaire analysis, the final research sample comprised 180 students. In terms of gender, the sample included 158 women and 22 men, which matches the current gender distribution among students of Teaching. Specifically, the research sample comprised students of the field of study Teaching health education for elementary schools, whose study plan includes disciplines focusing on health promotion and health education in order to become qualified teachers of Health education in elementary schools and to develop health

⁵ The findings presented in the methodology and results sections of this paper relate to the evaluation of the level of health literacy among future teachers in the HL dimension of disease prevention. The findings relating to the HL dimension of health promotion in the research sample will be presented at the *10th ICEEPSY 2019 – International Conference on Education & Educational Psychology* held from 9 to 12 October 2019 in Barcelona (Hrivnova et al., 2019a).

literacy in their pupils. Of the total research sample (180 respondents), the number of students of the field of study Teaching health education (THE) was 20 (11%), see Table 1.

Table 1

Description of research participants by field of study and gender

Gender	Other fields	THE	Row Totals
Female	141	17	158
Male	19	3	22
All Grps	160	20	180

Note: The item Other fields refers to students of other fields of study except Teaching health education; THE refers to students of Teaching health education.

Research method: “health literacy” questionnaire

The research was performed by means of the health literacy questionnaire designed by the World Health Organization, which had also been used to examine the level of health literacy among the citizens of the Czech Republic (Kučera et al., 2016). This is a standardized research instrument used for the detection of the level of overall health literacy and its subcomponents – HL in the area of healthcare, HL in the area of health promotion, and HL in the area of disease prevention. For the purposes of the present research the instrument was provided by the Institute of Public Health in Prague, specifically the Centre for Public Health Promotion, which has been a long-standing partner of the Faculty of Education, Palacký University Olomouc. For the purposes of the present research, the original “structured interview” method was changed into a written questionnaire. In the process of data evaluation, the required standard methodology was observed (Kučera et al., 2016). The indexes of individual HL dimensions (HL in the area of healthcare HC-HL, HL in the area of disease prevention DP-HL, HL in the area of health promotion HP-HL and general level of health literacy GHL) have values from 0 to 50 points divided into four health literacy intervals: Inadequate (0–25 points); Problematic (26–33 points); Sufficient (34–42 points) and Excellent (43–50 points). The HP-HL index was calculated based on questions Q1/32–37 (total of 16 questions).

The disease prevention index DP-HL was calculated based on the responses to questions Q1/17–31. It was calculated only for respondents who in the 15 cases indicated a maximum of one “5” response (i.e. “I don’t know”).

The statistical t-test method was used for data processing. The research data were processed by means of the STATISTICA 13 package including relevant graphs (Histogram and Box & Whisker Plot). This paper describes the partial data evaluating the level of “Health literacy in the area of disease prevention (DP-HL)”. The research study was conducted at the Faculty of Education, Palacký University Olomouc in the academic year 2018/2019.

Results and discussion

The research on health literacy among students in the final grade of Teaching suggests (see Table 2) that the average HL index in the area of disease prevention is 16.06, pointing to an inadequate level of health literacy. The maximum value of the index was observed between the categories of sufficient and excellent level of health literacy (index 42.22).

Table 2

Achieved values of health literacy index in HL dimension of disease prevention among students of Teaching

Variable	Valid N	Mean	Minimum	Maximum	Std. dev.
DP-HL index	172	16.06	0.00	42.22	8.17

The distribution of the achieved levels of the DP-HL index in the research sample is shown in Figure 1.

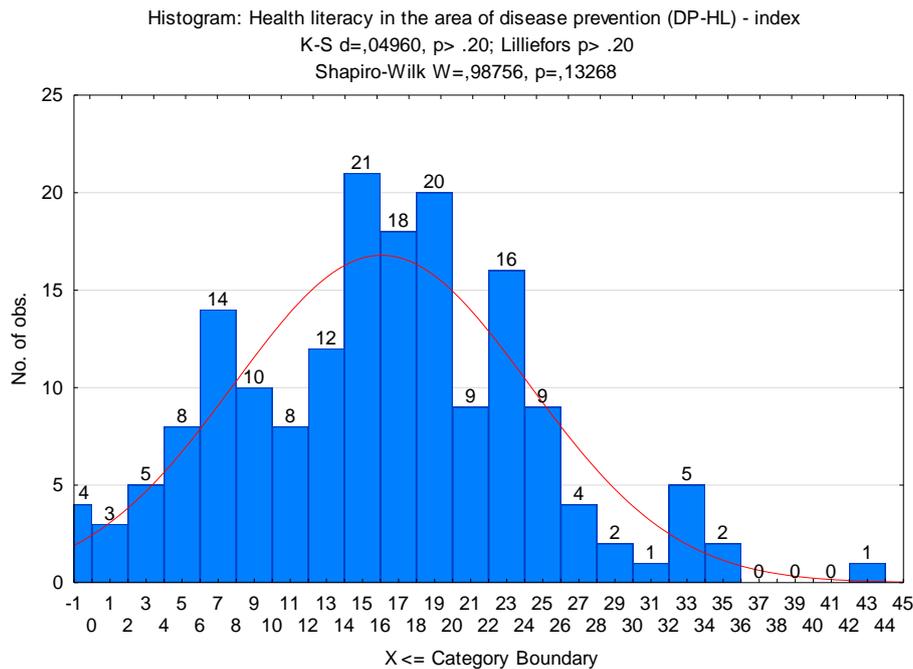


Figure 1. Numbers of students of Teaching by achieved values of DP-HL index.

A subsequent categorization of the results concerning the DP-HL index into the different levels of health literacy in the area of disease prevention (see Table 3 and Figure 2) suggests that the largest proportion of students of Teaching have an inadequate level of health literacy in the area of disease prevention (87.20 %). Similar results were observed in the assessment of the level of HL in the area of health promotion among future teachers (Hrivnova et al., 2019a).

Table 3

Level of health literacy in the area of disease prevention among students of Teaching

Category HL (DP-HL index)	Count	Percent
Inadequate	150	87.20
Problematic	19	11.00
Sufficient	3	1.70
Excellent	0	0.00

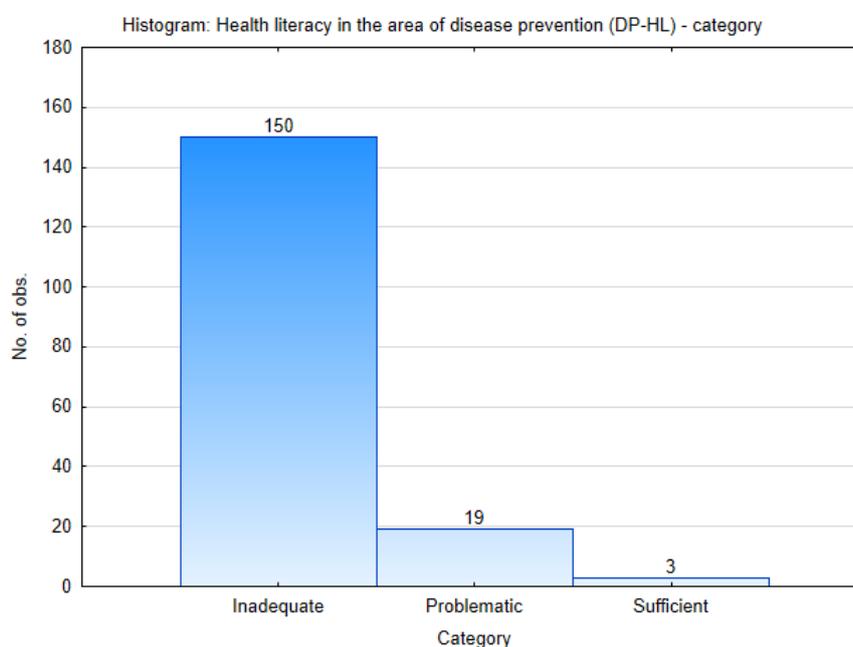


Figure 2. Level of health literacy in the area of disease prevention among students of Teaching.

Given the fact that students of Teaching health education for elementary schools have in their study plan more disciplines that should develop their health literacy compared with students of other fields of the teacher training study programme (Hřivnová, 2017; Hřivnova et al., 2019a; Marádová, 2016), one of the objectives is to identify whether students who are trained to become teachers of Health education in elementary schools have a higher level of health literacy in the dimension of disease prevention compared with students of other fields of the teacher training study programme. As suggested by Table 4 and Figure 3, students of Teaching health education for elementary schools show a higher level of health literacy in the area disease prevention compared with students of other fields, but it should be noted that the difference between the groups is not statistically significant.

Table 4

Comparison of the average score achieved in health literacy in the area of disease prevention among students of Teaching health education for elementary schools and students of other teacher training fields using a t-test.

Variable	Mean Other fields	Mean THE	t-value	df	p	Valid N Other fields	Valid N THE	Std. dev. Other fields	Std. dev. THE	F- ratio variances	P variances
DP-HL index	15.69	18.83	-1.62	170	0.11	152	20	8.22	7.46	1.21	0.65

Note: The item Other fields refers to students of other fields of study except Teaching health education; THE refers to students of Teaching health education.

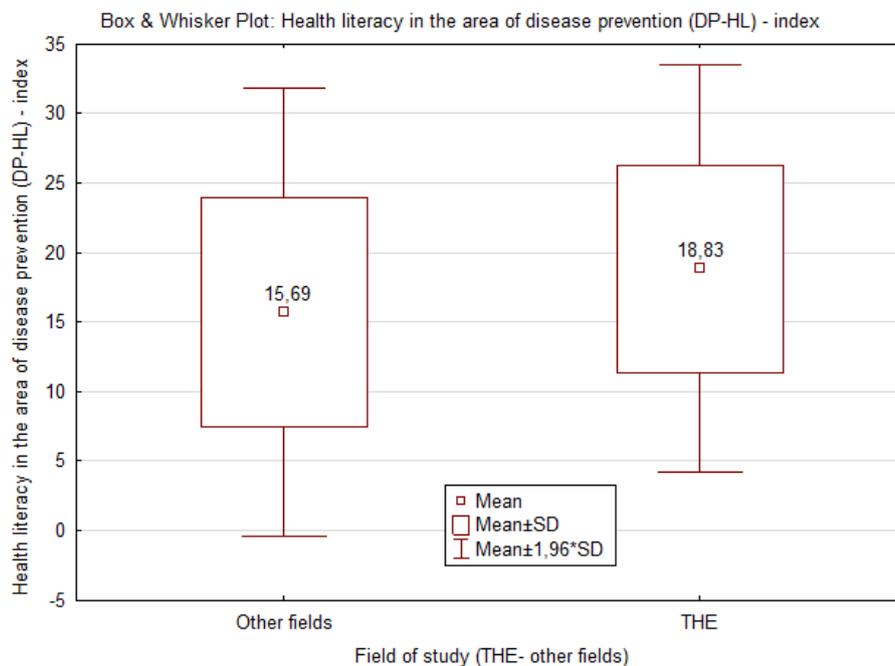


Figure 3. Comparison of the average score in the assessment of health literacy in the area of disease prevention among students of Teaching health education for elementary schools and students of other teacher training fields.

As suggested above, a research study on health literacy was performed in the Czech Republic in 2015 (Kučera et al., 2016), the methodology of which was identical with a research study on health literacy in eight European countries (Kickbusch et al., 2013). The present research adopted the methodology of these studies, which makes it possible to compare the results of the present study with the results concerning the level of health literacy in the area of disease prevention among the Czech adult population (Kučera et al., 2016). This comparison is presented in Figure 4. The graphical representation suggests a surprising negative conclusion concerning the level of health literacy in the area of disease prevention among future teachers before they enter the teaching process. In 2015, insufficient or problematic health literacy in the area of disease prevention was achieved by 54% of respondents while in the present

research this category was achieved by 98% of respondents, which is very alarming. The low level of health literacy among university students in the Czech Republic is also emphasised by other professionals who analysed the level of health literacy, albeit using a different methodology (Jarolímek & Lustigová, 2018; Urbánková & Reissmanová, 2013).

