Life in Health 2021:

Research and Practice

Proceedings
of the International Conference
held on 9–10 September 2021

Petr Vlček
Jitka Slaná Reissmannová (Eds.)

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Content

Preface

This book of proceedings is about the health promotion and health protection in the Czech Republic and abroad. It summarises the findings from more than forty authors´ research who participated at the interdisciplinary conference Life in Health 2021, which took place on 9 and 10 September 2021 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 health protection research, projects and progammes in this area and related educational aspects. In terms of content, the conference was relatively broad and provided space for topics relating to holistic health promotion and protection and health education. This included research-based and theoretical knowledge of educational, healthcare, medical, psychological and social disciplines, thus combining the perspectives of various specialists in the area. The papers published in this book of 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.

A number of individuals have been of assistance during the lengthy process of planning the conference and writing and editing this book. We wish to thank the English editors for helping write readily understandable texts that flows logically and are well structured. We would also like to thank all the colleagues from Physical Education and Health Education Department at the Faculty of Education, Masaryk University, for their fellowship and assistance; and also the management of our Faculty who strongly supported us and we thank them for that. In addition, we would like to thank all of you who will read this book of proceeding and give us feedback.

For the organizers,

Petr Vlček

Chair of the conference organizing committee

Health promotion and health protection research

The impact of COVID-19 on Physical Activity of Czech children

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Abstract: Introduction: The pandemic of coronavirus disease (COVID-19) and related restrictions (closed schools and sports centers, social isolation, masks) may have a negative impact on children's health. The purpose of this study was to evaluate the level of physical activity (PA) of Czech children during COVID-19 in autumn 2020.

Methods: Ninety-eight Czech children (mean age = 10.1 ± 1.47 years) completed the standardized Physical Activity Questionnaire for Older Czech Children (PAQ-C/cz) during COVID lockdown. Data were compared with previously published norms. Thirty-five children also reported daily number of steps measured by accelerometers.

Results: Total PAQ-C score was 0.38 lower during COVID compared to Pre-COVID [$t(302) = 5.118.$, $p < .001$]. The male PAQ-C total score was 0.37 lower [$t(146) = 3.21.$, $p = .002$)] and the female total score was 0.39 lower [$t(154) = 3.97.$, $p < .001$] during COVID compared to Pre-COVID. Specifically, responses of PA during spare time, before-school, physical education (PE), and recess were significantly lower during COVID. The average number of steps was 7.767 steps/day (boys = 9.255; girls = 6.982).

Conclusions: COVID lockdown resulted in significant reduction of PA in Czech children. Strategies to promote adequate PA of children during the pandemic need to be determined.

Key words: coronavirus, movement, younger school age, public health

Introduction

Healthy physical development in children is largely dependent on sufficient physical activity (PA), reduced sedentary behavior (SB) and adequate sleep. These three factors are referred to as a movement behavior (Jakubec et al., 2020). According to the World Health Organization (WHO), lack of regular PA and increased time spent in sedentary activity are globally the fourth highest risk factor attributed to mortality, with overweight and obesity being the third leading risk factor of mortality in middle and high-income countries, behind only high blood pressure and tobacco use (Kaptoge et al., 2019; Nemet, 2016).

Regular PA promotes general health, prevents obesity and other civilization diseases (Nemet, 2016). To meet the criteria of the optimal movement behavior, it is recommended that children and adolescents aged 5–13 years strive to achieve a daily minimum of 60 minutes of moderate to vigorous PA, limit sedentary recreational screen time to 2 hours maximum, and acquire 9 to 11 hours of uninterrupted sleep per night (Jakubec et al., 2020; Tremblay et al., 2016).

Beginning around six years of age, children undergo significant psychosocial developmental changes reflecting their self-concept and relationship with the environment (Sá et al., 2021). An important part of their daily routine and healthy lifestyle is their regular school attendance and organized PA (Anderson & Butcher, 2006; Miles, 2007; Sá et al., 2021; Sigmund, E., Sigmundová, D., & Šnoblová, R., 2011). It contributes to the improvement of social contacts and can influence quality of life. There is also strong evidence promoting the effectiveness of regular PA and exercise in the treatment of depression, anxiety and improving mental well-being (Fox, 1999).

Many countries have successfully worked towards these goals of optimal children's movement behavior by implementing different organized sport activities and integrating regular physical education (PE) lessons in schools. However, in December 2019 the first cases of the coronavirus disease 2019 (COVID-19) were reported and on January 30 COVID-19 became officially declared international public health emergency (Guo et al., 2020). Governments implemented restrictions involving school and sport grounds closures resulted in health risks behaviors especially reduced PA and increase SB (López-Bueno, López-Sánchez, et al., 2021). The regulations had negative effect on various mental and health aspects in children and youth such as increasing obesity (Beck et al., 2021; Maltoni et al.,

2021), pain (Law et al., 2021), depression, anxiety, loneliness feelings (Li et al., 2021; Panda et al., 2021; Zolnikov et al., 2021), sleep disturbances (Bucak et al., 2021; Perez et al., 2021), decreased cardiorespiratory fitness (López-Bueno, Calatayud, et al., 2021) and many others, affecting especially socio-economic deprived children (López-Bueno, López-Sánchez, et al., 2021).

PA in Czech children and youth was reported to be insufficient already before the COVID. Only 35% of children population performed the recommended amount of PA, i.e. 60 minutes of moderate to vigorous PA per day. The high rates of excessive screen-time were reported by Gaba et al. in study collecting data during the pre-pandemic 2018 year. Organized PA and sport have been performed by 55% of girls and 70% of boys, joint sports activities with the family at least once a week were reported only by 34% of girls and 37% of boys. Under normal conditions all schools in the Czech Republic must guarantee at least 90 min per week of PE (Gaba et al., 2019). However, this amount of time is considered insufficient and there has been a long-standing political and professional discussion on increasing PE classes at primary schools. Most schools offer more PE classes than the mandatory 90 minutes per week and provide favorable environment to promote PA outside PE classes. Still, there has been a call for increase of PE hours in elementary schools and after-school health-enhancing PA promotion (Gaba et al., 2019; World Health Organization, n.d.).

The first three cases of COVID-19 were reported in the Czech Republic on March 1st, 2020 (Komenda et al., 2020). Outbreak of COVID-19 resulted in full shutdown of organized sports and public sports facilities in the Czech Republic. From March 2020 till May 2021 school attendance and organized sport activities have been largely unavailable in the Czech Republic. By April 2021, the Czech Republic has recorded the second highest confirmed death rate in the world with 1.8% case fatality and 282.14 deaths per 100 000 people (Johns Hopkins University & Medicine, n.d.). With just a shortbreaks, children were ordered to stay at home, online education was established, and organized sport activities were prohibited both indoor and outdoor. Such long lasting restrictions may create unintended poor habits of decreased PA and increased SB in child populations (Hesketh et al., 2017), having negative effects on daily routines and opportunities for being active (Schmidt et al., 2020).

Movement activities of children and adolescents during COVID differ among countries due to different policy restrictions and the number of COVID-19 infections (Schmidt et al., 2020). According to UNESCO, from all European Union (EU) countries, the Czech Republic had the

longest school closure during the pandemic, that is 42 weeks (UNESCO 2021, n.d.). Even countries with much shorter period of school closure, such as France (11 weks school closure) (Fillon et al., 2021) or Portugal (24 weeks closure) (Pombo et al., 2020b) or Spain (15 weeks closure) (Cachón-Zagalaz et al., 2021) confirmed decreased levels of PA in children during COVID calling for the development of effective national action. German study where the schools were closed for 30 weeks reports decreased sports activity but increase in habitual physical activities such as gardening, housework, cycling or walking (Schmidt et al., 2020). Other studies also report the shift of PA towards nonorganized outdoors activites such as walking, running, bycycling and alike (Perez et al., 2021; Schnaiderman et al., 2021). This study attempts to analzye the impact COVID-19 has on PA on children in the Czech Republic, where COVID death rates were very high and the schools and sport facilites closed for the longest period of time in the whole EU.

It is difficult to determine the most appropriate tools to evaluate physical behavior aspects in children and the “gold standard” is still not available (Kowalski et al., 1997; Sallis & Saelens, 2000; Tremblay et al., 2016; Welk & Wood, 2000). Despite a certain degree of bias, questionnaires and accelerometers are currently the most widely used methods to collect such data. The principle of self-assessment questionnaires is based on the respondent's ability to recall his or her activities during the observed period of time, usually one week or one month back. Although only some questionnaires demonstrate adequate validity and reliability, they represent a cheap and easy way to assess the amount of PAs (Colley et al., 2019; Crocker et al., 1997; Jakubec et al., 2020).

The Physical Activity Questionnaire (PAQ) is one of the most frequently used questionnaires worldwide (Rubín et al., 2018). The Physical Activity Questionnaire for Older Children (PAQ-C) variant was developed for children aged 8–14 years old (Kowalski et al., 1997) and was recently standardized for Czech children by Cuberek et al. (38). PAQ-C is considered a reliable tool to evaluate children's PA (Cuberek et al., 2021; Kowalski et al., 2004; Marques et al., 2020; Sá et al., 2021). Questionnaires can be combined with data obtained from accelerometers that monitor the amount of PA. Although accelerometers do not capture certain types of PA accurately (such as cycling), they can provide a rough estimate of the level of PA achieved by the subject throughout the day (Colley et al., 2019).

This is the first study comparing PA of school children during the COVID lockdown time with pre-COVID norms defined by the Czech version of PAQ-C (PAQ-C/cz) and by evaluating their number of daily steps.

Methods

An anonymous survey to evaluate PA of children aged 8–12 years was conducted during COVID Lockdown in the Czech Republic in November and December 2020. The data were compared with the pre-COVID norms defined by the same questionnaire (PAQ C/cz) (see the S1 and S2 Files). The subjects were also asked to monitor and report the number of daily steps if they have appropriate measurement device (smart watch or smart phones) available. The study was approved by the Ethics Committee of the University Hospital Motol and 2nd Faculty of Medicine, Charles University in Prague (EK 1730/20).

Our data were collected during COVID lock down from November 2020 to January 2021. It was compared with the norms collected by Cuberek et al. (38) one year earlier, during the same time of the year before the COVID 19 occurred in the Czech Republic. Participants were recruited using an information leaflet created for the purpose of this study. It was published either electronically on an official Dynamic Neuromuscular Stabilization (DNS) website www.rehabps.com or in paper form at physiotherapy centers and at the Motol University Hospital. It contained information on the purpose of the study, a standardized questionnaire and the informed consent. Participation in the study was voluntary and the informed consent was signed by the participant's parent or legal representative. In total, ninety-eight children participants (56 girls and 42 boys) completed the questionnaire either electronically or as a hard copy. Inclusion criteria for participation comprised age (8–12 years) and participation in distance learning education. Participants were excluded if they had any serious health condition. The questionnaire data revealed participants in this cohort (98), were living in cities and villages of different sizes, came from different elementary schools, and came from various family and social backgrounds. Table 1 shows anthropometric characteristics of the study participants.

Physical Activity Questionnaire for Older Children (PAQ-C/cz)

A validated Czech version of the standardized PAQ-C/cz was used to evaluate the level of PA in the observed cohort. The standardized PAQ-C was recently adapted into the Czech version by Cuberek et al., which assessed its psychometric properties and recommended it as a tool for physical activity assessment in large-sample research studies (Cuberek et al., 2021).

PAQ-C/cz is a ten-item, self-administered, seven-day recall questionnaire for children 8–14 years old. The questionnaire provides a summary of PA calculated from nine items, each scored on a five point scale (with 1 representing the lowest level and 5 representing the highest level of PA). The total PAQ-C score is calculated as a mean value from the nine different item scores including: children´s spare time activity (question 1), activity before school (question 2), activity during physical education (PE) lessons (question 3), activity during recesses (question 4), activity after school (question 5), activity in the evening (question 6), activity during weekend (question 7), statement of free time activity during last week (question 8), and activity level and frequency performed each day during last week (question 9). Question number 10 is of a qualitative character inquiring about any disease or other obstacles to perform PA during the observed period of time and therefore cannot be included in the final score calculation (Cuberek et al., 2021).

Because the survey was done at a time of distance online school education, there was a note in the questionnaire form to evaluate PA during recesses as the time between online lessons. Collected COVID data were compared with the Pre-COVID norm data recently published by Cuberek et al. (Cuberek et al., 2021). See Table 1 to compare demographic characteristics of COVID and Pre COVID cohorts. Additionally, thirty-five children from our COVID cohort reported daily number of steps using smart watch or smart phones to count the steps. Children provided a print screen from the device to prove the number of steps for each day.

Table 1

Study characteristics comparing Cuberek et al. [38] pre-COVID data with during COVID data of Czech children.

	Sex	**Sample Size**	**Age***	**BMI***
Cuberek et al Pre-COVID cohort	Male	106	11.08 (0.84)	18.46 (3.13)
	Female	100	11.17 (0.82)	17.36 (2.68)
	Total	206	11.13 (0.83)	17.92 (2.97)
During COVID cohort	Male	42	10.21 (1.49)	17.56 (3.06)
	Female	56	10.02 (1.46)	17.20 (2.70)
	Total	98	10.10 (1.47)	17.35 (2.85)

*Reported as mean (standard deviation), note: BMI: Body mass index.

Statistical analysis

Descriptive statistics were calculated for all variables. Data are mean □ standard deviation, unless otherwise stated. Independent-samples t-tests (2-tailed) were performed to assess differences in PA from the PAQ-C scores among Czech children between the period of COVID lockdown with published PA norms prior to COVID restrictions. Statistical significance was determined a priori at $P < 0.05$ for the PAQ-C total score. When comparing responses to individual questions within the PAQ-C, Bonferroni corrections were utilized to reduce chances of Type 1 error, and was set at $P < 0.005$. Power analysis, using G*Power 3.1, indicated 128 subjects were needed (64 per group) to detect a medium effect size of 0.5 and an achieved power of 0.80. Effect sizes were interpreted as very small (< 0.2), small (0.2–0.5), medium (0.5–0.8), or large (> 0.8) (Cohen, 1988). Data analyses were conducted using the Statistical Package for the Social Sciences v27 (SPSS Inc, Chicago, IL).

Results

Distribution of the 98 participants during COVID lockdown were: males (n = 42, 42.9%), females (n = 56, 57.1%) and the 206 participants included from pre-COVID data were: males (n = 106, 51.5%), females (n = 100, 48.5%). Participant characteristics for both COVID lockdown and pre-COVID data are outlined in Table 1. Not all data was normally distributed, as assessed by Shapiro-Wilk's test. Due to the robustness of the independent samples t-test, data was not altered. Cronbach‘s alpha scores were calculated to score internal consistency for both sets of PAQ-C/cz questionnaire data (pre-COVID and COVID lockdown) using all nine questions. Cronbach’s alpha for pre-COVID questionnaire data (Cuberek et al. (38)) was acceptable at 0.758, and COVID lockdown Cronbach’s alpha was interpreted as good at 0.806 (Geroge & Mallery, 2003). Results of all independent samples t-tests with 95% confidence intervals are presented in Table 2, with gender-specific data presented in Table 3. Significant differences were found in the mean PAQ-C total scores between pre-COVID and COVID lockdown, t (302) = 5.118., p < .001, d = .63, with a mean difference of .385 (95% CI: .237, .532).

After a Bonferroni correction, independent samples t tests compared answers on nine individual questions of the PAQ-C. Significant differences between pre-COVID and COVID lockdown mean scores were noted for: Spare time (Q1) t(239.2) = 3.39., p = .001, d = .38, before school (Q2) t(236.9) = 2.97., p = .003, d = .34, PE (Q3) t(164.87) = 9.85., p < .001, d = 1.28, and recesses (Q4) t(302) = 7.91., p < .001, d = .97. No significant differences were noted for: After school (Q5) p = 0.32, evenings (Q6) p = 0.25, weekend (Q7) p = 0.49, statement (Q8) p = 0.64, or weekly activity (Q9) p = 0.16. See Graph 1. There were no differences noted between genders when comparing PAQ-C total scores pre-COVID or during COVID lockdown. After dichotomizing COVID lockdown data into younger (8–9 yr., n = 43) and older (10–12 yr., n = 55) groups, no differences were noted between PAQ C total scores (p = .217).

Table 2

Comparison of Czech children scores on the PAQ-C regarding PA before and during COVID pandemic (mean [standard deviation]).

Measure	**Cuberek et al. Pre-COVID (n = 206)**	**COVID Lockdown (n = 98)**	**Mean Difference (95% CI)**	**Effect Size**	***P* V*alue***
Total PAQ-C Score	2.69 (0.59)	2.30 (0.66)	0.38 (0.24, 0.53)	0.63	<.001*
Q1 Spare time activity	1.34 (0.22)	1.26 (0.17)	0.07 (0.03, 0.12)	0.38	.001**
Q2 Before-school activity	2.06 (1.37)	1.63 (1.08)	0.43 (0.15, 0.72)	0.34	.003**
Q3 Physical education	3.83 (1.15)	2.26 (1.37)	1.57 (1.26, 1.89)	1.28	<.001**
Q4 Recesses	2.82 (0.95)	1.87 (1.03)	0.95 (0.71, 1.18)	0.97	<.001**
Q5 After-school activity	3.00 (1.11)	3.14 (1.19)	-0.14 (-0.42, 0.14)	-0.12	0.32
Q6 Evenings	2.59 (1.07)	2.43 (1.30)	0.16 (-0.11, 0.44)	0.14	0.25
Q7 Weekend	2.90 (0.98)	2.82 (0.92)	0.08 (-0.15, 0.31)	0.09	0.49
Q8 Statement	2.71 (1.04)	2.65 (1.10)	0.06 (-0.19, 0.32)	0.06	0.64
Q9 Weekly activity	2.93 (0.76)	2.70 (0.85)	0.23 (0.04, 0.43)	0.30	0.016

*Statistically significant difference observed (P < 0.05)

**Statistically significant difference observed (Bonferroni correction P < 0.005)

Note: PAQ-C: Physical Activity Questionnaire for Older Children

Values are tabulated scores from PAQ-C

Effect size = calculated Cohen's d

Table 3

Gender specific scores on the PAQ-C before and during COVID pandemic mean [standard deviation]).

Measure		Cuberek et al. Pre-COVID (n = 206)	COVID Lockdown (n= 98)	Mean Difference (95% CI)	Effect Size	*P Value*
Total PAQ Score	Male	2.69 (0.62)	2.32 (0.69)	0.37 (0.14, 0.61)	0.59	.002*
	Female	2.68 (0.56)	2.29 (0.64)	0.39 (0.20, 0.58)	0.66	<.001*

*Statistically significant difference observed (Bonferroni correction P < 0.25)

Note: PAQ-C: Physical Activity Questionnaire for Older Children

Values are tabulated scores from PAQ-C

Effect size = calculated *Cohen's d*

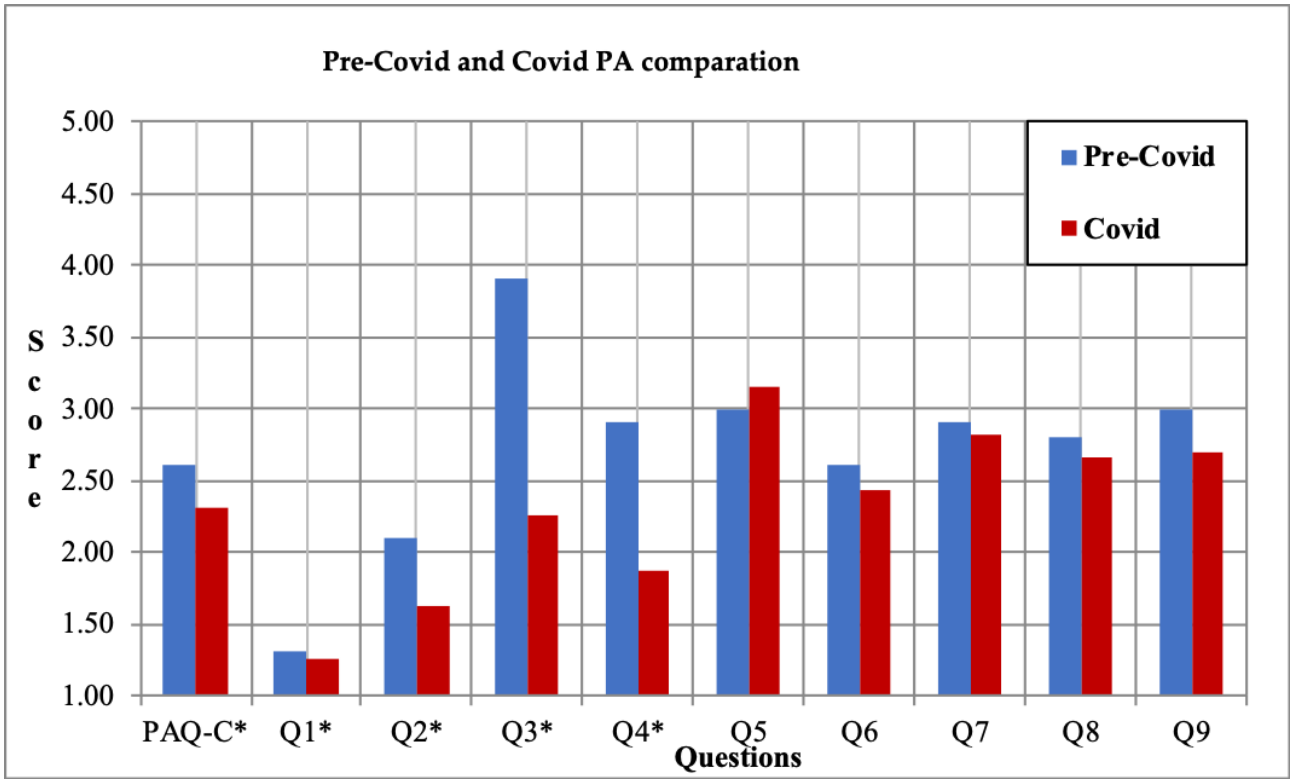

Figure 1. Comparation of PAQ-C/CZ questionnaire results between pre-COVID (n = 206) and COVID data (n = 98). PAQ-C – total PAQ-C score; Q1 – Spare time activity; Q2 – Before school activity, Q3 – Physical education; Q4 – Recesses; Q5 – After school activity; Q6 – Evening activity; Q7 – Weekend activity; Q8 – Statement; Q9 – Weekly activity.