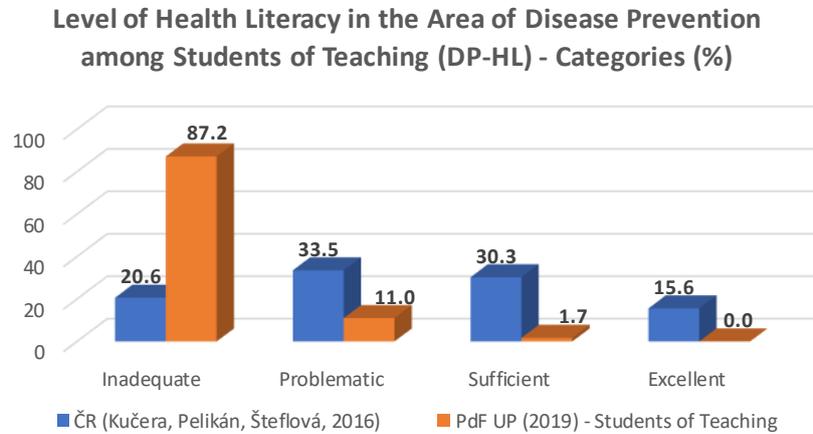


Figure 4. Comparison of the level of health literacy in the dimension of disease prevention among students of Teaching with the results of a research study of HL among the adult population in the Czech Republic.

Conclusion

The aim of the paper was to evaluate the level of health literacy among the graduates of the Teaching study programme at the Faculty of Education, Palacký University Olomouc, because increasing the level of health literacy among the Czech population is defined in the action plan *Development of health literacy for 2015–2020* (2015).

The results of the research suggest that future teachers have an insufficient level of health literacy in the area of disease prevention. Despite the fact that students of Teaching health education for elementary schools show a higher average health literacy index in the area of disease prevention compared with students of different teacher training courses, the difference is not statistically significant. At the same time, future teachers have a lower level of health literacy compared with Czech adults, as suggested by the results of a research study aimed at the general population (Kučera et al., 2016).

The above implies that the level of health literacy in the dimension of disease prevention among future teachers is unsatisfactory; and therefore, it is desirable to search for functional strategic instruments to increase the level of health literacy among teacher training graduates, because they are the ones who will develop health literacy of the young generation.

One of the possible solutions would be to support undergraduate preparation of future teachers focusing on the development of health literacy from a quantitative as well as qualitative perspective. At the same time, it would be desirable to perform a repeated research study on the level of health literacy among future teachers including other faculties of education in the Czech Republic, and last but not least to perform an identical study on existing teachers.

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Analysis of a Health Education Textbook in the Context of the Framework Educational Programme for Elementary Education and Possibilities of Implementation of the Issue of Chronic Non-Communicable Diseases in the Czech Republic

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Abstract: Chronic non-communicable diseases are the main cause of death in the Czech Republic. They primarily include oncological and cardiovascular diseases. Primary prevention starts in the family at an early age and continues (or should continue) during compulsory education.

The paper is focused on analysis of a health education textbook in the context of Framework educational programme for elementary education and possibilities of implementation of the issue of chronic non-communicable diseases. The absence of this theme in health education in elementary schools is highlighted by Hřivnová (2018). The issue of prevention of chronic non-communicable diseases should be present in elementary schools and teachers must be provided with high-quality resources to work with.

The authors analysed the Framework educational programme for elementary education (2017) and the only available textbook on health education certified by the Ministry of Education of the Czech Republic, and checked whether the theme in question was included. The authors also investigated whether and which programmes, projects and methodological materials elementary school teachers have on the prevention of chronic non-communicable diseases.

The analysis of the textbook showed an insufficient elaboration of the theme in the textbook.

The paper also presents 2 methodological materials intended for elementary school (and secondary school) teachers, which provide a didactic transformation of the issue of chronic non-communicable diseases.

Keywords: health, prevention, chronic non-communicable diseases, health education, textbook, methodological material

Chronic non-communicable diseases are the main cause of death in the Czech Republic. In the Czech Republic, the curricular document Framework educational programme for elementary education (2017) defines an educational area Man and health and an educational field Health education, which include the issue of prevention of non-communicable diseases. But what is the reality in Czech schools? Is this crucial theme taught? A research study by Hřivnová (2018) shows that the theme is absent in elementary schools. Hřivnová (2018) defines top ten themes that are absent and the issue of non-communicable diseases is ranked sixth. Research by Hřivnová further highlights a low (inadequate) level of health literacy among elementary

school pupils and teacher training students, including health education students. Hřivnová even suggests that the level of health literacy among future teachers of health education is of a low level after completion of their university study. One of the factors that may cause this situation is undergraduate training of future teachers. One of the causes concerning elementary school pupils is the fact that in the Czech Republic there is only one health education textbook certified by the Ministry of Education. The quality of this textbook was analysed by means of a text analysis and the results are provided below.

Objective

The objective of the research is to find out:

- 1) Whether the issue of prevention of chronic non-communicable diseases is included in the Framework educational programme.
- 2) Whether the issue of prevention of chronic non-communicable diseases is included in the health education textbook entitled *Výchova ke zdravému životnímu stylu* (Krejčí et al., 2018).
- 3) Whether projects, programmes and methodological materials are available in the Czech Republic that comprehensively cover the issue of prevention of chronic non-communicable diseases for elementary school pupils.

Research questions:

Is the issue of prevention of chronic non-communicable diseases included in the Framework educational programme for elementary education? If yes, in what manner?

Is the issue of prevention of chronic non-communicable diseases included in the textbook *Výchova ke zdravému životnímu stylu* (Krejčí et al., 2018)? If yes, in what extent and quality?

Are there projects, programmes and methodological materials in the Czech Republic that address the issue of prevention of chronic non-communicable diseases and are intended for elementary school pupils?

Method

- a) Analysis of the Framework educational programme for elementary education.
- b) Analysis of the health education textbook. The following textbook was analysed:
Krejčí, M., Šulová, L., Rozum, F., Havlíková, D., & Šafránková, D. (2018). *Výchova ke zdravému životnímu stylu: pro 2. stupeň ZŠ a odpovídající ročníky víceletých gymnázií*. Plzeň: Fraus.
- c) Analysis of a health education portal (www.vychovakezdravi.cz), which provides comprehensive information on methodological materials, projects and programmes aimed at health education.

Results

a) *Analysis of the Framework educational programme for elementary education (2017)*

In the Framework educational programme for elementary education (2017) the issue of prevention of chronic non-communicable diseases is included in the educational area Man and health and educational field Health education.

The issue is addressed by means of the following three thematic areas:

- 1) Healthy lifestyle and health care – protection from chronic non-communicable diseases and injuries – prevention of cardiovascular and metabolic diseases; preventive and medical care.
- 2) Value of health and health promotion – health promotion and its forms – prevention and intervention, responsibility for one's health, promotion of a healthy lifestyle.
- 3) Changes in the life of an individual and their reflection – sexual maturity and reproductive health.

It should be noted however that the thematic areas included in FEP EE (2017) are only indicative and it depends solely on the school and on the teacher in what ways they will be included in the school educational programme and which themes will be taught.

Another remark concerns the fact that the Framework educational programme for elementary education does not mention the term health literacy. This is also highlighted by Hřivnová (2018).

b) *Analysis of the textbook *Výchova ke zdravému životnímu stylu* (Krejčí et al., 2018)*

The textbook does not contain a separate chapter on the prevention of chronic non-communicable diseases. It only briefly mentions the term “lifestyle diseases”; the new term chronic non-communicable diseases is not used. Specific diseases such as cardiovascular diseases, obesity and type 2 diabetes are mentioned briefly in separate sentences or separate paragraphs. The issue of prevention of oncological diseases, osteoporosis, dental caries, and preventive examinations is missing.

The text below includes quotations from the textbook (Krejčí et al., 2018) concerning the issue of prevention of chronic non-communicable diseases:

Lifestyle diseases

“Lifestyle diseases = diseases that are the most common cause of death in developed countries and are related to nutrition, quality of food, lifestyle, and the environment.” (p. 91, sidebar)

“Excessive nutrition: long-term excessive intake of food, energy expenditure is not sufficient, leads to the onset of metabolic disorders, obesity, cardiovascular diseases, diabetes (lifestyle diseases). Constitutes a problem in developed countries.” (p. 84)

“People with overweight have limited movement ability and tend to be susceptible to lifestyle diseases. What would you recommend from the following?” (p. 84)

“Learn to enjoy salt-free food, limit the amount of salt in making dishes. Maintain appropriate fluid intake. Drink water and non-sweetened beverages. Remove fat from meat, use vegetable oil. Observing these recommendations will decrease the risk of the onset of lifestyle diseases.” (p. 91)

“Many people suffer from lifestyle diseases: obesity, diabetes, dental caries, cardiovascular diseases, neoplastic diseases. Try to explain the role of diet in the onset of these diseases.” (p. 91)

“The more frequent type is diabetes type 2 which is related to lifestyle. This type of diabetes is considered a lifestyle disease and is currently very widespread.” (p. 91)

“Which diseases are the so-called lifestyle diseases?” (p. 122)

Cardiovascular diseases

“Excessive nutrition: [...] leads to the onset of metabolic disorders, obesity, cardiovascular diseases, diabetes (lifestyle diseases).” (p. 84)

“Diseases that affect the heart and blood vessels are called cardiovascular diseases. The risk of heart diseases can be decreased by limiting fat consumption. Excess cholesterol in the blood causes the presence of fat substances in arteries a leads to their obstruction and a risk of myocardial infarction or brain stroke.” (p. 89)

“In many people, excess salt in the organism causes various diseases – high blood pressure, which can lead to brain stroke, heart problems or kidney diseases.” (p. 90)

“The effect of long-term excessive use of alcohol: risk of brain stroke, high pressure, vascular diseases.” (p. 114)

“Effects of long-term smoking: vascular diseases ...” (p. 115)

“A poor daily regimen results in a tendency to depression, cardiovascular diseases and neuroses of the stomach.” (p. 146)

Obesity

“Excessive nutrition: [...] leads to the onset of metabolic disorders, obesity, cardiovascular diseases, diabetes (lifestyle diseases).” (p. 84)

“Obesity and its causes: (1) Inadequate food intake regulation, (2) hormonal deviations, (3) smoking and alcohol addiction treatment, (4) pregnancy, (5) excessive appetite, (6) effect of stress.” (p. 84)

“People with overweight have limited movement ability and tend to be susceptible to lifestyle diseases. What would you recommend from the following?” (p. 84)

“Risky obesity is weight that exceeds optimum weight by 20–30%. Severe obesity contributes to a higher morbidity and shorter life expectancy.” (p. 85)

“The photographs show high-energy strong-taste food. If this food is consumed in addition to main dishes, it contributes to obesity. Another risk factor is insufficient physical activity.” (p. 94)

Type 2 diabetes

“Excessive nutrition: [...] leads to the onset of metabolic disorders, obesity, cardiovascular diseases, diabetes (lifestyle diseases).” (p. 84)

“A large part of the population is affected by diabetes mellitus. The more frequent type is diabetes type 2 which is related to lifestyle. This type of diabetes is considered a lifestyle disease and is currently very widespread.” (p. 91)

“Diet-treated diseases: diabetes – diabetetic diet.” (p. 91)

Neoplastic diseases

There is no information on the prevention of cervical cancer, testicular cancer, colon cancer and skin cancer.

The book (Krejčí et al., 2018) includes the following remark on lung cancer:

“Effects of long-term smoking: increased risk of lung cancer and airway cancer.” (p. 115)

The book includes no information on the prevention of oncological diseases, risk and protective factors, preventive examinations – except smoking in relation to lung cancer.

Allergic diseases

“Some people may be allergic to fruit, fish, egg white, nuts, dairy products, cereals, etc. These people need to be careful about products that contain allergens because their life could be at risk. The anaphylactic shock is one of the conditions that threaten the patient’s life.” (p. 93)

Osteoporosis

“Calcium is needed for the growth of bones and teeth.” (p. 82)

Dental caries

“Calcium is needed for the growth of bones and teeth.” (p. 82)

“It is sensible and desirable to undergo preventive examinations (e.g. at the dentist’s) [...]” (p. 135)

Protective factors of chronic non-communicable diseases

“Calcium is needed for the growth of bones and teeth.” (p. 82)

“Yoga exercises have a positive effect on the nervous, locomotor and circulatory system, stimulate the function of internal organs and endocrine glands and prevent lifestyle diseases.” (p. 126)

Risk factors of chronic non-communicable diseases

“Excessive nutrition: [...] leads to the onset of metabolic disorders, obesity, cardiovascular diseases, diabetes (lifestyle diseases).” (p. 84)

“The risk of heart diseases can be decreased by limiting fat consumption. Excess cholesterol in the blood causes the presence of fat substances in arteries and leads to their obstruction and a risk of myocardial infarction or brain stroke.” (p. 89)

“In many people, excess salt in the organism causes various diseases – high blood pressure, which can lead to brain stroke, heart problems or kidney diseases.” (p. 90)

The effect of long-term excessive use of alcohol: risk of brain stroke, high pressure, vascular diseases.” (p. 114)

“Effects of long-term smoking: vascular diseases....” (p. 115)

“A poor daily regimen results in a tendency to depression, cardiovascular diseases and neuroses of the stomach.” (p. 146)

“The photographs show high-energy strong-taste food. If this food is consumed in addition to main dishes, it contributes to obesity. Another risk factor is insufficient physical activity.” (p. 94)

“The more frequent type is diabetes type 2 which is related to lifestyle.” (p. 91)

On page 85 the authors of the book explain BMI and its calculation.