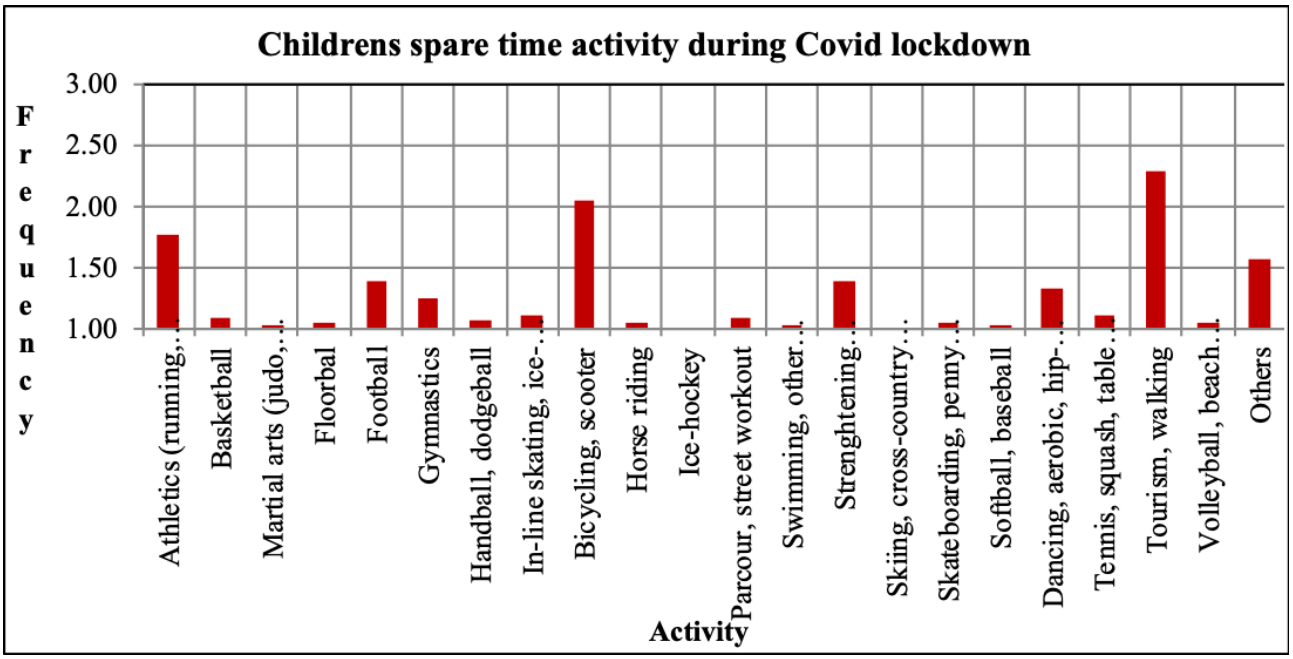

Figure 2. Spare time activity during COVID lockdown – reported mean values for each type of PA (n = 98), frequency of individual sort of PA from Question 1 (Evaluation of these leisure activities is a standard part of PAQ-C).

Discussion

The COVID-19 pandemic has created unprecedented situations by which strict community lockdowns have negatively affected the movement and health behavior in children (López-Bueno, López-Sánchez, et al., 2021). Negative consequences like increasing obesity (Beck et al., 2021; Maltoni et al., 2021), pain (Law et al., 2021), depression, anxiety, feelings of loneliness (Li et al., 2021; Panda et al., 2021; Zolnikov et al., 2021), and sleep disturbances (Bucak et al., 2021; Perez et al., 2021) are closely related to PA levels (Filos et al., 2020; Schnaiderman et al., 2021; Xiang et al., 2021). Our findings are similar to others (Cachón-Zagalaz et al., 2021; Fillon et al., 2021; Pombo et al., 2020a) demonstrating a significant decline in PA in children during COVID compared to pre-COVID. This problem is quite complex however, due to the multifactorial nature of various changes in PA during COVID such as: social status and family income (Perez et al., 2021), city dwelling versus villages or suburbs (Filos et al., 2020), parental education levels (Bucak et al., 2021), pre-pandemic sports habits (Vuković et al., 2021), the level of national restrictions, and age (Schmidt et al., 2020) among others.

Studies suggest of a relationship between age and the amount of PA during lock down (Cachón-Zagalaz et al., 2021; Schmidt et al., 2020). Speculating that older children could be more prone to online games, watching movies and following the social networks than younger children, we compared the COVID data for younger (8–9 yrs, n = 43) and older (10–12 yrs, n = 55) groups, but no differences were noted between PAQ-C total scores. Today, unorganized free-play activities have become less common and children's time has been increasingly devoted to organized PA (McGall et al., 2011). Due to COVID-19 regulations, even the youngest school children significantly reduced their PA and did not replace the regular amount of movement with any alternative PA such as playing in the garden, in the park, or running around the house. This was true both for the boys and the girls. We have not confirmed the increase in habitual outdoor PAs like other studies (Filos et al., 2020; Schmidt et al., 2020). A recently published study by Ng et al. on Czech adolescents' remote school and health experiences during spring lockdown reports more PA. This discrepancy is perhaps due to age differences since our study evaluates PA in children 8–12 years old, while the study by Ng was done on older children aged 11–15 years at a different time of year. We collected data in November-January, while Ng collected their data from May-June, when more individual outdoor PA could be expected (Ng et al., 2021).

Organized sports of all kinds, both indoor and outdoor were significantly reduced in our respondents (Q1 spare time activity) as well as morning, i.e. before school activities (Q2). This is not surprising, since children did not walk to school and could not participate in regular sports because playgrounds and sports clubs were closed. The results of our survey also show that PE activities (Q3) were significantly limited as well. This should be considered and possibly changed by the PE teachers. If other school subjects can be taught online, there is no reason why PE could not. We can assume that almost every child can do simple exercises such as jumps, push-ups, sit-ups, plyometric exercises at home under the online guidance of the teacher. At the same time the PE teacher can motivate children and request to do individual activities such as running, walking, nordic-walking, scootering, bicycling and alike recording the frequency and intensity in a PA diary that should be signed by the parents and regularly presented to PE teacher. The same is true for the PA during recesses which were also reported significantly low. PE teachers could possibly take over during recesses to guide children through simple stretching exercises and repetitive aerobic movements under their online guidance to compensate for the SB. Strategies and recommendations for PE via distance learning have already been discussed in the literature confirming PE teachers' critical

role in supporting student health during the COVID-19 pandemic (Vilchez et al., 2021) but the conditions differ significantly by country and local policies (Gobbi et al., 2020). Unfortunately, this type of regime was not established in many Czech schools. Children in the questionnaire mostly responded “I did not have a PE lesson/I did not do PE”. Also, the Czech pre-COVID PE score was rather low compared to other countries including data from Turkey, Great Britain, and China. In Turkey it was 4.52 ± 0.99 (ErdiM et al., 2019), two surveys in Great Britain reported a PE score of 4.14 ± 0.80 and 4.18 ± 0.74 (Thomas & Upton, 2014) and in China 4.04 ± 0.98 (Jing et al., 2016). The Czech pre COVID PE score was 3.83± 1.15 and during COVID it was only 2.26 ± 1.37 (38).

There were no significant differences in after-school activities, evening, or weekend activities. We speculate this results from parental care motivating children and establishing routines for movement at a time when the family is together (Cachón-Zagalaz et al., 2021). The most frequently reported PA during the period of quarantine restrictions was tourism and walking, followed by bicycling and athletics, specifically running (see Graph 2). The weekly activities mean score was lower during COVID compared with pre-COVID, but not enough to be statistically significant. The most active weekday was Saturday for both males and females, which is in line with other studies underlying the importance of accessibility to outdoor spaces for sufficient PA during the pandemic (Filos et al., 2020; Perez et al., 2021; Schmidt et al., 2020).

Tourism has a strong tradition in the Czech Republic, and likely represents the main type of regular PA during pandemic both for children and adults. COVID-19 associated regulations may change the structure of general population PA preferring the outdoor PA. Tourism is an optimal form of PA for the whole family and parental support is an important correlate of children's PA (Perez et al., 2021; Trost et al., 2003). The data from PAQ C are in line with data obtained from the thirty-five subjects from our cohort who also reported the number of daily steps measured by the pedometers (smartphones, watch). The average number of daily steps was 7.767 steps with boys reporting 9.255 steps per day and girls 6.982 per day on average. The highest number of steps (10.244 steps on average) was measured on Saturday. Still, Czech children during COVID-19 do not meet the recommendations for the number of daily steps. Suggested number of steps for normal 6–12 years children population to maintain good health ranges from 12.000 to 16.000 steps/day (Rowlands et al., 1999; Tudor-Locke et al., 2011; Vincent, S. D., & Pangrazi, R. P, 2002). For effective reduction of childhood

obesity, the girls are recommended to take at least 11.000 and the boys at least 13.000 steps/day five days per week at minimum (Panel, 2001). According to Vuković et al., children who were physically active before the pandemic tend to continue their activities during the emergency state (Vuković et al., 2021). The insufficient amount of PA of Czech children before COVID became even more pronounced during COVID (Gaba et al., 2019).

When comparing pre-COVID PAQ-C scores of Czech children with children of different countries, several differences exist. A Turkish study applied the PAQ-C survey to 784 primary school students (ages 9 14 years) and reported total PAQ-C scores to be 3.16 ± 0.73 (ErdiM et al., 2019). A study in the United States performed the PAQ-C survey in a group of 1,172 children and noted differences when separated by race: European-American (3.36 ± 0.80), African-American (3.37 ± 0.69), and Hispanic (3.19 ± 0.64) (J. B. Moore et al., 2007). Two British studies reported mean PAQ-C scores of 3.49 ± 0.68 (n = 336) and 3.36 ± 0.67 (n = 131) (Thomas & Upton, 2014). For Chinese children (n = 742), the total PAQ C score was lower, 2.62 ± 0.68 (Jing et al., 2016). The reported total PAQ-C score for the pre-COVID Czech population was only 2.69 ± 0.59, which means Czech children move less than Turkish, US and British children. Only Chinese children move slightly less then Czech. This is an alarming finding that even under normal conditions Czech children do not move sufficiently. The current findings of this study demonstrate a decrease in an already rather sedentary population of Czech children, which can only worsen as COVID lockdowns prolong.

Sufficient PA is critical in civilization disease prevention (Janssen, 2007; Tremblay et al., 2011; Twisk, 2001). Children should be physically active daily as part of play, games, sports, transportation, recreation, PE, or planned exercise in the context of family and if possible in the context of school and community (Tremblay et al., 2011). It seems that most families tried to compensate the lack of PA during COVID lockdown by tourism, especially on weekends. However, walking can be effective compensation only if optimal duration, speed, frequency, cardiorespiratory level, postural stabilization and other parameters are respected (Janssen, 2007; Tremblay et al., 2011). Especially the gait duration, speed and country terrain (hilly versus flat) is critical for sufficient oxygen uptake and aerobic fitness. For health benefits school-aged children and youth should accumulate at least 60 min of moderate to vigorous PA on a daily basis (Janssen, 2007; Tremblay et al., 2011; Singh & Tripathi, 2013). More daily PA provides greater health benefits (Tremblay et al., 2011). To meet such criteria, brisk

walking, jogging or hiking in nature is a good variant (Corbin & Pangrazi, 2003; Janssen, 2007). We do not know the parameters of the reported tourism, and therefore cannot tell if it was an effective compensation for PA.

When analyzing both during-COVID and pre-COVID PA, the aspect of weather should be taken into account. The comparison of our data collected during COVID lockdown was coincidentally collected during the same months (November–January) as the pre COVID data reported by Cuberek et al. just one year prior (Cuberek et al., 2021). Rain, temperature, and earlier times of dusk may discourage children from doing outdoor activities. The autumn season is characterized by a decrease in energy expenditure in children attaining lower numbers of steps per day (Máček et al., 2010). Perhaps spring and summer lockdowns would have less significant effects on children's PA.

Studies mapping the level of PA during COVID time in other countries exist, but other methods than PAQ C were applied. An American study monitored the time spent by eleven common types of PA (walking, running, swimming, etc.) and twelve common types of SB (watching television, playing computer games, reading, etc.). The most common types of PA during the early COVID 19 period was unorganized play and unstructured activities such as running around, hide and seek and similar games (90% of children) or going for a walk (55% of children). Parents of older children (9–13 years) admitted greater decreases in PA and greater increases in SB than parents of younger children (5–8 years) (Dunton et al., 2020). This was not confirmed by our study, because no differences were noted between younger and older children PAQ-C total scores ($p = .217$). The Canadian online study with children aged 12–17 evaluated PA, SB and sleep time during the March 2020 COVID-19 pandemic. Canadian children and youth had lower PA levels, less outdoor time, higher SB (including leisure screen time), and more sleep during the outbreak (S. A. Moore et al., 2020). A Portuguese anonymous online survey examined children aged up to 12 years at the end of March 2020. During COVID boys and girls performed PA equally but children with a previous routine of outdoor activities and children with siblings were more active. However, the total time spent being PA during COVID-19 was lower compared to normal days (Pombo et al., 2020a). A significant reduction of PA during COVID is also reported in a Brazilian study (Sá et al., 2021), Spanish online survey (López-Bueno et al., 2020) and Chinese study (Zhang et al., 2020) using the International Physical Activity Questionnaire Short Form (IPAQ-SF) and the Profile of Mood States (POMS).