A separate chapter is devoted to nutrition (Krejčí et al., 2018, p. 76–96), but no clear information is provided on the relationship between nutrition and the prevention of chronic non-communicable diseases. For example, on page 82 there is a task relating to the different ontogenetic periods and food intake, but the assignment is incomprehensible and unsuitable.

Preventive examinations, screening

“It is sensible and desirable to undergo preventive examinations (e.g. at the dentist’s), vaccination and treatment as required.” (p. 135)

The textbook does not mention the significance of other preventive examinations (e.g. gynaecological), there is no information on the screening of cervical cancer, breast cancer or colon cancer.

It is surprising that some themes are elaborated in too much detail (e.g. the development of a preschool child is described on 12 pages of text, the characteristics of a school-aged child is on 4 pages of text, the principles of Health 21 is on the whole page 131, the organ clock is described on page 147, Sun salutation is on pages 139–140). The textbook also includes non-scientific information such as acidification of the body or tongue cleaning (p. 125).

c) Analysis of a health education web portal (Výchovakezdraví.cz, 2009)

The web portal provides comprehensive information on methodological materials, projects and programmes aimed at health education.

There is no project, programme or methodological material intended for elementary school teachers on the prevention of chronic non-communicable diseases.

Partial themes are included in the *HOBIT* project (Hobit.cz, 2019), which addresses the prevention of cerebrovascular accident and also focuses on early recognition of CVA and provision of first aid. Teachers can use e-learning and additional materials (for more information see www.projekthobit.cz).

The prevention of the ageing syndrome (chronic non-communicable diseases include the metabolic syndrome, atherosclerosis, osteoporosis) is addressed by the *Growing old successfully project* (Stárněmeúspěšně.cz., 2019). The authors of the project are members of the Faculty of Medicine, Masaryk University headed by Prof. Matějovská Kubešová. Teachers can use online presentations (for more information see www.starneme-uspesne.cz).

Oncological prevention focuses especially on the prevention of breast cancer (*Happy balls*, intended for secondary schools), testicular cancer (*Happy balls*, intended for secondary schools), and cervical cancer (*Spiral programme*).

For more information see: <http://www.vychovakezdravi.cz/clanky/prevence-nadoru.html> (Výchovakezdraví.cz, 2014).

A programme that offers teachers further education in allergies and asthma is *7A–7x* (Českáiniciativaproastma.cz, 2010), but this is not a methodological workshop.

An analysis of available materials, programmes and projects intended for elementary schools suggests that in the Czech Republic there is no comprehensive programme, project or methodological material that would address the prevention of chronic non-communicable diseases.

The authors of the present paper have not analysed available materials for primary school, but some of them include *Physical activity and nutrition* (Mužík & Mužíková, 2016; Pohybavýživa.cz, 2013) or *It is normal not to smoke* (Žaloudíková & Hrubá, 2007, 2008, 2009a, 2009b). A material developed for kindergartens primarily addressing protective and risk factors is *Good practice lexicon – health and healthy lifestyle education in kindergarten* (Hřivnová & Košťálová, 2013).

Recommendations and discussion

In the context of the review of FEP EE (to be completed by 2023) the term “health literacy” should be included in FEP EE (Hřivnová, 2018); or even better, as suggested by Reissmannová (2010, p. 54), a new term “health competences” should be introduced. This could strengthen the significance of health and health literacy in schools and health education would be taught in a more effective and meaningful way.

The analysis of the textbook *Výchova ke zdravému životnímu stylu* (Krejčí et al., 2018) showed an insufficient elaboration of the theme in the textbook, which resulted in a need to provide a strong methodological background so that the theme is comprehensible and readily applicable by elementary school teachers.

Looking at the textbook as a whole, it is obvious that the themes are analysed in an unbalanced way, often contain non-scientific information, the authors use unsuitable pictures and excessively focus on some marginal issues. The content of the textbook does not match the requirements specified in FEP EE as declared in the book.

In 2018 a methodological material entitled *We're not afraid of cancer or prevention as a doorway to health* (Smejkalová & Slaná Reissmannová, 2018) was published, which focuses on the prevention of oncological diseases. The material is intended for elementary school teachers and contains 10 chapters describing a comprehensive system of oncological prevention. Each chapter is introduced by a theoretical text, the purpose of which is to provide a scientific background, proposal of a lesson plan where each lesson is described in detail to provide guidance. Part of each chapter is a pupil worksheet including a key for the teacher and

additional activities. The material also includes a number of internet references which provide useful information or which can be used directly in classes.

In 2019 the second volume entitled *Decide! or lifestyle for health* was published (Slaná Reissmannová & Smejkalová, 2019), which focuses on primary prevention of chronic non-communicable diseases and the remaining chronic non-communicable diseases (i.e. except oncological). The structure of the material is identical with *We're not afraid of cancer*.

The purpose of these two materials is to inspire the implementation of the issue of prevention of chronic non-communicable diseases in elementary school classes. The materials have received positive acceptance from teachers, academia, and physicians. Both materials were supported by League Against Cancer. They are available at MUNI SPACE and www.vychovakezdravi.cz (Výchovakezdravi.cz, 2009).

The authors have submitted a project application, the purpose of which is to have the material *We're not afraid of cancer* translated to English to be able to use it internationally.

It would be interesting to make a comparison with foreign textbooks focusing on health education or similar themes. For example, Slovenian textbooks *Gospodinstvo 6* (Kostanjevec, 2011) and *Sodobna priprava hrane* (Koch, 2000) focus on the education of nutrition-related issues including the effect of nutrition on the prevention of chronic non-communicable diseases.

Conclusion

The above suggest a need for the implementation of the theme in standard health education textbooks. This was also supported by interviews with teachers during practical teacher training sessions aimed at teacher needs. A brand new health education textbook should be developed to reflect on the themes defined in the Framework educational programme for elementary education and the needs of teachers.

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Mapping the Health Education Knowledge of Primary School Pupils in the Czech Republic

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Abstract: Health Education helps pupils to develop and protect physical, mental and social health in a holistic context, teaches them how to be responsible for their own and others' health. There are six key areas related to interpersonal relationships: changes in human life and their reflection, lifestyle and health care, health risks and their prevention, values and health promotion, personal and social development.

The aim was to map the knowledge of a sample of 9th grade elementary schools pupils on Health Education. The results of this research will serve as feedback to improve the quality of teaching Health Education at elementary schools.

Quantitative research was carried out in the 2018/2019 spring term using an anonymous questionnaire of 100 items compiled by the authors based on the content and outputs of the subject Health Education. It covered 5 key areas and included 600 pupils from the 9th grade of 16 intentionally selected elementary schools from the regions of Southern Moravia, Moravian-Silesia, Central Bohemia and Prague. The collected data were sorted out and statistically analysed.

The surveyed students received an average of 70.2 points out of 100 in a questionnaire. We can say that the level of knowledge of Health Education is practically equal in boys and girls. The knowledge of pupils in the sample varies regionally and also among schools in one area. The pupils of the most successful school achieved on average of 83.2 correct answers, while the least successful schools achieved only 47.2. The most significant differences in knowledge are apparent in the pupils from the elementary schools in Brno and its surroundings. The level of knowledge of pupils from the city of Ostrava and its surroundings is more even. Pupils showed the most knowledge in human sexuality, assistance for people in emergency situations, health and first aid. Poor knowledge was found in healthy lifestyles, and the least knowledge in health risks and prevention.

It is important to teach pupils to understand what is beneficial and harmful to their health. The research has shown that there are significant regional differences in pupils' knowledge, as well as in their rate of success in mastering issues in Health Education. There is room for improvement in the quality of teaching, thus the students can better acquire the presented knowledge.

Keywords: questionnaire, protection, emergency situations, health promotion, first aid, prevention, risk, sexuality, school, health education, research, education, health, pupil, student, lifestyle

“Health is a condition in which the organism in its specific environment and using appropriate adaptive processes maintains the level and the course of its internal functions within a normal range.” (Kotulán, 2005, p. 123).

Health is one of the basic conditions for meaningful being and enables us to live a productive life. Health has not only a personal significant value, but also a social one, since a healthy individual is a basic prerequisite for the success and full development of society. (Čevela, Čeledová, & Dolanský, 2009).

Recently the concept of healthy lifestyle has received considerable attention. People have been aware of better protection of their health and the prevention or treatment of disease. A healthy lifestyle has become a natural part of our lives. We are responsible for our health, how we treat it, and can influence it positively and negatively (Havlinová, 1998; Komárek & Provazník, 2004).

Health Education in the Czech Republic was first accredited in 2004 at the Faculty of Education, Masaryk University, Brno. Subsequently, other faculties of education introduced it as well. The existence of this subject came into being due to the situation in society, as there were many changes that began to have a negative impact on human health. Not only has our way of life changed, but also the environment in which we live. Health education is a multi-disciplinary field emphasizing a holistic view of health, as it views a human being as a unified functioning unit. The aim of the field is to shift the focus of health care from a therapeutic approach to a preventive one, which means changing the way of human thinking (Havelková, 2009).

Health education in elementary schools should be effective, hence timely, systematic, comprehensive and well thought out. All pupils should gain specific knowledge that is appropriate to their age and acquire the necessary habits in order to be able to recognize what is harmful and beneficial to their health. The aim of health education is to raise conscious pupils who have positive attitudes towards a healthy life and respect the rules of a healthy lifestyle. Healthy lifestyle includes a varied and valuable diet in the appropriate quantity, a sufficient drinking regime, and suitable sports activities, plenty of sleep, rest and thermal/physical conditioning. A negative attitude to lifestyle is mainly associated with an unbalanced diet consisting of large amounts of salt, fats and simple sugars, overeating, lack of exercise, stress, tobacco use, alcoholism and other potentially addictive behaviours (Klíma, 2003).

Pupils need to be encouraged to realize that the main goal of a healthy lifestyle is not to achieve absolute perfection, but to approach it according to their abilities and possibilities (Lebedová, 2017).

Theoretical basis

Health Education and *Physical Education* are included in the educational area *Human and Health*. Health education leads pupils to develop and protect physical, mental and social health, including responsibility for their and others' health. Health Education is linked with the cross-sectional theme *Personal and Social Education*. It includes knowledge about oneself and also interpersonal relationships in general, as well as partnership, family and school relationships (Machová & Kubátová, 2006; Mužíková, 2010; NÚV, 2016).

The curriculum of Health Education at junior elementary school includes understanding the importance of health, basics about healthy nutrition, the need for sufficient quality sleep and physical exercise, the need for regularly spending time outside, protection against contagious diseases and injuries, personal hygiene, personal safety and warning against contact with strangers (Kotulán, 2005; Marádová, 2006; Mužíková, 2010; Mužíková, 2011).

The curriculum of Health Education at the senior elementary school comprises six basic areas (Marádová, 2006; Mužíková, 2010; Mužíková, Mužík, & Kachlík, 2006; NÚV, 2016):

- 1) *Relationships between people and forms of coexistence* (pair relationships; relationships and rules of coexistence within the community).
- 2) *Changes in human life and their reflection* (childhood, puberty, adolescence, sexual maturation and reproductive health).
- 3) *Healthy lifestyle and health care* (nutrition and health; external and internal health effects; physical and mental hygiene, daily routine; protection against contagious diseases; protection against chronic non-transmissible diseases and injuries).
- 4) *Health risks and their prevention* (stress and its relation to health; self-destructive addictions; hidden forms and degrees of individual violence and abuse, sexual crime; safe behaviour and communication; compliance with safety and health rules; manipulative advertising and information; human protection in emergencies).
- 5) *Value and promotion of health* (holistic conception of the human in health and illness; promotion of health and its forms).
- 6) *Personality and social development* (self-knowledge and self-concept; self-regulation and self-organization of activities and behaviour; psycho-hygiene; interpersonal relationships, communication and co-operation).