To our knowledge, this is the first study using the standardized PAQ-C to compare PA pre COVID and during-COVID lockdown. The PAQ-C/cz questionnaire was recently validated (Cuberek et al., 2021) and the pre-COVID raw data were compared with during-COVID raw data collected during the same time of year (November-January). However, a limitation of PAQ-C is that the questionnaire does not offer detailed information about the intensity and time engaged in PA. Therefore, we combined the PAQ-C data with the number of steps reported by 35 subjects who had pedometers available. The use of pedometers is historically the oldest but still currently the most widespread way of instrumental PA monitoring (Rowe et al., 2004; Sigmund, E., Sigmundová, D., & Šnoblová, R.., 2011). It is the suggested method to monitor PA to follow prescribed public health guidelines (Adams et al., 2013). Although boys reported higher numbers of daily steps, due to the small sample size comparing only 12 boys with 23 girls we have identified no statistical difference between boys and girls. However, this trend is similar to normative data. Simply comparing the current dataset of Czech children's steps/day with previously published normative data, large differences are noted, which are concerning. It is typically noted that the number of steps/day peak before the age of 12 and slowly decrease throughout adolescence to approximately 8.000–9.000 steps/day by 18 years old. In children, boys typically average 12.000–16.000 steps/day, whereas girls average 10.000–13.000 steps/day (Tudor-Locke et al., 2011). The limited cohort in this study reported boys averaged 7.768 steps/day, and girls averaged only 6.982 steps/day. This concerning trend requires further investigation.

There are some limitations to this study. Only 98 children completed the questionnaire with only 35 also reporting the number of daily steps using smart watch/phones. Employment of such devices may have represented a certain motivation for children to take a larger number of steps. We expect that these children walked more than the rest of the cohort. Therefore, the average number of the steps in the whole cohort was most likely smaller then reported above. The data collection started at the time when some outdoor organized sport activities were still allowed (early November) while children who completed the survey later in December were protected from all organized sport activities. So, during the time of data collection the restriction orders kept slightly changing. This could possibly affect results. Another limitation could be the fact that the study may not fully represent the population as a whole. Parents who are not upset by the lockdown are perhaps not as motivated to complete a questionnaire regarding their child's lack of PA.

The authors of the study encourage researchers from other countries to use the internationally standardized PAQ-C to conduct surveys in their countries and compare the results internationally, to help establish optimal strategies for preventing detrimental effects of long lasting hypomobility in school-aged children.

Conclusions

The “second wave” of the COVID-19 pandemic restrictions had a negative impact on PA of Czech boys and girls 8–12 years old. Based on comparison of Czech and international PAQ-C data, it seems that even under normal conditions Czech children are less physically active than their peers abroad. Further significant reduction of children’s PA due to epidemic restriction is alarming. This topic should be considered a public health concern. School, sport and government authorities need to set up effective strategies promoting school children's PA both during and after COVID.

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Risk of Mobile Phone Addiction in Secondary School Pupils

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Abstract: Background: the urge to use mobile devices constantly and anxiety that might come in case of impossibility to use them, represent one of the forms of behavioral addictions, the so-called nomophobia. Nomophobia negatively affects all attributes of human health, seriously affects its mental, physical and social components.

Objectives: the main objective of the research was to determine the degree of nomophobia in a sample of secondary school students, the partial objective was to map potentially risky areas with the use of modern information and communication technologies.

Methods: a quantitative method was chosen to carry out the survey, and an anonymous questionnaire containing a standardized core was used as a research tool. It consisted of 20 items focused on respondents' reactions in situations where communication links are not available or cannot be used. The survey was conducted in the eighth and ninth grades of 11 randomly selected primary schools in the Hradec Králové region. Data were obtained from 373 respondents with a balanced representation of boys and girls. 3 working hypotheses were established to compare the opinions, behavior and degree of nomophobia between boys and girls. The answers were evaluated by methods of descriptive statistics, Student's t-test was used to analyze the hypotheses.

Results: 0.5% of respondents did not show symptoms of nomophobia, a very mild and moderate form was recorded in 70% of respondents, mild form in 18% of the group, moderate in 8% and severe in 2% of respondents. Almost three-fourths of the students were not directly at risk of dependence on a mobile, but a tenth of the sample showed serious problems of a behavioral addiction nature. Respondents used an average of 4 applications, mainly communication programs, social networks and music players.

Conclusions: girls in the sample showed a higher rate of nomophobia than boys. The biggest differences in responses were mainly for fears of not being able to communicate immediately with family or friends.

Key words: questionnaire, mobile phone, nomophobia, prevention, risk, school, research, health, addiction, pupil

Introduction

Since the simple transmission of voice the mobile telephone communication has undergone rapid development in recent years, associated in particular with the expansion of text and picture messages. Subsequently, the massive use of the Internet connection enabled communication via social networks, online games and other features. The mobiles offer tools for working with information on the Internet, taking photos, shooting videos, using navigation and other more or less useful applications. The approach to mobiles by the owners is diverse - some cannot live without them, the others do not pay attention to them until someone calls or sends them a message (Broža, 2000).

Recently a new type of anxiety was observed and later defined in some users. This is the so-called nomophobia – addiction to a mobile phone. It manifests itself if a person cannot use a mobile phone for any reason and it represents a major life complication for the person. In most developed countries as well as in the Czech Republic the children also use the mobile phones. Nowadays young and very young children own mobiles. Therefore it is necessary to set the rules how to use mobile phones and other electronic devices at schools and other educational institutions (Slaninová, 2017).

As the signs of nomophobia are already evident in elementary pupils, it is appropriate to map the situation at schools and use appropriate preventive strategies. This intention became the motivation for the implementation of the research survey.

Theoretical basis

Addiction and its characteristics

Addiction can be described as disorder = a repeated urge to use a substance or repeat a certain behavior. An addict cannot resist the urge despite the negative consequences that addictive behavior brings (Vacek & Vondráčková, 2014). Vágnerová (2008, p. 548) interprets addiction syndrome as follows: *"Addiction syndrome can be defined as a set of mental (emotional,*

cognitive and behavioral) and somatic changes that arise as a result of repeated use of a psychoactive substance. Addiction can be understood as a lifestyle dominated by a preferential focus on this substance. It manifests in certain symptoms that persist for 12 months."

According to the 10th revision of the International Classification of Diseases (ICD-10) of the World Health Organization (WHO) the definition of addiction is based on the occurrence of physiological, behavioral and cognitive phenomena that are associated with the use of addictive substance or substances. This use is much more important to individuals than their previously recognized and valued values and patterns of behavior. They desire (crave) to take psychoactive substances, alcohol or tobacco. Reuse of substance after a period of abstinence usually leads to a faster re-emergence of symptoms unlike use of substance in persons without addiction (Nešpor, 2011).

According to the American Psychiatric Association (APA) and the 4th revision of its Diagnostic and Statistical Manual of Mental Disorders (DSM-IV), a diagnosis of addiction can be made if an individual has at least three of the seven symptoms for at least one year. It is: (1) a strong desire or urge to use the substance; (2) difficulty in self-control when using the substance; (3) physical withdrawal; (4) evidence of tolerance to the substance; (5) long unsuccessful efforts or attempts to control use; (6) the gradual neglect of other pleasures or interests in favor of the substance used; and (7) the persons continues using substances despite clear evidence of obviously harmful consequences (Nešpor, 2011). Factors influencing addiction can be divided into internal and external. Internal risk factors are innate and affect a person all his/her life. This group includes substance abuse in ancestors, psychiatric illness, violent tendencies, self-control disorder, susceptibility to common chronic illnesses, or tendencies to depression and self-pity. The group of external risk factors includes family, school, peers, society and the environment (Nešpor, 2001).

According to Vacek & Vondráčková (2014) it is possible to divide addiction to two basic types. The first is substance addiction associated with the action of substances of the nature of psychoactive substances to the organism, the second is behavioral addiction, where people show elements of addictive behavior in relation to certain activities. The terminology in this area is not completely uniform, in addition to the term *behavioral addiction,* synonyms of *non-substance addiction, non-chemical addiction, non-drug addiction, substance less addiction or process addiction* are used. In the following text, we will stick to the term *behavioral addiction*.

Behavioral addictions

According to Vacek & Vondráčková (2014, p. 327) behavioral addictions can be diagnosed when an individual shows *"significance (a certain activity becomes the most important activity in the person's life and dominates his/her thinking, feelings and behavior); mood swings as a result of the start of certain activity which is primarily as coping strategy; tolerance; withdrawal symptoms; interpersonal or intrapersonal conflict and relapse"*.

The criteria are almost identical to those for substance addiction. According to Vágnerová (2008, p. 527) behavioral addiction is defined differently: *"Many human activities are considered normal or even socially desirable, but only when one does them at a reasonable level. If they get out of control they can turn into pathological behavior. Then it is no longer so much about the content of the activity as about its adequacy and ability to control it in an acceptable way."*

Alter (2018) compared two types of addictive behavior' patterns; substance and behavioral. It was found out that the reaction of the brain of the pathological player during the game and the addict after taking the drug is similar. This means that both substance and non-substance behavior activate the same reward center in the brain that releases dopamine. It is a substance that then evokes an intense wave of pleasure. Addiction is the relationship between the individual and his/her experience. The individual becomes addicted against his/her will. Therefore behavioral addictions can be similarly dangerous as substance addictions. Addictions should be viewed from a broader sociological perspective and focus prevention on values which were key values to the addict before he/she became addicted (Matoušek et al., 2013).

Behavioral addictions can be divided into currently defined and accepted diagnoses and new, yet unclassified types of disorders. ICD-10 lists only the following types of behavioral addictions: F63 – addictive and impulsive disorders (gambling – disease gambling, kleptomania – disease theft, pyromania - disease firing, and trichotillomania - hair pulling disease). Furthermore the signs of addictive behavior show classified disorders F52.7 – hyper sexuality, disorder F50.2 – eating disorder and disorder F50.4 – food addiction (Vacek & Vondráčková, 2014). Recently new types of behavioral addictions have emerged, including the use of the Internet and computer game addiction, loan addiction, shopping addiction, work holism, addiction to another person and extensive care of the others, co-dependency (Krejčí, 2016).

Technological addictions and their influence on youth

Technological dependencies represent a subset of behavioral dependencies. According to Vacek (2017a) modern information technologies include television, computer, mobile phone, Internet and other technologies which are becoming an essential part of the individual and the society. The same opinion shares Hubinková et al. (2008).

Sieberg (2011) sees the attractiveness of the Internet primarily in freedom and anonymity. He considers the negative effects of communication absence, loss of barriers and time spent with technologies that prevent individuals from natural development and thus separate it from the real world. Černá et al. (2013) states that the most vulnerable group on the Internet are adolescents who need to experiment with their identity. The Internet offers them anonymity and the loss of barriers to communicate. This way they feel that in "online world" they are better understood than in ordinary "offline" life.

Dočekal et al. (2019) compares the Internet to a huge playground where a child can promote will and desire to learn and create. He also says that this playground might have a possible effect on children as future "addicts". Spitzer (2014; 2016) recalls that the use of the Internet is changing our brains, which have been evolving for many years and adapting to the conditions of individual stages of human development without digital technology. He points to the so-called digital dementia, i.e. a disorder of cognitive abilities and mental functions which is caused by a long-term use of digital media which gradually loses patterns of behavior and inability to remember important details from everyday life. He further points out that digital media relieve individuals of the need to perform intellectual work as this basic human activity is taken over by modern technologies. The expansion of digital media results in a lower intensity of brain use and a decline in brain performance over time. In young people the brain development is delayed, so their mental performance remains below its potential.

Zimbardo & Coulombová (2017) view the use of the Internet as a serious problem in establishing a healthy relationship and sexual life of young people. Another author dealing with this issue is Alter (2018) who states that modern technologies should primarily make our lives easier, so it is important to find the right balance. If we learn to use the modern technologies properly and find a balance between, the people do not necessarily become addictive to them.

Last three generations in the Czech society can be referred to as Generation X, Y and Z. Generation X represents people born between 1968 and 1983. In the Czech Republic this group is called the Husák's children (Husák was a president under socialism era) and practically did not encounter digital technologies during their childhood. Generation Y is often referred to as the so-called millennial generation. These are people born between 1984 and 2005 who experienced a rapid development of information technology during childhood and their youth. Generation Z is a generation of people born between 2005 and 2015 who grew up and are growing up surrounded by ubiquitous modern information and communication technologies (ICT), they cannot imagine life without the Internet. In this group the differences between the real and online world are practically zero (Müllerová, 2019).

The effects of ICT on the young people can be divided into positive and negative. The positives ones include easy search for information, possibility of self-education, personal development in the form of fun games or competitions, the creation of social groups, the development of logical thinking, memory or perseverance or spatial imagination. It is also important to acquire skills and knowledge in the field of computer literacy, which is a very desirable feature of employers and will probably be highly required in the future (Vacek, 2017b).

Negative influences include uncritical receipt of unverified information, spending a large amount of time on ICT and possible problems in personal, verbal and social communication. Decreased levels of social intelligence lead to an inability to empathize, to discharge aggression in connection with playing computer games. In terms of negative impacts on the health of an individual it is necessary to mention the tendency to obesity, the risk of vision damage, back pain, frequent headaches. ICT abuse is a separate issue of behavior' risk patterns associated with cyberbullying, stalking, hoaxing and other negative phenomena (Vacek, 2017b).

More common types of technology addictions

Addiction to mobile phones

In the Czech Republic the mobile networks were launched in 1992, the devices at that time were very expensive, bulky and heavy, allowing only long-distance calls. In 1995 SIM cards came to the market that allowed the use of a single phone number with different types of mobile phones. The price of the devices was dropped, the weight and dimensions were greatly reduced. In addition to phone calls it was also possible to send short text messages (SMS). Three main mobile operators gradually divided the Czech market. At the turn of the millennium telephones with integrated cameras and color graphics displays became available (Tomek, 2006).

Another milestone in the development of mobile communication are the smartphones using an advanced operating system and application interface that allows the installation or modification of programs. Mobile applications can be divided into: games, web browsers, antivirus programs, e-mail programs, programs for playing and editing multimedia, applications using GPS, shopping applications, social networks and more. This represents a very interesting business subjects with high potential (Clement, 2020c).

Opinions on the use of mobile devices by the school management vary. In most cases the school management leans towards strict forms of restrictions or prohibitions imposed by the school rules, as there is a number of problems associated with excessive use of mobile phones at schools (Fišer, 2018). The main risks in children include reading disorders, anxiety and depression, tendencies to obesity, as well as reduced ability to concentrate, which can lead to reduced emotion control and insufficient empathy in adulthood (Brdečka, 2019; Drahoš, 2016). Other risks include financial problems (high fees for telephone services), sleeping disorders or effects associated with the electromagnetic radiation on the human brain, which has not been much researched yet (Kopecký, 2015a). Better concentration, lower level of stress might go hand in hand with the reduction of mobile phones - but it depends on the school's priorities - whether it is important for students to protect students from external influences or prepare them for the existence in a global environment with global competition (Brdečka, 2019).

An important argument for reducing the use of mobile phones at school is also the effort to reduce cyberbullying. The more students use the mobile phones, logically the greater risk of

their misuse for risky forms of behavior (Brdečka, 2019). Restrictive measures at school concerning mobile phones are also associated with a significant improvement in pupils' social competencies and a higher degree of their social interaction with classmates (Fišer, 2018). It turns out that a ban on the use of mobile phones only at school does not solve the risk of addiction to them. It is more advantageous to introduce ethical rules and zones without a mobile phone, possibly without a signal. Strict adherence to those rules of mobile phone use, basic rules of decency and consideration might be used as a practical compromise for most schools (Brdečka, 2019).

In 2018 the Czech School Inspectorate issued an opinion which, on the one hand, allows the restriction of mobile phones at schools, but on the other hand does not recommend a total ban, because mobile phones are the students' personal property and a tool for education, obtaining and working with information in modern society. However, an effort to designate environment and time to use them may not be easy. The management of most schools prohibits students from using mobile phones during classes and specific rules are set out in the school rules (Andrys, 2018). The inconsistency in the interpretation of this opinion has the consequence that at some schools the use of mobile phones is strictly forbidden, at others is limited to breaks (Kopecký, 2019).

Addiction to the mobile phones is referred to as *nomophobia*. The term was first developed and applied in the UK in 2008 as part of a survey focused on the possibility of anxiety disorders' cases due to excessive use of the mobile phones. It is composed of the words *NO MObile PHOne phoBIA* and is used to describe a mental state where people are afraid of being disconnected from mobile phones or losing the mobile network signal. As a result of these unfounded concerns, negative effects on the physical and mental condition of users might be observed. The term is constructed from the definitions described in DSM-IV and has been described as *phobia of certain - specific things* (Bashar et al., 2019; Güzel, 2018).

Yildirim & Correia (2015) describe nomophobia as a modern phenomenon characterized by the so-called smart mobile phones, with fast and comfortable access to the Internet allowing the users to use many applications, including social networks. In this way they increase the fears of users of the loss of communication not only for voice transmissions via the mobile network, but also for the use of the wide possibilities of the Internet, including the social networks.

Social networks are the most used applications on the mobile platform, then followed by games, communication, and shopping applications (Riley, 2018). In developed European countries (France, Germany), the average user spends about two hours a day using his/her mobile phone, in developed Asian countries (South Korea, China) and some countries in South America (Brazil) it is twice as long (AppAnnie, 2019).

Svobodová (2016) mentions the following symptoms of nomophobia: nervousness and even panic if a person does not have a mobile phone or the device on them, if it is discharged or without a signal, constant check the display, immediate response to incoming messages. Blinka et al. (2015) added to those symptoms: strong desire, euphoria, tolerance, withdrawal syndrome, conflict, and relapse.

Nomophobia is associated with a number of health problems, such as sleep disorders, headaches or eye pain from constant monitoring the display. In the social sphere a direct face-to-face personal communication is limited. Due to the desire to control the mobile phones constantly, nomophobic people cannot concentrate, and more often they are also at risk of losing personal data and passwords due to fraudulent software (Güzel, 2018). One of the most common symptoms of nomophobia is so-called multitasking (performing multiple activities at the same time on a mobile). Krejčí (2019) reminds that in the organism there is a leaching of stress hormones that excessively stimulate the brain, affecting thinking and the ability to concentrate. The brain is constantly flooded with a lot of information, which weakens our concentration.

According to expert advice if person experiences symptoms of nomophobia, he/she needs to start developing new habits and try to be without a mobile phone for several hours a day. It is not desirable to fully stop using the phone immediately, but to use it only if someone calls or the user needs to call. It is important to set a daily limit to use a mobile. Another tip is to turn off the phone when a person is expecting a social meeting (family celebration, dinner with friends) (Svobodová, 2016). According to Krejčí (2019) for people who want to reduce the use of mobile phones the most important is a change of their thinking, making their own decisions, setting and adhering to priorities related to the use of the mobile phone, organizing time, scheduling tasks.

Internet addiction

The Internet is a worldwide computer network connecting millions of computers and servers all over the world. Internet addiction is technically called *netolism or net mania*. Internet users can be divided into two groups. Some users use the Internet as a working tool for information search, the others as a hobby (Pokorný et al., 2002).

Some users overuse the Internet. Blinka et al. (2015) distinguish excessive Internet use from the Internet addiction. Internet addiction is when the following characteristics are met: strong desire, mood swings, tolerance, withdrawal syndrome, conflict, and relapse. This is the so-called Griffits operational definition of addiction. Thus the Internet addicts are the most affected group of people who use the Internet excessively.

According to Pokorný et al. (2001) the emergence of netolism is related to the way the user perceives himself/herself and his/her surroundings, how he/she is open to the outside world. Other contributing factors are low self-esteem or self-doubt. The Internet offers to an addict a seemingly increase his/her personal prestige in the virtual world.

Internet addiction is a broader range of different types of behavior. Young (2010) states the following: addiction to cybersex and Internet pornography, addiction to social networks, addiction to online gambling, shopping or stock trading, addiction to information search and download and addiction to computer games. Internet addiction is associated with the use of some of the digital devices that can use the Internet connection effectively. The most used digital device is a mobile phone (based on the customs of a certain country), followed by personal computers and tablets (GSS, 2019).

The negative consequences of excessive Internet use include physical, mental and social health. Physical problems include, in particular, posture defects and back pain, visual impairment, impaired blood circulation, obesity due to lack of exercise and poor eating habits. In case of mental problems the user has difficulties to concentrate due to information overload, is irritated, distracted or unfocused. Moreover, the children are at risk of leaching from the excitatory amino acids due to excessive and prolonged tension when watching the Internet, damaging the cerebral cortex, which can reduce intellectual abilities. In the social sphere the computer is becoming a substitute for mutual interpersonal communication in the real world and endangers especially children and adolescents. Netolism is also often reflected in partner and sexual life, where sexual life is reduced to browsing porn sites (Pokorný et al., 2002).

It is recommended to solve the very beginning of Internet addiction under professional guidance. First, it's a good idea to share it with your family, colleagues, or your friends to see if they also see someone addicted to the Internet. If so, it is advisable to seek the help of a professional psychologist (Pírko, 2005).

Addiction to social networks

The term *social network* is currently most often associated with a service on the Internet, providing a certain group of people with different opportunities for communication and data sharing (Kabele, 2018). "*We define social networking sites as web services that allow individuals to: (1) compile a public or semi-public profile within a restricted system; (2) formulate a list of other users with whom they share a connection; and (3) view and browse their list of connections and connections created by others in the system "* (Boyd & Ellison, 2007, p. 211). The foundations of the modern concept of social networks were laid at the end of the second millennium (Boyd & Ellison, 2007).

Relatively recent data shows that there are 4.54 billion active Internet users in the world, of which 4.18 billion use a mobile phone for connection. Approximately 3.8 billion Internet users actively use social networks and the vast majority of them connect via mobile phone. The number of Internet users is constantly growing, the number of mobile Internet users is growing slightly faster, and the number of social network users available mainly through the mobile Internet is growing the fastest (Clement, 2020a). Losekoot & Vyhnánková (2019) see the reasons for the constant growth of social network users in the natural human need to fit into the pack, to behave in conformity.

The world's most widespread social network is Facebook with about 2.5 billion users, followed by You Tube, followed by WhatsApp and Facebook Messenger (Clement, 2020b). Social networks represent a powerful marketing tool (Smith, 2019).

Blinka et al. (2015, p. 181) say that *"excessive use of social networks can have a form of addiction, as all its features are present, including withdrawal symptoms, conflicts with the environment and relapse."* Extroverts with their distrust of their social competence in real life have social networks addiction, the introverts have increased tendency to some forms of addiction (Blinka et al., 2015).

Social network addicts subconsciously know that they spend a disproportionate amount of time in the online world, but they do not want to admit this fact. They feel guilty and at a more advanced stage of addiction changes similar to those on the Internet begin to show. They neglect hobbies, duties, loved ones and themselves. They excuse for their behavior, they run away from problems. In case of abstinence they suffer from nausea, anxiety or depression, often also insomnia due to check of social network several times a night (Dočekal & Eckertová, 2013).

Fieldingová (2018) describes Facebook as an invaluable resource for meeting human needs such as communication and belonging. However, she reminds that in case of overuse, this tool has completely opposite effects. There may be a loss of well-being and depressive states known as *Facebook depression*. Another risk is the *compare and do spair syndrome*, which is related to the perception of photos of friends showing happy moments in their lives. The person feels that when compared to them he/she does not live such a happy life as presented on their Facebook, they can gradually fall into depression with the risk of resulting in suicidal behavior.