Objectives

The aim of the quantitative research was to map and evaluate the knowledge of the 9th grade pupils of elementary schools in Health Education and subsequently to improve the teaching of health education. The pupils' knowledge was tested through a questionnaire test.

Survey methodology

The survey used the method of quantitative research, which is frequently used in educational research (Gavora, 2010). This natural and comprehensive research was carried out in the spring semester of the 2018/2019 school year at 16 elementary schools in different parts of the Czech Republic.

An anonymous questionnaire for 9th grade pupils of elementary school was compiled by the authors in accordance with the Framework Educational Program for Primary Education of the Ministry of Education. Individual items of the questionnaire corresponded to the expected outcomes and content of the educational field Health Education (NÚV, 2016). The questionnaire had 100 items with multiple-choice answers from which the pupils were to select only one correct answer from four options. For a correct answer the pupil got 1 point; for a wrong answer 0 points. The time required to complete the questionnaire was 80 minutes, so teachers combined two lessons. The printed questionnaires were administered by teachers of health education. Teachers were present in the classes while students were filling in the questionnaires, thus there was a return rate of practically 100%.

The items in the questionnaire were divided into five basic thematic areas that corresponded to the curriculum content of the educational field:

- 1) *Healthy lifestyle and health care*, items 1–20 (health and illness, holistic concept of health, mental and physical health; importance of prevention; nutrition and drinking regime, alternative forms of nutrition, eating disorders).

- 2) *Health risks and their prevention*, items 21–40 (tobacco use, alcohol and other addictive substances; pathological dependencies and their prevention; consequences of addictive behaviour on the human body).
- 3) *Human sexuality*, items 41–60 (adolescence; safe sexual behaviour; pregnancy, contraception, family planning; sexual crime and violence; gender identity disorders, protection against sexually transmitted diseases, HIV/AIDS; crime and violence; awareness and information campaigns).
- 4) *Health and first aid*, items 61–80 (basics of human anatomy; prevention and medical care; civilisation diseases; first aid, integrated rescue system).
- 5) *Protection of human beings in emergency situations*, items 81–100 (natural disasters, and their consequences; passive and active protection; accidents involving leakage of dangerous or radioactive substances, terrorism).

Evaluation of three working hypotheses was another objective of this survey:

- Working hypothesis H₁: The average number of correct answers of girls is higher than the number of correct answers of boys.
- Working hypothesis H₂: Respondents from Prague and its surroundings achieve a higher number of correct answers than respondents from Brno and its surroundings.
- Working hypothesis H₃: The number of correct answers in human sexuality is higher than the number of correct answers in human protection in emergency situations.

Elementary schools from various localities of the regions of Southern Moravia, Moravian-Silesia and Central Bohemia, as well as the capital city of Prague were addressed using the method of deliberate selection (Průcha, 1995). The research sample included 600 pupils of 9th grade from 16 elementary schools. In order to maintain anonymity, individual schools were given numerical codes (01–16). Elementary schools from Brno and its surroundings, Prague and its surroundings, and Ostrava and its surroundings participated in the research. More detailed characteristics of the research sample are given in Table 1.

Table 1

Characteristics of the research sample (in absolute frequencies; classification by school, location and gender of respondents)

School code	Location	Total number of respondents	Number of boys	Number of girls
01	BS	23	14	9
02	BS	38	21	17
03	BS	20	9	11
04	BS	79	41	38
05	BS	40	18	22
06	BS	23	13	10
07	BS	37	19	18

08	PS	45	20	25
09	PS	28	14	14
10	PS	31	16	15
11	PS	29	16	13
12	PS	25	11	14
13	PS	24	13	11
14	PS	48	23	25
15	OS	52	27	25
16	OS	58	28	30

Shortcuts: BS – Brno and surroundings; PS – Prague and surroundings; OS – Ostrava and surroundings

The collected data were processed anonymously; data from printed forms were recoded and recorded in MS Excel 2007. Other operations were performed in the statistical software packages Statistica for Windows, v. 7cz (Statsoft, Inc., 2004) and Epi Info, v. 6.02en (Dean et al., 1994).

Tables of absolute and relative frequencies of individual characters were obtained. The items were sorted according to thematic areas of the curriculum, and according to the location, school and gender of respondents. The significance of the differences among groups in point gain was verified by using the parametric ANOVA test and non-parametric Kruskal-Wallis test for two groups; the homogeneity of variance was revealed by the Bartlett test. The significance of group differences for individual items in terms of correctness of responses was verified using the chi-square test, its modification according to Mantel-Haenszel and Yates, and Fisher's exact test (Hendl, 2004; Spousta, 2009). The internal consistency of the questionnaire (Cronbach alpha) was 0.69 (Statsoft, Inc., 2004).

Results of the research

The results of the research are presented in the tables with commentary. The following abbreviations are used: AVG = arithmetic mean, SD = standard deviation, MOD = mode, i.e. the most frequent value. In the whole sample, respondents achieved an average of 70.2 correct answers out of a maximum of 100 responses. Girls were slightly more successful than boys, with an average of 70.9 correct answers, while boys averaged 69.5 correct answers. See Table 2 (no statistical significance, Kruskal-Wallis, $p = 0.926$).

Table 2

Average number of correct answers per respondent (in absolute frequency, by gender)

Item	Total respondents	Boys	Girls
Total number of people	600	303	297
Average number of correct answers	70.2	69.5	70.9

The best and worst score of answers (maximum and minimum) and the most frequent value (modus) in the file is given in Table 3. The most successful respondent was a boy who was the only one to reach 94 points; 6 boys had 90 or more points. The most successful girl had 93 points; 3 girls had 90 or more points. The least successful respondent was a boy who had only 6 points. The least successful girls were 2, reaching 41 points. In this respect, the difference between boys and girls is more pronounced, although not statistically significant (Kruskal-Wallis, $p = 0.926$). The performance of girls can be considered more balanced than that of the boys.

Table 3

Respondents' success rates in the whole sample and classified by gender

Surveyed parameter	Number of points
Maximum success rate of respondents in the whole sample	94
Minimum success rate of respondents in the whole sample	6
The most common point gain (modus) in the whole sample	65
Maximum success rate of boys	94
Minimum success rate of boys	6
The most common point gain (modus) of boys	69
Maximum success rate of girls	93
Minimum success rate of girls	41
The most common point gain (modus) of girls	65

Respondents from elementary schools in Brno and its surroundings most frequently achieved a success rate (modus) of 86 points; respondents from Ostrava and the surrounding area had 70 points; and respondents from Prague and the surrounding area 65 points. The most successful and the least successful respondents are all from elementary schools in Brno and its surroundings (Table 4). There was a very significant difference between the overall success

rate of respondents from Brno and surroundings (AVG = 76.1 points, SD = 16.1) and Prague and surroundings (AVG = 65.8 points, SD = 4.9); (Kruskal-Wallis, $p < 0.001$), from Brno and surroundings and Ostrava and surroundings (AVG = 68.3 points, SD = 4.3); (Kruskal-Wallis, $p < 0.001$), as well as between the success rates of respondents from Ostrava and surroundings and Prague and surroundings (ANOVA, $p < 0.001$).

Table 4

Respondents' success rate sorted by location

Surveyed parameter in the location	Location and the number of points		
	Brno and surroundings	Prague and surroundings	Ostrava and surroundings
Maximum success rate of all respondents	94	78	78
Minimum success rate of all respondents	6	54	59
The most common point gain (modus) of all respondents	86	65	70
Maximum success rate of boys	94	78	78
Minimum success rate of boys	6	57	61
The most common point gain (modus) of boys	86	63	69
Maximum success rate of girls	93	74	76
Minimum success rate of girls	41	54	59
The most common point gain (modus) of girls	82	65	70

The knowledge of the pupils of individual schools seems to be significantly different (Table 5). The students of the most successful school achieved an average of 83.2 correct answers; the students of the least successful school only 47.2. The most significant differences in knowledge are apparent among pupils of elementary schools in Brno and its surroundings (BS). According to the average number of correct answers, out of the total of 16 participating schools, they ranked 1st – 4th, 12th, 15th – 16th, indicating significant differences in pupils' knowledge. On the contrary, the level of knowledge of pupils from Ostrava and its surroundings (OS) seems very balanced. The two participating schools ranked 5th and 6th. The elementary schools from Prague and its surroundings (PS) ranked 7th – 11th and 13th – 14th.

Table 5

Schools participating in the study ranked according to pupil's achievement

Ranking of school according to the success rate	School location	Code of school	Number of pupils	Total number of points	Average number of points per pupil
1.	BS	05	40	3,330	83.2
2.	BS	04	79	6,561	83.0
3.	BS	03	20	1,604	80.2
4.	BS	02	38	2,981	78.4
5.	OS	15	52	3,564	68.5
6.	OS	16	58	3,951	68.1
7.	PS	12	25	1,699	68.0
8.	PS	14	48	3,257	67.8
9.	PS	09	28	1,867	66.7
10.	PS	10	31	2,052	66.2
11.	PS	13	24	1,580	65.8
12.	BS	06	23	1,503	65.4
13.	PS	08	45	2,895	64.3
14.	PS	11	29	1,863	64.2
15.	BS	07	37	2,327	62.9
16.	BS	01	23	1,086	47.2

Shortcuts: BS – Brno and surroundings; PS – Prague and surroundings; OS – Ostrava and surroundings

Respondents from elementary schools in and around Prague were represented in the highest number (260 pupils), but they achieved the lowest average number of correct answers per person (65.8). Respondents from Ostrava and the surrounding area were represented in the lowest number (110 pupils) and achieved on average of 68.3 correct answers per person. The best knowledge was shown by respondents from Brno and its surroundings (230 pupils), who achieved an average of 76.1 correct answers per person (Table 6).

Table 6

Success rate according to the school location

Ranking of location according to the success point	School location	Number of pupils	Total number of points	Average number of points per pupil
1.	Brno and surroundings	230	17,504	76.1
2.	Ostrava and surroundings	110	7,515	68.3
3.	Praha and surroundings	260	17,101	65.8

Data in Table 7 show that the best knowledge by pupils was shown in human sexuality, where they achieved 8,810 points out of a maximum of 12,000 points. The second topic was human protection in emergencies, followed by health and first aid. Pupils showed somewhat worse knowledge in healthy lifestyle. The worst knowledge was in the group of questions concerning risks to human health and prevention, where they gained only 7,768 out of the possible 12,000 points.

Table 7

Success rate of respondents by topic

Ranking according to topic	Topics (20 items in each section)	Total number of points (max. 12,000)	Total success rate in % (n = 600)
1.	Human sexuality (items 41–60)	8,810	73.4
2.	Protection of human beings in emergency situations (items 81–100)	8,699	72.5
3.	Health and first aid (items 61–80)	8,526	71.0
4.	Healthy lifestyle and health care (items 1–20)	8,317	69.3
5.	Risks to health and their prevention (items 21–40)	7,768	64.7

Table 8 shows the results of when we sum up the achieved correct answers in the whole sample and sort the respondents according to gender and school location. Table 8 contains data both for the individual topics and globally for the whole questionnaire. The theoretical maximum score for a perfectly completed questionnaire would be 100 points with 20 points for each topic.