According to Blinka et al. (2015) a possible solution is to listen to the reactions from their surroundings. If a person is repeatedly told that he/she spends too much time on social networks, he/she should seek professional help. The victim himself is not aware of his/her dependence on social networks. It is important to make a decision to see a psychologist or a psychiatrist, and then start treatment according to the usual procedure, which is very similar to other types of behavioral addictions.

Objectives

The main objective of the research survey was to determine the degree of addiction to mobile phones in a sample of 8th and 9th grades of the elementary school pupils (age range 13 to 16 years) of selected in the Hradec Králové region in the Czech Republic. We assumed that the rate of nomophobia would be higher in girls than in boys. Related to this fact are three working hypotheses that compare the behavior of boys and girls and were statistically tested. The secondary objective was to find out which mobile applications are most used by this sample.

Methods

The research survey was designed as a quantitative one, an anonymous questionnaire consisting of a standardized core was the tool for data collection. The survey took place in 11 randomly selected elementary schools in the northeastern Bohemia in the Hradec Králové region in the school year 2019/2020, in 15 classes of the last and penultimate years (in two eighth and thirteen ninth classes). The locations of schools were marked numbers 1 to 8 in order to comply with data protection regulations.

- Location 1 is the largest in the selected group with more than 11,000 inhabitants. There are several primary schools with 1,614 pupils. The survey was conducted at three primary schools in their final years.
- Location 2 is the second largest city with approximately 7,000 inhabitants, it includes several surrounding municipalities and local parts. There is one primary school with a total of 770 pupils.
- Location 3 is a town with more than 6,000 inhabitants and a fully organized primary school with a total of 723 pupils. There is also an orphanage with a school in the town. It is a modern facility that implements the European principles of education of children with behavioral disorders. 40 pupils were contacted in this facility.
- Location 4 includes a town with more than 4,500 inhabitants. The local primary school attends total of 475 pupils, questionnaire survey was conducted there, including preliminary research.
- Location 5 is located in the foothills of the Eagle Mountains with approximately 2,100 inhabitants. There is a primary school with a total of 380 pupils.
- Location 6 includes approximately 1,900 inhabitants and a primary school with 300 pupils.
- Location 7 is located in the vicinity of the Eagle Mountains has almost 1,700 inhabitants and a primary school with a total of 330 pupils.
- Location 8 is a mountain village with the smallest population in the group 1,050 people living in it. The primary school attends 140 pupils, half of whom commute from the surrounding mountain villages.

The research sample included a total of 373 pupils, of which 184 were girls (49.3%) and 189 boys (50.1%). From the point of view of gender representation, it was very balanced. In terms of age, most respondents reached the age of 14 and 15, 115 pupils were 14 years old

(30.8%), 222 pupils were 15 years old (59.5%). When classifying the group by sex, 14-year-old boys were 26.5%, 14-year-old girls 35.3%, 15-year-old boys 62.4% and 15-year-old girls 56.5%. The relative frequency of younger and older pupils outside the most represented group ranged from 0.5% to 6%. The average age of all respondents was 14.7 years, for boys 14.7 years, for girls 14.6 years.

An anonymous questionnaire consisting of two parts served as a research tool. The basis of the first part was a standardized core, the second part was originally assembled and connected within the research survey. The first part of the questionnaire consisted of a standardized model, which was created at the University of Iowa in 2014 (Yildirim & Correia, 2015). It spread rapidly and became a recognized standard for quantitative surveys of the nomophobia' degree. It was popularized in the journal Huffpost in the Science section (Gregoire, 2015) and its Czech translation was available in August 2015 on the E-safety portal (Kopecký, 2015b).

It contains a total of 20 items evaluating common situations, not extremes. The introductory 9 questions examine the behavior of respondents if they *have a mobile phone on them, but for some reason they cannot use it.* The first 4 items are focused on the situation when the respondent is not able to use a mobile phone to *obtain information*, the next 5 maps the feelings of respondents in situations where they have a mobile phone, but *for technical reasons cannot use it*. The following 11 questions examine the behavior and feelings of respondents when *they do not have a mobile phone on them at all*. The items 10 to 15 focus on situations where respondents *do not have access to communication* via mobile phone (e.g. with friends or family), items 16 to 20 ask about situations where respondents *lose connection*.

Scaling was used to answer the questions. Six categories were offered as part of the percentage agreement with the question that best describes the respondent's behavior. Thus, the respondent could express the degree of his agreement with the relevant item from 0% to 100% in steps of 20%. The lower part of the scale (0% agreement rate) means that the respondent would never feel or behave this way, the upper part (100% agreement rate), that the respondent always agrees with the question asked, 20% agreement means that the respondent agrees with the question in one out of five cases, etc.

A summary was chosen to evaluate the entire questionnaire. To do this, the individual scales of answers to the questions were scored from 1 point (0% agreement with the question) to

6 points (100% agreement with the question) in steps of 1 point. The results of the questionnaire survey for 20 items can take values of 20–120 points. We based on the evaluation of the questionnaire according to Kopecký (2015b), but its slight adjustment was made due to the large range reported for mild and moderate rates of nomophobia (Havranová, 2020). A total gain of 20 points means that the person does not suffer from symptoms of nomophobia, a range of 21–40 points indicates very mild nomophobia, 41–60 points mild nomophobia, 61-80 points mild degree of nomophobia, 81–100 points moderate degree of nomophobia and 101-120 points severe nomophobia.

The second part of the questionnaire contained a single item and was focused on the applications that respondents prefer to use. Respondents were instructed that they could select a maximum of the five most frequently used applications with priority sorting, so position 1 is the most popular, 5 the least popular. The list of applications was compiled on the basis of Richter's research (2017) and findings from preliminary research (Havranová, 2020).

In order to assess the respondents' behavior when using a mobile phone, the applications were in categories that better characterized the respondents' behavior for a similar type of application. Some categories of applications partially overlapped, their predominant focus was taken into account. The following categories were chosen: social networks, text, voice or video communication, listening or downloading music files, playing games, pornographic applications, sports applications, advertising and shopping applications, news sites and applications, internet search engines, applications for playing and downloading movie and series files.

The survey was conducted in June 2019 on a voluntary basis. Randomly selected primary schools were personally visited and asked for cooperation. The questionnaires were prepared in printed form and their completion took place anonymously during Civics. According to the teachers' feedback the study appealed to the students, and no one refused to fill in the form, which is a signal that this is a current issue affecting the Czech school system. If the school management showed interest to see the results, they were provided. Data obtained from completed printed forms were converted into electronic form using a spreadsheet processor MS-Excel and are subjected to statistics. Some surveys (Arslan et al., 2017) show that girls are more prone to mobile phone addiction. Therefore, the working hypotheses related to this fact were formulated in a null and alternative version to the following research assumptions:

Working hypothesis H1: The value of the averages of the scored answers to the individual survey questions is /is not the same for girls and boys.

Working hypothesis H2: The value of the averages of the total score of nomophobia is/is not the same for girls and boys.

Working hypothesis H3: The value of the averages of the point evaluation of the answers to the first twenty questions of the survey is/is not the same for girls and boys.

Testing of the mean value using a t-test (Student's test) with the selected confidence level α=0.05 (Bednářová, 2020) was used for statistical processing. In the case of the first hypothesis, the items in the questionnaire were divided into 4 groups of questions related to the same situations as follows:

- group 1: items 1 to 4, the user has a mobile phone, loses access to information;
- group 2: items 5 to 10, the user has a mobile phone, for technical reasons cannot use it;
- group 3: items 11 to 15, the user does not have a mobile phone, loses the possibility of communication;
- group 4: items 16 to 20, user does not have a mobile phone, loses connection.

This is an unpaired distribution (the number of boys and girls was different and the responses of both groups were independent), the F-test was used first to determine the identity of the variances of both groups. Based on its results, an unpaired two-sample two-tailed t-test was selected and applied. The procedure was similar for the second hypothesis, where the total sum of points obtained from all 20 items in girls and boys was tested. The third hypothesis was evaluated using a paired two-tailed t-test (Bednářová, 2020). Excel version 2016 spreadsheet was used for calculations.

Results

We present a brief evaluation of the first part of the questionnaire for each of the twenty items, followed by the outputs from its second part and an analysis of working hypotheses.

Data obtained from the first part of the questionnaire

Item 1: *I would feel uncomfortable without constant access to information via my mobile phone.* Most of the respondents were relatively moderate in answering this question, which

applies both in the whole group and in the classification of answers by gender. One third of the group responded with a 20% agreement rate, a quarter with a 40% rate, and 16% with a 60% rate. The relative frequencies of the remaining options are around 10% without major differences between boys and girls. Most respondents would therefore be able to cope with this situation relatively well.

Item 2*: I would be upset if I couldn't look at the information on my mobile phone when I needed*. The answers to this question were relatively evenly distributed throughout the sample, even with a gender breakdown of between 20% and 100% agreement by approximately one-fifth. Only 6% of respondents were completely dissenting. Compared to item 1, more respondents reacted angrily if they could not use their phone when they needed it.

Item 3: *It would make me nervous if I could not receive messages (events, weather, etc.) on my mobile phone.* Respondents did not see a big problem in this situation, the average frequency of the 0% to 40% agreement rate was 20%, and with a higher agreement rate it decreased. The answers sorted by gender were relatively balanced, with differences of up to 6%.

Item 4: *I would be upset if I couldn't use my mobile phone and its capabilities when I needed*. A higher level of agreement was recorded for this question (with a frequency of almost 60% in the whole sample at 60% and a higher level of agreement). Most respondents would be angry that they would not be able to use their mobile phone if they needed one for some reason. There was a certain difference (6% to 8%) between the reactions of boys and girls, which was observed in the 20% to 40% agreement rate and further in the range of 80%–100% agreement rate.

Item 5: *It would scare me if the battery runs out in my phone.* Respondents assessed this situation with the highest frequency (29% to 39% in the whole sample) at a 0% to 20% agreement rate, towards a higher agreement rate the frequency decreases to 6% to 8%. Girls had a significantly higher level of concern, with 40% and a higher level of agreement being reported by 42% compared to boys with a frequency of 27%.

Item 6: *I would panic if I used up my monthly data limit or ran out of credit.* This situation would not worry respondents too much. More than half of the respondents strongly disagreed with the statement (0% agreement), a fifth expressed a 20% agreement. Categories with

a higher level of agreement were represented in the sample with a frequency from 4% to 9%. No significant differences were found between the responses of boys and girls.

Item 7: *If I did not have an operator signal or Wi-Fi, then I would constantly check if I am already connected.* Most respondents expressed a low level of agreement with this item; a clear disagreement was evident in 27% of the sample, a 20% agreement rate in a quarter of the sample. In total, a third of respondents chose a 60% to 100% consent rate. No significant differences were found between the responses of boys and girls.

Item 8: *If I could not use my mobile phone, I would be afraid that I would get lost, get stuck, etc.* Respondents' fears that they would get lost or stuck somewhere if the mobile phone did not work were assessed in a rather disagreeable way - almost half of the respondents clearly disagreed, 20% agreed, 20% tenth, 40% tenth, the remaining categories were represented with frequency from 4% to 6%. The frequency of major disagreements was higher for boys (54%) compared to girls (39%). The lower level of concern was probably due to the fact that respondents would rely on loved ones in the event of difficulties.

Item 9: *If I couldn't use my mobile phone for a while, I would feel compelled to check it.* One third of respondents disagreed with this statement in principle, a quarter expressed a 20% agreement with it, a fifth with a 40% agreement. The frequencies of the remaining categories ranged from 4% to 12%. 4% of boys and 9% of girls would feel the urge to check their mobile device constantly.

Item 10: *I would feel nervous because I can't communicate with my family or friends immediately.* The highest frequency - 20% of agreement (one third of respondents) was represented in the sample, followed by 40% of consent (one fifth of respondents), 60% and 0% of 15% each. Categories with a higher level of agreement were represented with a frequency of about 10%. One third of boys and 41% of girls stated an agreement with 60% and higher.

Item 11: *I would be afraid because my family or friends would not be able to contact me.* As with the previous item, a higher level of agreement (80% and 100%) with this situation was significantly higher for girls (27%) compared to boys (14%). The most frequent rates of agreement in the whole group were 20% (acknowledged by a quarter of respondents) and 40% (chosen by a fifth of respondents).

Item 12: *I would feel nervous because I would not be able to receive SMS messages and calls.* Absolute disagreement with the situation was expressed by boys (23%) compared to girls (16%), while a high degree of agreement with the question (80% and 100%) was expressed by girls (22% in total) compared to boys (12% in total). The 20% consent rate was represented with the highest frequency (one third) in the whole group.

Item 13: *I would be nervous because I would not be in contact with my family and friends.* Boys again expressed stronger disagreement in this situation (18%) compared to girls (11%). In the case of a high level of agreement (80% and 100%), the situation was just the opposite (girls a total of 25%, boys a total of 16%). In the whole group, the highest frequency of consent was represented by 20% (28%) and 40% consent (one fifth of respondents).

Item 14: *I would be nervous because I wouldn't know if anyone wanted to contact me.* A quarter of the sample expressed a fundamental disagreement with this item, almost a third of the respondents expressed a 20% agreement and almost a quarter of the respondents a 40% agreement. A high level of concern was recorded in 13% of respondents, which may be due to the fact that respondents do not yet solve important term tasks to ensure the running of the household or the performance of work duties. Mainly friends and parents call them, pupils have a relatively fixed weekly program.

Item 15: *I would be nervous because my constant contact with family and friends would be disconnected.* The frequencies of occurrence of the categories 0%, 20% and 40% of the agreement rate in the whole group were relatively balanced, ranging between 22% and 26%. Girls showed a slightly higher degree of nervousness in the 60% categories and a higher level of agreement (34% in total) compared to boys (28% in total).

Item 16: *I would be nervous because I would be disconnected from my online identity.* Three quarters of the sample (total of 0% and 20% of the agreement rate) fundamentally or almost disagreed with this statement. The frequencies of the remaining categories ranged from 3% to 9%. There were no significant differences in responses by gender. Respondents do not consider their online identity to be very important.

Item 17: *I would feel uncomfortable because I would not be able to update information from my social networks and online media.* The situation was similar to the previous item. More than half of the respondents strongly disagreed with the statement, which was also true when classifying reactions by gender. A quarter of the sample expressed a 20% agreement rate. The

remaining categories were represented with low frequencies from 3% to 12%. Respondents would not feel uncomfortable if they could not update information about themselves on social networks and websites via mobile phones. They usually do not have the urge to post on social networks as soon as possible after an experience.

Item 18: *I would feel uncomfortable because I would not be able to receive update notifications from my online contacts.* Approximately 70% of respondents would not feel uncomfortable in this situation (0% and 20% agreement) with the question. The frequencies of the remaining categories were lower, ranging from 3% to 13%. There were no major differences between the reactions of boys and girls.

Item 19: *I would be nervous because I couldn't check my emails*. In this situation the lowest level of agreement was recorded out of all 20 monitored items. Three-quarters of respondents felt no nervousness if it were not possible. One-fifth of the group expressed a 20% agreement rate. The frequencies of the remaining categories varied from 0% to 6%. A probable explanation may be the fact that respondents prefer other means of communication (synchronous, e.g. chat, than asynchronous e-mails).

Item 20: *I would feel weird because I wouldn't know what to do.* The majority of respondents reacted strongly negatively or rather dissentingly, with 0% and 20% agreeing with the situation, with more than 60% of them expressing no major differences between boys and girls. The frequencies of the remaining categories ranged from 5% to 17%. Most respondents do not feel that they do not know what to expect without a mobile phone.

Comparisons of responses to situations were made using arithmetic mean and standard deviation. The results are summarized in Table 1.

Table 1

Evaluation of survey questions using statistical indicators of position and variability

Questionnaire item	Entire set (n = 373)				Boys (n = 189)				Girls (n = 184)			
	Item scoring	Standard deviation	Average agree (%)	Average deviation (%)	Item scoring	Standard deviation	Average agree (%)	Average deviation (%)	Item scoring	Standard deviation	Average agree (%)	Average deviation (%)
1	3.05	1.11	41.0	22.2	3.08	1.20	41.6	24.1	3.02	1.01	40.4	20.2
2	3.80	1.30	56.0	26.0	3.85	1.32	57.0	26.5	3.74	1.27	54.8	25.4
3	2.92	1.31	38.4	26.2	2.94	1.26	38.8	25.2	2.90	1.35	37.9	27.1
4	3.81	1.28	56.2	25.6	3.89	1.25	57.8	25.1	3.72	1.31	54.5	26.3
5	2.45	1.32	29.0	26.4	2.25	1.20	25.1	23.9	2.65	1.37	33.0	27.4
6	2.00	1.12	20.0	22.4	1.92	1.06	18.4	21.2	2.08	1.18	21.5	23.6
7	2.78	1.39	35.6	27.8	2.78	1.36	35.7	27.2	2.78	1.40	35.5	28.0
8	2.13	1.13	22.6	22.6	1.96	1.03	19.2	20.7	2.30	1.16	26.1	23.2
9	2.51	1.26	30.2	25.2	2.52	1.21	30.4	24.2	2.51	1.27	30.1	25.3
10	3.06	1.27	41.2	25.4	2.86	1.20	37.1	24.1	3.28	1.31	45.5	26.1
11	3.11	1.26	42.2	25.2	2.93	1.16	38.6	23.2	3.30	1.32	46.0	26.4
12	2.88	1.28	37.6	25.6	2.69	1.19	33.9	23.8	3.07	1.33	41.4	26.5
13	3.10	1.30	42.0	26.0	2.91	1.22	38.2	24.4	3.29	1.33	45.8	26.5
14	2.65	1.26	33.0	25.2	2.60	1.18	32.0	23.7	2.71	1.27	34.1	25.4
15	2.90	1.32	38.0	26.4	2.83	1.27	36.6	25.3	2.97	1.31	39.5	26.3
16	1.91	1.04	18.2	20.8	1.90	1.00	18.0	20.0	1.93	1.00	18.6	20.0
17	1.98	1.06	19.6	21.2	2.03	1.07	20.6	21.4	1.92	0.97	18.4	19.4
18	2.05	1.08	21.0	21.6	2.13	1.05	22.6	21.1	1.97	1.00	19.4	20.0
19	1.38	0.63	7.6	12.6	1.44	0.63	8.8	12.6	1.33	0.49	6.5	9.8
20	2.40	1.31	28.0	26.2	2.33	1.21	26.6	24.2	2.48	1.30	29.7	26.0
1–20	**2.64**	**1.20**	**32.9**	**24.0**	**2.59**	**1.15**	**31.8**	**23.1**	**2.70**	**1.20**	**33.9**	**23.9**

It is obvious that the respondents mostly agreed with the statements for items 2 and 4, i.e., that they would be angry if they could not use a mobile phone when needed. Boys expressed a slightly higher degree of agreement than girls did. On the contrary, a very low level of agreement was recorded for item 19 on nervousness in case respondents could not check

e-mails. The overall evaluation showed that the average level of agreement in the first part of the questionnaire reached 32.9% in the whole set. It represented 31.8% for boys and 33.9% for girls. The higher consent rate for girls' concerned items 5, 10, and 11 to 13.

A comprehensive evaluation of the rate of nomophobia according to the described methodology showed that 1.9% of respondents suffer from severe nomophobia, 7.8% from moderate nomophobia. In contrast, 0.5% of the sample showed virtually no signs of nomophobia. A slight degree of nomophobia was observed in 18.8% of respondents. The most numerous group of respondents (42.4%) falls into the zone of mild nomophobia and very mild nomophobia (28.7%). The majority of respondents, i.e. 71.6%, are not yet at risk of nomophobia, the opposite is the situation in about one tenth of the sample. When classifying the results of the overall rate of nomophobia by gender, it was found that girls are slightly more at risk in the categories of mild, moderate and severe forms of nomophobia. Only 1% of girls, no boys, was completely asymptomatic.

Analysis of data obtained from the second part of the questionnaire

It was a probe into the behavior of respondents using the Internet. Respondents had the task of choosing a maximum of 5 applications out of 12 in the basic menu, which they use most often. On average, 4.1 applications were selected without major differences between boys and girls. Each of the respondents uses an average of 3 social networks and one program to communicate, almost every third uses an application to listen to music.

Respondents also had the opportunity to add their favorite application directly, with an average of 0.28 applications per person. If we consider the whole set, then 373 respondents marked a total of 1,634 applications in the basic offer or newly added them, 4.4 applications per respondent. Approximately every fourth girl and almost every third boy entered one additional application. Girls more often mentioned applications designed for chatting, recording and playing multimedia files, photo processing, boys more often expanded the list to include applications focused on sports matches and results, games, journalism and erotic content. Online viewing of films and series has become a common area of interest. In almost 70% of the applications used, social networks (Messenger, YouTube, Instagram, and Facebook) formed the most numerous categories. 20% followed communication programs for internet calling and chatting, 10% music applications and games. Girls preferred Instagram, Pinterest, TikTok and Twitter, while boys preferred Facebook, music apps and Reddit.

Testing of working hypotheses

In the first working hypothesis, sets of scores of boys and girls for individual items were statistically tested. The results are summarized in Table 2. For none of the items 1 to 4 of the first block of situations aimed at the loss of access to information, the null hypothesis cannot be rejected, the difference between the reactions of boys and girls is not statistically significant.

For items 5 to 9 of the second group of situations focused on the loss of mobile phone' capabilities use, the rejection of the null hypothesis prevails for three items (6, 7 and 9), its rejection in two (5 and 8), there is a statistically significant difference in responses to the submitted situation between the observed groups. In girls, a greater degree of susceptibility to nomophobia is evident in these situations.

For items 10 to 15 of the third block of situations related to loss of communication, the rejection of the null hypothesis prevails for four items (10 to 13), there is a statistically significant difference in reactions between the observed groups. Girls show a higher degree of nomophobia. For items 14 and 15, the null hypothesis cannot be rejected.

In the case of items 16 to 20 of the fourth block of situations mapping reactions to loss of connection, the null hypothesis cannot be rejected for any of the items, so no statistically significant difference between the reactions of boys and girls was demonstrated. Although 6 cases of rejection of the null hypothesis were recorded in 4 groups of items, it can be concluded that in the whole block of 20 items it cannot be rejected as a whole.

In the case of the second working hypothesis (see Table 2), a two-tailed unpaired two-sample t-test was used. The variances of both sets turned out to be identical. The level of significance of the t-test was greater than 0.05, we do not reject the null hypothesis for the agreement of the mean values of the sets of answers of girls and boys (overall evaluation of nomophobia). The values of the averages of the overall score of nomophobia do not differ significantly between boys and girls.

Table 2

Statistical testing of the first two working hypotheses

Questionnaire item	Significance level differences of the F-test	Variances of non-paired two-sampled double-sided t-test	Significance level of the t- test	Verdict on the null hypothesis	Group of items
1	p<0.05	mismatching	p>0.05	do not reject	1
2	p>0.05	matching	p>0.05	do not reject	
3	p>0.05	matching	p>0.05	do not reject	
4	p>0.05	matching	p>0.05	do not reject	
5	p>0.05	matching	p<0.05	reject	2
6	p>0.05	matching	p>0.05	do not reject	
7	p>0.05	matching	p>0.05	do not reject	
8	p>0.05	matching	p<0.05	reject	
9	p>0.05	matching	p>0.05	do not reject	
10	p>0.05	matching	p<0.05	reject	3
11	p>0.05	matching	p<0.05	reject	
12	p>0.05	matching	p<0.05	reject	
13	p>0.05	matching	p<0.05	reject	
14	p>0.05	matching	p>0.05	do not reject	
15	p>0.05	matching	p>0.05	do not reject	
16	p>0.05	matching	p>0.05	do not reject	4
17	p>0.05	matching	p>0.05	do not reject	
18	p>0.05	matching	p>0.05	do not reject	
19	p<0.05	mismatching	p>0.05	do not reject	
20	p>0.05	matching	p>0.05	do not reject	
1-20	p>0.05	matching	p>0.05	do not reject	-

The third working hypothesis verified the difference in the values of the responses' means for individual 20 items when classifying responses by gender. A two-tailed paired two-tailed t-test was used. The agreement of the variances of both sets' values was found. We reject the null hypothesis for the concordance of the averages of the boys' and girls' responses to individual items at the significance level of 0.05. The difference between the reactions of boys and girls is statistically significant, girls show a higher rate of nomophobia.