Table 8

Success points for correct answers from questionnaire according to different types of data sorting

Topic	Whole sample (n = 600)	Boys (n = 303)	Girls (n = 297)	Brno and surroundings (n = 260)	Prague and surroundings (n = 230)	Ostrava and surroundings (n = 110)
Healthy lifestyle and health care (1)	AVG 13.9 SD 2.8 MOD 13.0	AVG 13.9 SD 3.1 MOD 13.0	AVG 13.8 SD 2.6 MOD 13.0	AVG 15.1 SD 3.5 MOD 17.0	AVG 12.8 SD 2.0 MOD 13.0	AVG 13.7 SD 1.9 MOD 13.0
Risks to health and their prevention (2)	AVG 12.9 SD 3.1 MOD 14.0	AVG 12.7 SD 3.3 MOD 12.0	AVG 13.2 SD 2.9 MOD 14.0	AVG 14.5 SD 3.7 MOD 17.0	AVG 11.8 SD 2.3 MOD 12.0	AVG 12.4 SD 2.0 MOD 12.0
Human sexuality (3)	AVG 14.7 SD 3.5 MOD 13.0	AVG 14.5 SD 3.9 MOD 13.0	AVG 14.9 SD 3.0 MOD 15.0	AVG 16.4 SD 4.4 MOD 19.0	AVG 13.2 SD 2.1 MOD 13.0	AVG 14.5 SD 2.0 MOD 15.0
Health and first aid (4)	AVG 14.2 SD 2.5 MOD 15.0	AVG 14.1 SD 2.8 MOD 16.0	AVG 14.4 SD 2.1 MOD 15.0	AVG 14.4 SD 3.1 MOD 16.0	AVG 14.0 SD 2.1 MOD 14.0	AVG 14.3 SD 1.8 MOD 14.0
Protection of human beings in emergency situations (5)	AVG 14.5 SD 2.6 MOD 14.0	AVG 14.4 SD 2.9 MOD 14.0	AVG 14.6 SD 2.3 MOD 15.0	AVG 15.7 SD 3.1 MOD 16.0	AVG 13.9 SD 1.9 MOD 14.0	AVG 13.4 SD 1.9 MOD 13.0

Summary of all topics	AVG 70.2	AVG 69.5	AVG 70.9	AVG 76.1	AVG 65.8	AVG 68.3
	SD 11.6	SD 13.4	SD 9.4	SD 16.1	SD 4.9	SD 4.3
	MOD 65.0	MOD 69.0	MOD 65.0	MOD 86.0	MOD 65.0	MOD 70.0

Although the average highest number of correct answers by respondents was achieved in human sexuality, none of this group of questions was individually among the questions with the highest number of correct answers. Among the five most successfully answered items, there were three in human protection in emergency situations, one in health risks and prevention. The most successfully answered item is the question of healthy lifestyle with 571 correct responses (Table 9).

Table 9

Items with the most correct answers

Ranking of successfully answered topics	Items with the most correct answers (max. number of correct answers = 600)	Number of correct answers	Percentual success rate (%)
1.	An alternative way of eating where a person does not eat meat or meat products is referred to as: <i>vegetarianism</i> .	571	95.2
2.	Before leaving a dwelling during evacuation (mark wrong answer): <i>carefully clean and wash the windows</i> .	560	93.3
3.	Emergency hotline number within Europe is: <i>112</i> .	556	92.7
4.	During school evacuation: <i>pupils leave school together with their teacher to keep track of everyone</i> .	542	90.3
5.	The organization was established in 1967 as a co-ordinating body for road safety. It deals mainly with prevention in the field of traffic and traffic education. This is: <i>BESIP</i> *.	539	89.8

* *BESIP* from Czech translation *Bezpečnost a ochrana silničního provozu (Road safety)*

The items with the lowest number of correct answers included questions from all areas except those concerning human sexuality. The item with the lowest number of correct answers (120 out of the maximum possible number of 600) was prevention, particularly the meaning of the term *resilience* (Table 10).

Table 10

Items with the lowest number of correct answers

Ranking of successfully answered topics	Items with the lowest number of correct answers (max. number of correct answers = 600)	Number of correct answers	Percentual success rate (%)
1.	Resistance to negative influences, especially psychological nature, is called: <i>resilience</i> .	120	20.0
2.	This neurological seizure is characterised by convulsions and unconsciousness. We distinguish tonic and clonic seizures. During a tonic seizure, the affected person falls unconscious, the eyeball is turned to the side, the upper limbs are bent, and the lower limbs are stretched. It is accompanied by convulsions, foaming at the mouth, body jerking, the release of sphincters. This is: <i>epilepsy</i> .	141	23.5
3.	This condition is caused by the effect of direct sunlight, shining on the exposed head for a long time, resulting in the brain overheating, headache, fever and weakness. The severe form can cause brain swelling and death. This is: <i>heatstroke</i> .	149	24.8
4.	The critical angle for an avalanche is: 22°–25°.	212	35.3
5.	Choose the right statement: <i>fats containing unsaturated fatty acids should predominate in the diet</i> .	213	35.5

Analysis of working hypotheses

Working hypothesis H_1 : *The average number of correct answers of girls is higher than the number of correct answers of boys.*

The Kruskal-Wallis non-parametric test (Kruskal-Wallis $H = 0.009$, $p = 0.926$) was used to compare both groups. There was no statistically significant difference in the number of correct answers between girls and boys. The girls reached an average of 70.9 points (SD = 9.4), while the boys reached 69.5 points (SD = 13.4). The analysis of hypothesis H_1 shows that girls were slightly more successful, but at a level that is statistically insignificant. Hypothesis H_1 was falsified.

Working hypothesis H₂: *Respondents from Prague and surroundings achieved a higher number of correct answers than respondents from Brno and surroundings.*

The Kruskal-Wallis non-parametric test (Kruskal-Wallis H = 169.255, $p < 0.001$) was used to compare both groups. A statistically significant difference was found between the number of correct answers of respondents from Prague and its surroundings and from Brno and its surroundings. Respondents from Prague and surroundings achieved an average of 65.8 points (SD = 4.9), while respondents from Brno and surroundings achieved an average of 76.1 points (SD = 16.1). An analysis of hypothesis H₂ shows that respondents from Prague and its surroundings did not gain more points than the respondents from Brno and its surroundings. Hypothesis H₂ was falsified, thus validating the opposite.

Working hypothesis H₃: *The number of correct answers in human sexuality is higher than the number of correct answers in human protection in emergency situations.*

A chi-square test ($\chi^2 = 2.60$, $p = 0.107$) was used to compare both groups. No statistically significant difference was found between the number of correct responses from either of the monitored groups. In terms of questions concerning human sexuality, respondents achieved a total of 8,810 points out of the maximum possible 12,000 points. Respondents obtained 8,699 points on issues related to human protection in emergency situations. Hypothesis H₃ was falsified.

Summary and discussion

Respondents from 16 elementary schools achieved an average of 70.2 points out of 100. The girls were slightly more successful than the boys, with an average of 70.9 correct answers, while the boys had 69.5. We can say that the level of knowledge of 9th grade boys and girls in Health Education is quite comparable.

The most successful respondent was a boy who was the only one to reach 94 points and 6 boys gained 90 or more points. The most successful girl achieved 93 points. Three girls had 90 or more points. The least successful respondent was a boy who achieved only 6 points. The least successful girls were two with 41 points. In this respect, the difference between boys and girls seems more pronounced. Overall the girls' performance was more balanced than that of the boys.

The level of pupils' knowledge in the sample of individual schools is varied. Pupils of the most successful school achieved an average of 83.2 points. The pupils of the least successful school achieved only 47.2 correct answers. The most significant differences in the level of knowledge are apparent in the sample of elementary schools in Brno and its surroundings. According to the average number of correct answers, out of the total number of 16 participating schools, the Brno schools ranked 1st – 4th, 12th, 15th – 16th place, which indicates significant differences in pupils' knowledge. On the contrary, the level of knowledge of pupils from Ostrava and its surroundings seems very balanced. Two participating schools ranked 5th and 6th Elementary schools from Prague and its surroundings ranked 7th – 11th and 13th – 14th.

Respondents from elementary schools in Prague and its surroundings were represented in the highest number (260 pupils); however, they achieved the lowest average number of correct answers per respondent (65.8). Respondents from Ostrava and its surroundings were represented in the lowest number (110 pupils) and achieved an average of 68.3 correct answers. In general, the best knowledge by respondents was shown from Brno and its

surroundings (230 pupils), who achieved on average of 76.1 correct answers per respondent. Respondents from elementary schools in Brno and its surroundings reached 86 points; respondents from Ostrava and surroundings 70 points; respondents from Prague and surroundings 65 points. The most successful and the least successful respondents were all from a sample of primary school pupils in Brno and its surroundings.

Pupils generally showed the best knowledge in human sexuality, where they gained 8,810 points out of a possible maximum of 12,000. This was followed by human protection in emergency situations, health science and first aid. The pupils showed the worse knowledge in healthy lifestyle, and the worst in the group of questions concerning health risks and prevention, where they achieved only 7,768 out of a possible 12,000 points.

Although the average highest number of correct answers by respondents was achieved in human sexuality, none of the items in this area was individually among the questions with the highest number of correct answers. Of the five most successful items, three came from the topic human protection in emergency situations; one of the questions was related to health risks and prevention. The most successful item, with 571 correct answers, was among the questions on healthy lifestyle.

Among the items with the lowest number of correct answers, there were questions from all areas of the curriculum except human sexuality. The item with the lowest number of correct answers (120 out of the maximum possible 600) was among the topic risks to health and prevention.

Conclusion

The aim of Health Education is to offer pupils the latest knowledge in this field, to teach them behaviours that are beneficial to their health, teach them about the risks to human health and the problems associated with illness or worsening health. Pupils should acquire skills and consolidate habits that lead to maintaining and strengthening their health, but they should also acquire the necessary level of responsibility for their own and others' health. Emphasis should be placed on decision-making on issues relating to the self, accountability in action, and an active approach to the development and protection of physical, mental and social health. Health education also includes the promotion and development of positive peer, partner, marriage and family relationships.

It is important to teach pupils to understand what is beneficial and harmful. Attention should also be paid to the formation of values of life and basic ethical and moral attitudes, and to realize the important role of the teacher who is able to influence the pupils' attitudes with a positive personal example. A healthy lifestyle should become a natural part of human life, as health is a value that must not only be discussed but also be actively addressed. The basic goal of health education is a physically, mentally and socially healthy individual who will live a full, satisfied and active life. He or she will appreciate his/her health and know how to preserve and protect it.

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New Concept of Health and Safety Education Curriculum in the Context of Teacher Education in the Czech Republic

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Abstract: The article responds to the current situation in the preparation of the revision of the framework education programmes in the area of health education (human personality development, health promotion and safety protection). Based on the results of research surveys carried out at the Faculty of Education of Charles University in recent years, it draws attention to problems related to the implementation of the current curriculum of health education into the educational reality of elementary schools. It emphasizes the need to draw up a revised curriculum in accordance with the possibilities of its implementation in educational practice. The justification of the requirement to update the content of education in line with societal needs is illustrated by a presentation of research in which pupils' behaviour in cyberspace was monitored and new challenges for framework education programmes were revealed. In connection with the upcoming curriculum changes, attention is also drawn to the need to ensure adequate teacher training. The current intentions in health and safety education in the Czech Republic are reflected with inspirational ideas from abroad (England, Ireland and Finland).

Key words: health education, safety protection, safety on social networks, framework education programme, teacher education, health education in Finland, England and Ireland

Health and safety education is an important component in developing life literacy and readiness to live a full life. Curriculum documents (framework education programmes), with their concept and content, have grounded health issues as an essential part of school education. The Framework Education Programme for Elementary Education (FEP EE, 2007), which was a major challenge for elementary schools to address the development of key human competences, pupil's life and professional skills and to develop their own school curricula, can be considered as a key document. In order to meet the objectives of health promotion, it offered several levels which have a formative educational function, enabling schools to develop a positive attitude towards health among pupils and teach them the necessary skills. The implementation of health education in the "life of the school" as well as in the educational content realized in the classroom required a specific systemic approach based on a perfect understanding of health issues (holistic health model) and on lifelong development strategies for health literacy. This was not a simple matter for designers of school educational programs.

The implementation of educational objectives in the area of health promotion and safety protection in schools has become the subject of research at universities and has also been monitored in the surveys of the Czech School Inspection (ČŠI, 2014). The results of the available studies show that the evaluation of the quality of school education in the area of health promotion and safety is usually approached in two steps. First, the concept of curriculum designed at school level (including the inclusion of health education in the

curriculum) is assessed, followed by the processes that take place during its implementation (in the classroom) and, where possible, the outcomes of education. (Fialová et al., 2014).

In the discussion of the upcoming curriculum revision, it is possible to rely on a number of studies that show the development of the curriculum transformation in the given area and the current state of education (Marádová, 2009; Mužíková, 2010). They note an indisputable shift in creating conditions for developing pupils' health literacy:

- A way has been opened to transform the expected outcomes of the framework curriculum into school education programmes.
- Schools have gained experience in the process of implementing health and safety education in school education (both in instruction and in school life) and they continue to take advantage of the experience.
- The foundation of the health and safety education curriculum has been verified in the everyday practice of schools over a period of ten years.

At the same time, however, they draw attention to the problems related to the establishment of the new concept of Health Education:

- The way health education is implemented in school programmes varies significantly from one school to another. Somewhere it is incorporated in line with the requirements, but in many monitored primary schools the quality of education in the given field cannot be guaranteed.
- The biggest barrier to meeting the expected outcomes is the insufficient time allocation for health education as determined by the syllabus.
- The quality of a curriculum designed at school level depends on the erudition of health education teachers. A number of elementary schools address the absence of a qualified health education teacher by integrating the educational content of this field into other subjects, which usually leads to a significant reduction in educational content. (Marádová, 2010)

The available sources on health and safety education thus provide information on what schools are successful in, what problems teachers face, what they miss, what kind of help they would appreciate, etc. These facts should be taken into account in the upcoming revision of the FEP. Essential requirements include linking and developing educational content between the individual educational levels from pre-primary to upper secondary education, removing content overlaps, combining education with school life and pupils' daily routine (connecting formal and informal curricula).

Other education requirements that need to be reflected in the revised FEPs are related to ongoing societal changes. In education that will ensure the development of health and safety literacy it is necessary to take into account:

- the development of scientific knowledge in the scientific fields that constitute the knowledge base (especially medicine),
- new societal needs (in cases of emergency),
- attitude of the society towards life value and taking own responsibility for health, and family.

The justification of the requirement to update the content of education in accordance with the needs of the society is demonstrated by a research survey carried out in 2018.

Objectives

The aim of the research was to determine the level of risk arising from primary school pupils' use of a virtual environment, to monitor the amount of personal information published on Internet servers with special regard to social networks.

Over the last few years, communication through social networks has grown enormously. Their popularity is particularly evident in the lower age categories. The official lower limit for using the most popular social networks is 13 years of age. Nevertheless, it has been recorded that in the Czech Republic even children aged 9–12 are active on the internet. Popular social media of this age category include YouTube (93% of users), Instagram (78% of users), and Facebook (60% of users). It is worrying that 42% of users in this age group communicate with people they have never seen. (Avast, 2018)

The following research questions were formulated for the research:

- 1) Is the rate of social networking used by elementary school pupils related to their age?
- 2) To what extent do pupils include their personal data on their profiles?
- 3) What is the percentage of significant risk behaviour?
- 4) To what extent are pupils able to reflect on their own behaviour in cyberspace?

Methods

The questionnaire survey method was chosen to answer the research questions. The research tool contained 15 selective response items. The evaluation included 1180 questionnaires completed by lower secondary pupils of elementary schools in the selected region.

Results

For the purpose of this study, we present here selected research results related to research questions.

- 1) 97% of elementary school pupils use their own profile on some social network. In the sixth year 97%, in the seventh 97%, in the eighth 95% and in the ninth 98%. There was no change in age-related use. Already in the 6th grade the percentage is very high, at the lower age than 13 years. 76% of pupils have Facebook profile, 83% of pupils have Instagram profile. 66% of pupils use both Instagram and Facebook. Most pupils are only recipients of information, rather than public disseminators or creators. They usually contribute once a month (42%) or weekly (38%), only 6% of social network users contribute to them daily.
- 2) 92% of pupils active on social networks publish personal data or data on their profiles, which is 89% of the total number of respondents. 79% of pupils use their real photo, 90% of pupils use their real name, 68% of pupils use their real email address, and 39% of pupils on social networks even give their real phone number. The real name and the photo are given more often by girls than boys.
- 3) In the past, 14% of pupils shared intimate information or photos, two thirds of whom were girls. 48% of pupils communicated with an unknown person. Boys have stranger's contacts to strangers more often and communicate with them more often than girls. Girls more often shared their intimate data or photos. At the same time, they said more often that they regretted something they had shared in the past.

- 4) 49% of respondents answering the question about reflecting their own behaviour (“Do you feel that you should behave more carefully in the Internet environment?”) said that they did not feel this way. Yet 82% of pupils who answered “no” to this question previously shared something they regretted, shared their intimate photos, were directly involved in cyberbullying, had something on their profile that they were ashamed of or had strangers as internet friends or even communicated with them. Only 18% of those who think they are really cautious about social networks and cyberspace really do comply with the principles of non-risk behaviour.

The results of the research, which are not fundamentally different from the results of previously published Czech and foreign studies, clearly show that the use of cyberspace is a significant risk for elementary school pupils, which they do not realize and usually underestimate. This is a fundamental argument and guideline for the planned revision of the framework education programmes in the field of “Man, His Personality, Health and Safety”. This curriculum update, which will undoubtedly increase the importance of the area in terms of readiness for life, should be reflected in teacher training.

Curriculum revision and current requirements for teacher education

The key to the successful implementation of the upcoming revision of the curriculum in practice will be in the hands of teachers (teachers, educators, special educators, teacher assistants, etc.). Therefore, it is necessary to pay sufficient attention to undergraduate training of teachers in view of the need to develop competences in the field of health and safety literacy and to consider how to include this issue in newly accredited degree programs. The required implementation of health promotion in school education programmes places specific demands on teachers working at the primary level. Also the cooperation of all teachers at the lower secondary level of elementary school or grammar school has its specifics. Practising teachers should be offered appropriate opportunities for further education, both professionally and in terms of didactics.

Based on many years of experience in preparing teachers in the field of healthy lifestyle education at the Faculty of Education, Charles University (Marádová, 2016) it is recommended to incorporate this issue into curricula using the following system:

- a) To develop personal health and safety literacy in all future teachers: to provide expertise on health promotion and safety protection; to facilitate orientation in information sources, to deepen the relationship of students to health, to motivate them to protect their own and others' health, to teach them to provide pre-medical first aid, to develop skills that determine a healthy lifestyle and quality of life.
- b) To promote the pedagogical competency of students to protect the health and safety of their pupils: to equip them with the legal awareness needed to ensure the safety and health of pupils, to develop the social skills necessary to assist the child in a health and safety risky situation, to develop skills necessary to participate in creation and implementation of school projects supporting health (Kovaříková & Mazáčová, 2019).
- c) To include courses in preschool education and primary education teacher training programs, which will enable students to understand the importance of broad-based health promotion in preschool or primary education and to acquire the necessary theoretical fundamentals of health and safety education. The focus of the follow-up didactic preparation lies in the activity and experiential learning, in the development of abilities to

help children and pupils to cope with potentially difficult life situations, to manage stress and to effectively resist all forms of self-destruction.

- d) The preparation and successful implementation of the health promotion and safety protection program at schools requires a professional guarantee, which should be provided by a graduate teacher training for primary and secondary education – health education. This health and safety education specialist is not only able to teach and educate health education topics, but also to provide professional and methodological assistance to others. As a qualified pedagogical worker, he/she is equipped with the necessary competencies, both theoretical and didactic.

Health education and teacher training in health in examples from abroad

The current preparation of the revision of the framework education programmes in the area of health education in the Czech Republic could be a suitable moment for looking at the situation with health education abroad. Our intention is to present different approaches to health education and teacher training taken in Finland, England and Ireland with the aim to demonstrate the interdependence of the attitude of the government policy, implementation of health education in schools and teacher health training.

School and its teachers influence children for a long span of time and therefore teachers' role as health supporters and health educators is highly important. It is therefore crucial for teachers to receive quality health and well-being training before they enter the profession (Byrne et al., 2016; Jourdan et al., 2008). Health education in schools and teacher training in health subjects varies considerably in different countries. The international literature (Byrne et al. 2016; Pickett et al., 2017) on teaching health issues at school confirms that successful outcome in this field depends on the positive attitude of school leaders and staff about health and wellbeing, health-supporting organisation and atmosphere of the school, well-designed health education programmes and well trained and prepared teachers. The attitude of school leaders, teachers and other school staff as well as parents, pupils and general public towards health education in schools depends to a large extent on the attitude of the state to health issues in education and consequently the support provided. Health is often proclaimed as one of the priorities in education. However, the real promotion and support received from the state is crucial and determines the level and quality of health education implementation in the reality of schools.

England

An example illustrating the impact of the government policy is the recent development in health education in England. In the national curriculum in England, health education is covered within the subject Personal, Social, Health and Economic Education (PSHE). The national curriculum includes both statutory and non-statutory subjects. PSHE has been part of the national curriculum since 2000 as a non-statutory subject. To allow schools and teachers to be more flexible in teaching PSHE, the government did not see it necessary to set compulsory guidelines for this subject. Even after the government's review of PSHE in 2013 the subject remained non-statutory. Consequently, schools themselves can decide how they will deliver PSHE. Byrne et al. in 2016 present this fact as one of the factors contributing to the situation when delivery of PSHE varies widely from school to school in both extent and quality.

The situation of PSHE implementation in schools is also reflected in teacher training. According to Byrne et al. (2015) pre-service teacher training in England is currently provided mainly by Higher Education Institutions at undergraduate or post graduate level. The status of PHSE within the training is, however, not firmly grounded due to its non-statutory character and following the absence of any explicit reference to health and wellbeing in Teachers' Standards from 2012 (DfE, 2012).

Recently, however, there has been a significant change in the government's strategy. In 2017, the government (DfE, 2019a) recognized the need to introduce three subjects dealing with health and wellbeing issues as statutory. Relationships Education (RE) should be compulsory for all primary pupils, Relationships and Sex Education (RSE) for all secondary pupils and Health Education for primary and secondary pupils in all state-funded schools from September 2020. PSHE continues to be compulsory in independent schools. The introduction of HE as a statutory subject seems to be generally welcome, RSE, on the other hand, raises some controversy on the part of parents and some religious groups (DfE, 2019b). Every school will have to decide on how to deliver the subjects. According to the guidelines of the Department of Education (DfE, 2019a) some schools might choose to deliver RE or RSE within PSHE programme as they already have experience in this organization with good outcomes. Others may choose different models for delivery of the subjects. It will also be necessary to ensure that RE, RSE and HE complement content covered in subjects such as citizenship, science and PE without duplicating. The statutory character of the three subjects will undoubtedly be reflected in pre-service teacher training as well. The implementation of the changes will certainly bring new experiences and possibilities as well as challenges and problems to be tackled. Nevertheless, the future development in health education in England might serve as inspiration for other countries.

Ireland

Health education in Ireland belongs to the area of Social, Personal and Health Education (SPHE). Materials of the National Council for Curriculum and Assessment (NCCA, 2000, 2011) emphasize the importance of the whole-school climate for successful SPHE and state that from this point of view every teacher in school is in fact a teacher of SPHE. However, Mannix McNamara et al. (2012) argue that teachers do not perceive themselves in this way. The reality is that the subject of SPHE enjoys lower status in comparison with sciences and specialized subjects. The reason is the absence of formal examination in SPHE within the Irish education system where examination plays a dominant role. Examination performance of students determines their teachers' reputation and therefore teachers concentrate on examination subjects and rather avoid SPHE. Similarly, students, not being required to take examination in SPHE, perceive SPHE as a subject of lower importance.

There is very little or no pre-service teacher education in SPHE in Ireland (Mannix McNamara et al., 2012). It is not surprising then that without having no chance to develop knowledge and skills for teaching about health, teachers do not think of themselves as of health promoters or educators. The notion of all teachers being teachers of SPHE would need support in the form of healthy environment in schools and appropriate pre-service teacher training in SPHE.

Finland

Paakkari (2012) describes the introduction of Health Education (HE) into the Finnish school system. HE became a new independent and obligatory subject in Finnish primary and secondary education in 2001. While in grades 1–6 health issues are covered within other subjects, from grade 7 HE is delivered as an independent subject. Students can even take HE as part of their matriculation examination. At the same time, health issues are recognized as a cross-curricular theme and as such it should be included in all subjects.

Since August 2012 teachers of HE have been required to have teaching qualifications needed for a subject teacher who specializes in a particular subject. A qualified HE teacher must take basic and intermediate levels of health education. The studies are provided in both pre-service and in-service forms. Teacher training programs at different universities are fairly similar. Paakkari (2012) presents the program at the University of Jyväskylä. Currently, training teachers at this university can study HE as their second subject, the first subject being mainly physical education.

Examples of the three countries illustrate the impact of the government attitude to health and wellbeing in education, implementation of health education programs in schools and pre-service health teachers' education. Schools educating children as well as universities training new teachers need clearly defined strategy and support from the government to be able to assure quality in health education.

Conclusions

It is expected that the revision of the Framework Education Programmes in the Czech Republic will be an opportunity to make such changes in the concept of the framework curriculum, which will contribute to increasing the necessary credibility of the relevant educational area at all levels of education including the promotion of a legitimate requirement to increase the scope for implementing health and safety education objectives in syllabi. This should be a challenge for faculties preparing teachers to expand their educational offers with subjects developing interactive health and safety literacy of teachers and to create conditions for the development of didactics of health and safety education as an important scientific discipline. It is desirable to consider and possibly apply the experience from abroad when preparing and implementing the outlined plans. It is evident from the examples presented that implementation of quality health education at school level requires support from the government as well as well qualified teachers. At the time of updating the curriculum in the Czech Republic, there is a great opportunity to enhance the system of pre-service teachers' education to help facilitate the process of health and safety education in schools and increase the credibility of this area.

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Evaluation of Pilot Verification of an E-learning Course on Security Issues at the Faculty of Education of the Charles University

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Abstract: The paper presents the evaluation of pilot verification of a module e-learning course on security issues for students of the follow-up master's programme. The paper brings information on the structure and contents of the course, as well as experience from the first year of its implementation. The text brings information on the results of a survey conducted among students who completed the course. The conclusion summarizes the results of the survey and their use for updating the course.

Key words: e-learning, security issues, evaluation of importance of the course, evaluation of difficulty of the course, evaluation of interest in the course

Inclusion of security issues to university education of teachers at the Faculty of Education of the Charles University takes place on the basis of implementation of the Government Decree No. 734, document *Incorporation of the topics Protection of people in extraordinary events, health care and road safety education to study programmes of faculties of education*, although the current wording of the above decree is not binding in terms of implementation. The module e-learning course *Training before teaching practice* was launched at the Faculty of Education of the Charles University in winter semester of the academic year 2018/2019⁶.

Starting points

In the academic year 2017/2018, the preparation of a course on security issues focused on common risks and extraordinary situations at school for undergraduate students of the Faculty of Education of the Charles University was launched. It was necessary to create the contents of the course, as well as prepare study texts for individual modules of the e-learning course. The preparation of the course was based on the recommendations of the European Agency for Safety and Health at Work (EU OSHA, 2009). The publication *Occupational safety and health and education: A whole-school approach* (Bruck, 2013) lists recommendations for successful inclusion of security issues to teachers' undergraduate training (Kovaříková, 2018). The following recommendations were used to create the course.

- 1) Security education must be limited to key aspects using actual cases, problem-solving methods and active learning.
- 2) To incorporate the issue, use existing courses as updates of current subjects, in particular in common pedagogical preparation.
- 3) Make use of the possibilities of e-learning courses which offer students the option of individual fulfilment.

⁶ Hereinafter referred to as the *course*.

- 4) Cooperate with the Integrated Rescue System during the course preparation and implementation.
- 5) Cooperate with other universities engaged in teacher preparation and share materials on security issues.

As for the first point of the recommendation concerning the definition of key aspects of the issue, topics were defined based on discussion of selected academic staff with members of the inter-sector expert working group for security topics. The following topics were determined:

- common risks at school (injuries, first aid);
- traffic safety;
- emergency situations (fire protection);
- amok, armed attacker in school;
- selected school safety legislation;
- information security.

As for the second point of the recommendation, on the use of existing courses, the courses Continuous Professional Practice at Primary School and Continuous Professional Practice at Secondary School were used for implementation. The course was presented as an update of the current texts for students in Moodle and was redesigned to e-learning structure, not as an introduction of a new course (see recommendation no. 3). The course is completed with a certificate which the student prints themselves on the basis of an immediately automatically evaluated control test. The test includes control questions from all modules. Printed certificates are added to students' portfolios from professional practice. In creating the contents of the e-learning, we cooperated with professionals from the respective units of the Integrated Rescue System, particularly for the purpose of reviewing individual parts (see recommendation no. 4). The course has currently been adopted and used by the Hussite Theological Faculty in Prague and negotiations with other institutions are underway (see recommendation no. 5).

The course was opened to students in the academic year 2018/19. Students were trained before entering continuous professional practice.

Methodology

Data were collected electronically during May and June 2019. Individual modules of the course were anonymously evaluated by respondents in terms of selected criteria. The questionnaire included both closed and open-ended questions. Questions were focused on subjective evaluation and reflection of the course. This included the fulfilment of participants' expectations, usefulness and practical applicability of individual topics. We also learned about satisfaction with organization of education, methods used and professional level of education. Open-ended questions allowed to pass any recommendations for implementation. It was also examined how individual participants perceive tangible benefits of education for their work. We received a total of 148 questionnaires. The questionnaire measured 21 parameters evaluated by respondents on a 1 to 10 scale.

Objectives of the survey

To learn the evaluation of the new course in terms of its importance for actual teaching practice, evaluation of difficulty of individual topics in study and evaluation of interest in individual topics.

To use the data obtained to modify the course and learning curriculum of security issues and used educational methods, as well as for final text editing and creating methodology of security issues.

Hypotheses

- 1) Respondents from practice (students of combined studies) generally evaluate the importance of the course and its benefits for practice at school as more important.
- 2) Respondents from practice (students of combined studies) generally evaluate the importance of individual parts of the course as more important.
- 3) Respondents from practice (students of combined studies) generally evaluate the benefits of the course for practice at school as more important.
- 4) Number of years of experience affects the evaluation of total importance of the course.
- 5) Number of years of experience affects the evaluation of importance of individual parts of the course.
- 6) Number of years of experience affects the evaluation of benefits of the course for practice at school.
- 7) Among women, the total importance of the course was generally evaluated as more important.
- 8) Among women, the total importance of individual parts of the course was generally evaluated as more important.

Methods

Descriptive statistics and nonparametric statistical methods were used for the analysis. *Mann – Whitney test, Spearman’s Rank correlation coefficient and Somers’ D coefficient* (Hebák, 2013). Data were tested to meet the assumption of normal distribution which was rejected based on the Shapiro-Wilk test. Since the data from the questionnaire are also ordinal, nonparametric statistical methods were used for further analyses.

Mann – Whitney test for two independent samples, the test compares medians, or the whole distribution of variables, and tests their conformity. As it is based on ordering of all measured values in ascending order of their size, it can also be used for ordinal variables. The test criterion U is the number of all cases in which the values of one selection precede the values of the other. The hypothesis can be verified by comparing the resulting P-value with the significance level, usually chosen as $\alpha = 5\%$. If the P-value is greater than 0.05, we cannot reject the tested hypothesis of the same level in the groups. On the contrary, it can be rejected at a value lower than 0.05 which proves dependence of the level on the factor observed. (Pecáková, 2011).

Spearman’s Rank correlation coefficient

The Spearman’s coefficient measures the intensity of dependence of the order of the characters of the variable observed. It is used to measure the association of two ordinal variables for which non-parametric testing is required. It takes values between $< -1; 1 >$; extreme values denote absolute dependence, the sign indicates the direction: plus for direct, minus for indirect dependence. Lower values mean weak or moderate dependence. The statistical significance of this coefficient is verified using the test and its respective P-value. If it is lower than the selected significance level, often 0.05, the dependence measured by the

coefficient is considered statistically significant. The strength of the correlation is determined by the value of this coefficient. (Hebák, 2013).

Somers' D coefficient

The Somers' coefficient measures the relationship between two ordinal variables. Its asymmetric variant can also take into account the direction of dependence. The extreme values from $< -1; 1 >$; indicate the strength of the association. The statistical significance of this coefficient can also be observed using the test and its respective P-value. (Hebák, 2013).

Evaluation, descriptive statistics

The sample of respondents consists of one tenth of men, the rest being women (Figure 1).

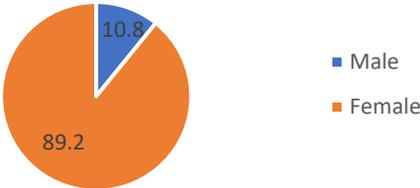


Figure 1. Gender of respondents.

Further identification data observed included type of studies. More than half of respondents has full-time studies, others study in combined studies. Only two respondents specified both types of study (Figure 2).

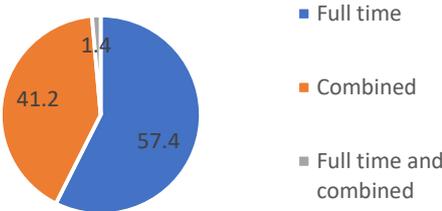


Figure 2. Types of study.

In the introductory part of the questionnaire, respondents were asked whether they perceive the course as beneficial for teaching practice. According to 83.8% of respondents, the course is beneficial for teaching practice (Figure 3).

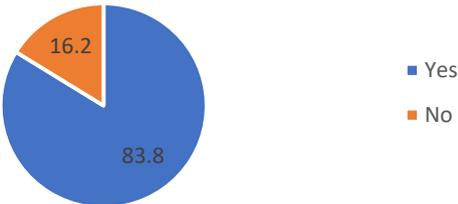


Figure 3. Perceive the course.

Average time spent by studying the course was 4 hours, the middle median value of the coordinated set is 2 hours. The time ranges from 0 to 80 hours (Figure 4).

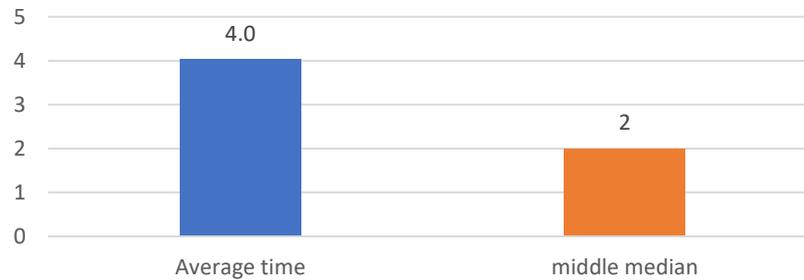


Figure 4. Time spent by studying course.

Evaluation of importance of the course

The course was further evaluated in terms of importance for teaching practice, difficulty and interest in its contents. These three parameters were chosen as the key factors for students' motivation to study the course (for more details, see for example Hrabal & Pavelková, 2010). Average evaluation of the course importance was 45.5, with 29.7 for difficulty and 37.6 for interest. The middle median value of the coordinated set was 47 for importance, 30 for difficulty and 38 for interest. The most common modal value is for importance and 30 for both difficulty and interest. The ratings always range from 6 to 60 (Table 1, Figure 5).

Table 1

Evaluation of importance of the course

	Importance	Difficulty	Interest
Average	45.5	29.7	37.6
Middle median	47	30	38
Modus	60	30	30
Standard deviation	11.277	12.228	12.687
Minimum	6	6	6
Maximum	60	60	60

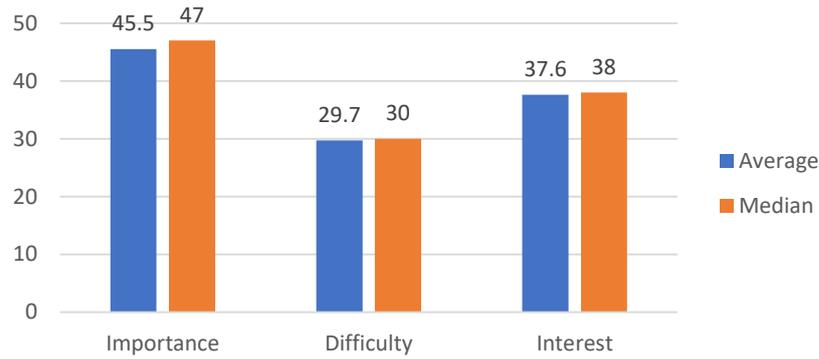


Figure 5. Evaluation of importance of the course.

Evaluation of difficulty of the course

The highest average evaluation of difficulty of the course is 5.4 for school legislation, 5.2 for information security and 5.0 for active shooter (Figure 6).

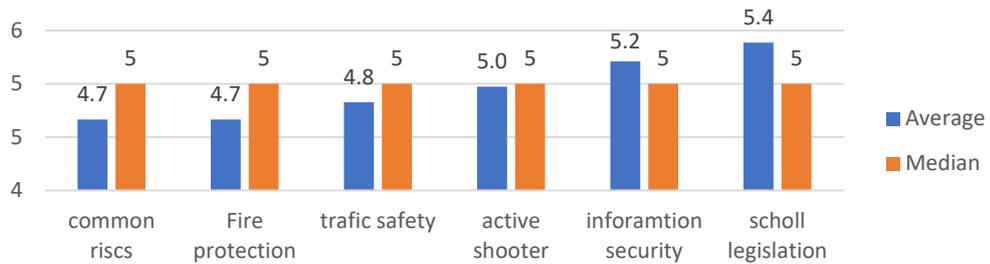


Figure 6. Evaluation of difficulty of the course.

Evaluation of interest in the course

The highest average evaluation of interest in the course is 7.0 for active shooter, followed by 6.6 for traffic safety and 6.6 for common risks at school (Figure 7).

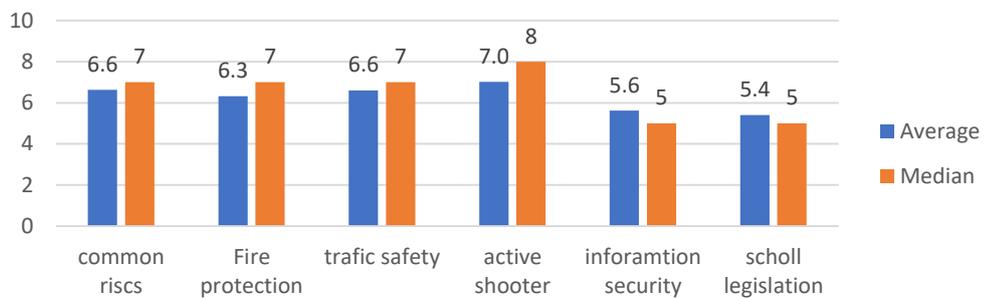


Figure 7. Evaluation of interest in the course.

Testing of hypotheses

Hypothesis 1: Respondents from practice (students of combined studies) generally evaluate the total importance of the course as more important.

According to both average and median values of total evaluation of importance, students of full-time studies indicate higher importance. According to the Mann-Whitney test, however, the difference is not statistically significant as the resulting P-value is higher than 0.05. Moreover, even according to Somers' D, there was no statistically significant dependence of importance evaluation on the type of studies (Table 2, Table 3, Table 4).

The hypothesis that respondents from practice (students of combined studies) generally evaluate the total importance of the course as more important was therefore not proven.

Table 2

Total importance

Types of study	Total importance	
	Average	Median
Full time	46.4	49
Combined	45.0	46
Total	45.5	47

Table 3

Test Statistics^a

Coefficient	Importance
Mann-Whitney U	2230.000
Wilcoxon W	4121.000
Z	-1.440
Asymp. Sig. (2-tailed)	.150

Note: ^a Grouping variable: study.

Table 4

Directional measures

Coefficient	Value	Asymptotic Standard Error ^a	Approximate T ^b	Approximate Significance
Ordinal by Ordinal Somers' D importance Dependent	-.140	.095	-1.475	.140

Note: ^a Not assuming the null hypothesis.

^b Using the asymptotic standard error assuming the null hypothesis.

Hypothesis 2: Respondents from practice (students of combined studies) generally evaluate the importance of individual parts of the course as more important

According to both average and median values of evaluation of importance, students of full-time studies indicate similar evaluation of importance as students of combined studies in all parts of the course apart from “Information security, GDPR”, where students of combined studies indicate much lower importance. In this part only the difference according to the Mann-Whitney test was statistically significant as the resulting P-value is lower than 0.05. Also, according to Somers' D, in this part only there was a statistically significant dependence of importance evaluation on the type of studies with students of combined studies usually indicating lower evaluation of importance. However, according to the coefficient value of 0.325, this dependence is very weak.

The hypothesis that respondents from practice (students of combined studies) generally evaluate the importance of individual parts of the course as more important was therefore proven only for the “Information security, GDPR” part (Table 5, Table 6, Table 7, Table 8).

Table 5

Test Statistics

Types of study	Common risks at school	Fire protection	Traffic safety	Armed attacker	Information security	School legislation
	Average	Average	Average	Average	Average	Average
Full time	8.4	7.8	7.9	7.2	7.9	7.3
Combined	8.2	8.0	7.9	7.2	6.4	7.3
Total	8.2	7.8	7.9	7.1	7.2	7.2

Table 6

Test Statistics

Types of study	Common risks at school	Fire protection	Traffic safety	Armed attacker	Information security	School legislation
	Median	Median	Median	Median	Median	Median
Full time	9	8	8	8	8	8
Combined	9	8	8	7	6	7
Total	9	8	8	8	8	8

Table 7

Test Statistics^a

Coefficient	Common risks at school	Fire protection	Traffic safety	Armed attacker	Information security	School legislation
Mann-Whitney U	2351.500	2580.000	2536.000	2542.500	1749.000	2591.500
Wilcoxon W	4242.500	6235.000	4427.000	4433.500	3640.000	4482.500
Z	-.998	-.051	-.231	-.201	-3.389	-.004
Asymp. Sig. (2-tailed)	.318	.959	.817	.840	.001	.997

Note: ^a Grouping variable: study.

Table 8

Directional Measures

Ordinal by Ordinal Somers' D	Value	Asymptotic Standard Error ^a	Approximate T ^b	Approximate Significance
Common risks at school Dependent	-.093	.092	-1.006	.315
Fire protection Dependent	.005	.093	.052	.959
Traffic safety Dependent	-.022	.094	-.233	.816
Armed attacker Dependent	-.019	.095	-.203	.839
Information security GDPR Dependent	-.325	.092	-3.521	.000
School legislation Dependent	-.038	.094	-.405	.685

Note: ^a Not assuming the null hypothesis.

^b Using the asymptotic standard error assuming the null hypothesis.

Hypothesis 3: Respondents from practice (students of combined studies) generally evaluate the benefits of the course for practice at school as more important.

According to average values of evaluation of the course benefits, students of combined studies usually indicate somewhat higher importance (in 90% of cases). According to the Mann-Whitney test, however, the difference is not statistically significant as the resulting P-value is higher than 0.05. Moreover, even according to Somers' D, there was no statistically significant dependence of benefit evaluation on the type of studies.

The hypothesis that respondents from practice (students of combined studies) generally evaluate the benefits of the course for practice at school as more important was there not proven (Table 9, Table 10, Table 11).

Table 9

Test Statistics

Types of study	Benefits	
	Average	Median
Full time	0.8	1
Combined	0.9	1
Total	0.8	1

Table 10

Test Statistics^a

Coefficient	Benefits
Mann-Whitney U	2402.000
Wilcoxon W	6057.000
Z	-1.198
Asymp. Sig. (2-tailed)	.231

Note: ^a Grouping variable: studium.

Table 11

Directional Measures

Coefficient	Value	Asymptotic Standard Error ^a	Approximate T ^b	Approximate Significance
Ordinal by Ordinal Somers' D Benefits dependent	.073	.059	1.248	.212

Note: ^a Not assuming the null hypothesis.

^b Using the asymptotic standard error assuming the null hypothesis.

Other results observed.

***Hypothesis 4:** Number of years of experience affects the evaluation of total importance of the course.*

The hypothesis that the number of years of experience affects the evaluation of total importance of the course was not proven.

***Hypothesis 5:** Number of years of experience affects the evaluation of importance of individual parts of the course.*

The hypothesis that the number of years of experience affects the evaluation of total importance of the course was proven only for the “Information security, GDPR” part.

***Hypothesis 6:** Number of years of experience affects the evaluation of benefits of the course for practice at school.*

The hypothesis that the number of years of experience affects the evaluation of benefits of the course for practice at school was not proven.

Another monitored dependence was the relationship between the importance and benefit evaluation by gender.

***Hypothesis 7:** Among women, the total importance of the course was generally evaluated as more important.*

The hypothesis that among women, the total importance of the course was generally evaluated as more important, was proven.

***Hypothesis 8:** Among women, the total importance of individual parts of the course was generally evaluated as more important.*

The hypothesis that among women, the total importance of individual parts of the course was generally evaluated as more important, was proven for three parts: “Common risks at school”, “Fire security” and “Active shooter”.

Conclusion

The results of the questionnaire survey showed that students evaluate the course on security issues as important for practice and interesting. Since the course is perceived as not difficult, it can be assumed that the chosen form of e-learning course enabled all students to complete the course with an average duration of four hours. In the short period of one year, this form allowed to provide basic training in security issues to a total of 89% of all students of the follow-up master’s studies. A total of 22% of all trained students provided feedback.

The first year of the course showed the necessity of further updating existing topics of the course and adding more module units to the course. A new module focusing on pupils’ trips abroad, overnight events, safety during specific activities and other extraordinary situations is currently planned.

It is pleasant that the Faculty of Education of the Charles University takes security issues for teachers as integral part of undergraduate training and the proposed new accreditation includes these issues in direct teaching of common basis.

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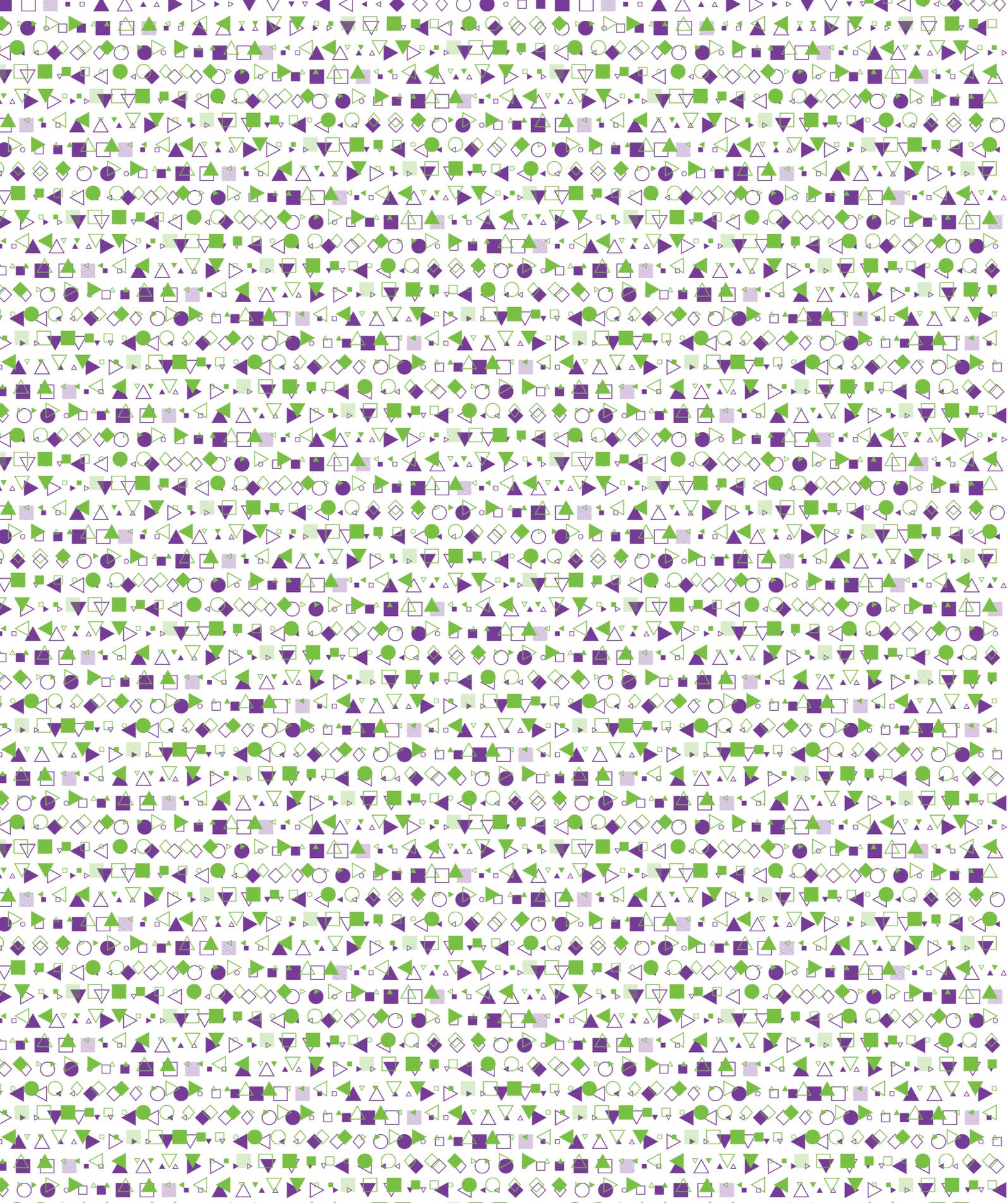
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