When comparing the total of 20 items, no statistically significant difference was found between boys and girls between the total number of points. However, if the average values of the responses for the individual items were examined, a significant difference was already found in the pairwise testing. In summary, girls from the observed population sample show

a higher rate of nomophobia than boys based on hypothesis testing. The biggest differences in respondents' reactions were related to fears that they would not be able to communicate with family or friends via mobile phone immediately.

Discussion and pedagogical recommendations

Discussion

Yildirim (2014) conducted a research survey in the USA in a sample of 301 respondents. They were university students of agriculture, economics, technology, humanities and the arts; 135 respondents were male, 166 female. The basis of the questionnaire and the methodology of its evaluation were practically identical to the survey described by us, but the age of the respondents was higher. A comparison of the two surveys' results showed that there was a statistically significant difference between them at the 5% level.

The mean value of the scored answers of primary school pupils' sample is significantly lower compared to the sample of university students, which can be explained by several facts. The sample addressed by us is significantly younger, it is the so-called generation Z (the year of respondents' birth mostly falls in the range of 2003–2004), and the survey in the USA concerned respondents of generation Y (their year of birth was in the range of 1990–1997). The second possible reason is that the respondents in our survey underestimated their behavior and reacted subconsciously with a lower level of agreement than would actually correspond to their behavior.

The implemented research investigation has its limits. Its results cannot be generalized, but they are valid in the monitored region and the addressed population segment. A multicenter study with the help of randomly selected primary schools with similar characteristics would contribute to a deeper mapping of the nomophobia' degree. A standardized questionnaire is advantageous, with which the degree of nomophobia can be determined and expressed using a tried and tested standardized methodology.

The observations and findings made by teachers at the senior primary school show that many pupils who do not have a mobile phone with them show a higher degree of nervousness and are more conflicting.

Social changes, including the rise of new ICT, place high demands on a person's ability to adapt to them. They bring not only benefits to humanity, but also negatives. The biological

and genetic nature of the organism lags behind the rapid development of modern technologies in the speed of adaptation. The ever-increasing pressure forcing these people to manage, receive, sort and store information leads to stressful situations that can result in serious health problems. Members of the Z generation cannot imagine their lives without the Internet, social networks and mobile devices, which, however, can, in the event of inappropriate or above-limit manipulation, condition risky patterns of behavior, including behavioral addictions.

Pedagogical recommendations

At present, our company views the use of modern ICT from various angles. The Ministry of Education, Youth and Sports of the Czech Republic has not yet defined clear rules for the use of mobile phones at schools, and experts dealing with this issue have not reached agreement. Also, the management of individual schools does not share the same views on these issues, it takes its own positions essential to creating a healthy school climate. Specific methodological recommendations for the use of mobile phones are therefore not currently set.

According to Hronová (2018), it is very important to include in school rules the rules for the use of ICT, the Internet and mobile phones on the school premises, during classes and during breaks. Zajíček (2018) in the recommendation of the Ministry of Education, Youth and Sports in *Annex 15 Netolism* proposes the prevention of ICT addiction in primary school pupils. Above all, it is a professional approach of pedagogical staff, who can detect the risky behavior of pupils in time by their observation. Furthermore, there is essential cooperation between the school management, prevention methodology, educational counselor, but above all the unity of other teachers involved in the educational process of students, and last but not least, the approach and cooperation of their legal representatives. Behavioral addictions of the public are not considered very dangerous, so they are often underestimated. Interventions to address ICT dependence and the use of mobile phones in schools do not fall within the remit of the educator himself, but his professional approach can detect undesirable pupil behavior in a timely manner. Based on his experience and empathetic approach, the teacher is able to establish contact with the student, gain his/her trust and offer him/her professional help.

Discussions with teachers and with the management of a number of primary schools have shown that although they do not strictly prohibit the introduction of pupils' mobile phones into schools, their use during teaching is prohibited. During breaks students are usually allowed to use their phones. There is a need for a clear set of rules with clearly defined sanctions for their

violation. The rules for using a mobile phone should be written in the school regulations (Havranová, 2020).

It is necessary to include the rules of good behavior in the rules, such as not using a mobile phone during personal communication or at the school canteen. Sanctions should be increased in the event of repeated infringements. An extreme sanction may be a ban on the use (not introduction, which restricts pupils' property rights) of mobile phones at school in the event of a particularly serious or repeated offense. It is very important to observe equal access to all pupils when applying restrictions (Havranová, 2020).

Conclusion

The use of mobile phones has undergone a very rapid development over the past three decades. At the same time there was a massive expansion of fixed Internet and then the transmission of data via mobile networks, which is constantly accelerating and growing in volume. Also applications for mobile phones have undergone rapid development, especially social networks have changed a lot in the field of communication and have a large number of users who spend a lot of time on them.

An anonymous questionnaire survey conducted using a standardized tool in a sample of 373 pupils in the eighth and ninth grades of selected primary schools in the Hradec Králové region showed that less than 2% of respondents show a high degree of addiction on a mobile phone. Approximately 8% of respondents are directly at risk of addiction on a mobile phone, they feel more anxious if they cannot use a mobile phone. It can be considered a positive finding that 72% of respondents are not directly endangered by mobile phone addiction, although they actively use a mobile phone, but if they do not have access to it, they do not feel anxious, but rather a certain degree of nervousness. Girls are more prone to nomophobia than boys.

Respondents most often use applications from the group of synchronous communicators (chatting), social networks and access to audio media on their mobile phones. The most common are Messenger, YouTube, Instagram, Facebook and Spotify. If it comes to level of popularity social networks clearly lead, other boys prefer gaming, sports and erotic applications, while girls prefer various types of applications that allow you to work with multimedia, especially photos and videos.

Measures aimed at controlling the use of mobile devices at schools are not uniform. The Ministry of Education, Youth and Sports of the Czech Republic has issued a set of recommendations that school management can adapt to its discretion and specific situation and implement together with possible sanctions into school regulations.

Pupils and teachers were actively interested in the questionnaire survey, as well as the results. The survey can be the basis for subsequent more detailed and multicenter studies.

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The cognitive dimension among university students in the area of sexual and reproductive health with an emphasis on the issue of delayed/late pregnancy and parenthood

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Abstract: Background: The shift in women's fertility and birth rate to the higher age is characterized as the most significant feature of reproductive behaviour over the past decades in the Czech Republic (and in other developed countries). The trend of the so-called delayed or late pregnancy/motherhood/parenthood is determined by polyfactorial influences with possible risk impacts on the biomedical and psychosocial aspects of the health of mothers, fathers, children and society as such. In 2020, the following project was implemented: 50/2020/PPZ/OKD *In Time – responsible, erudite, planned and prepared parenthood – The shaping and development of health literacy in the area of reproductive health among young adults (university students)*. The project was supported by the Ministry of Health of the Czech Republic and the Faculty of Education, Palacký University Olomouc. The outcomes of the project are of both educational and research nature. Method(s): *The Research on the cognitive and affective dimensions of young adults in the area of early pregnancy/parenthood* involving a sample of 844 student respondents from 14 universities in the Czech Republic evaluated the level of knowledge of health literacy with an emphasis on the general area of sexual and reproductive health as well as the specific area of possible risks associated with delayed/late pregnancy/parenthood. The research also focused on the personality and attitude dimensions of young adults in the context of delayed and late pregnancy. Results: In a specific area of sexual and reproductive health, the level of knowledge was problematic, sometimes even insufficient. An alarming fact is the complete lack of knowledge concerning the probability of conception during a single ovulation cycle of a young woman (18–30 years). Surprisingly, the correct answer was identified by less than 2% of female university students. The complete set of results of the research is published in the monograph *In Time: The cognitive and affective dimensions of young adults in relation to pregnancy and parenthood*. Conclusions: The unfavourable level of health literacy concerning early pregnancy/parenthood may have

a negative effect on the affective and behavioural dimension of young adults and support the manifestations of possible bio-psycho-social risks and complications resulting from the trends of shifting motherhood/parenthood to higher age bands. It is thus necessary to educate the young generation by means of adequate didactic procedures in order for them to be able to make informed decisions about whether and when to have a child.

Keywords: Delayed/late pregnancy/motherhood/parenthood; university students; cognitive dimension; sexual and reproductive health

Introduction

According to the long-term and continuous monitoring and evaluation of the development of fertility and birth rate in the Czech Republic, there was a clear decline in birth rate in 1995─2005 (Fig. 1) and at the same time an increase in mothers' age since this period (Fig. 2), very noticeable in the case of first birth (Fig. 3). In 2019, women's mean age at birth in the Czech Republic was 30.2 years. In 2018, 56% of women who gave birth were older than 30 years, of whom 38% were older than 35 years.

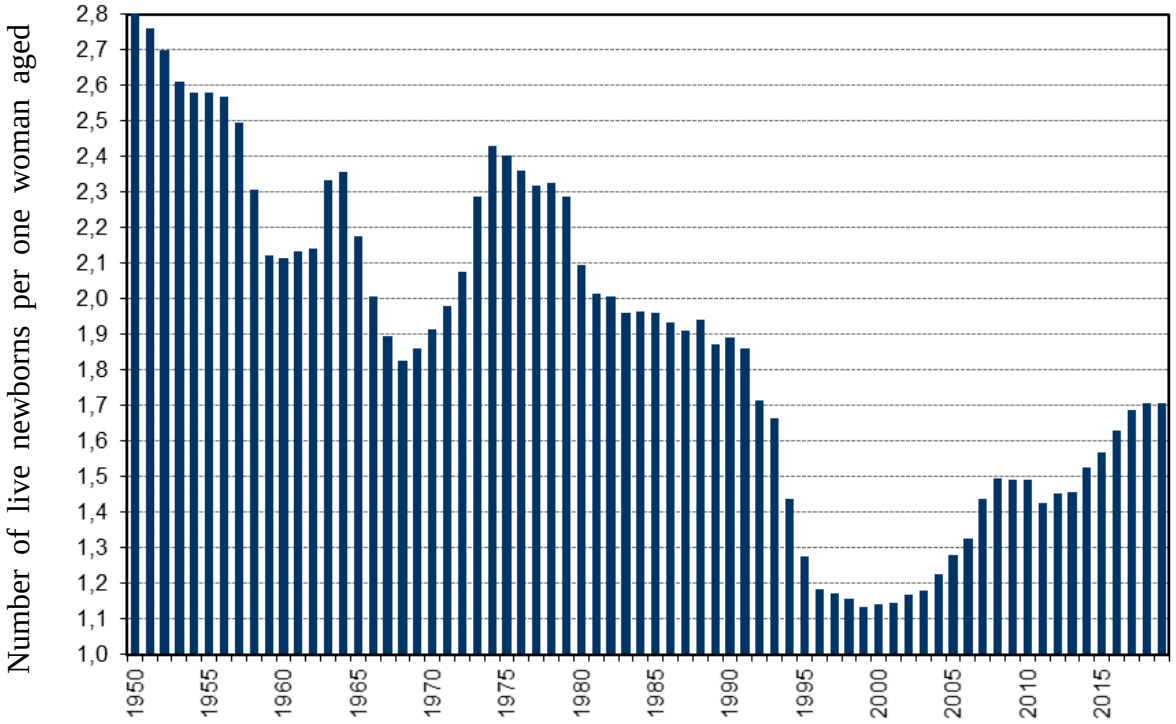

Figure 1. Overall fertility in 1950─2019.

Source: Czech Statistical Office. Born and deceased in 1950─2019 (2020)

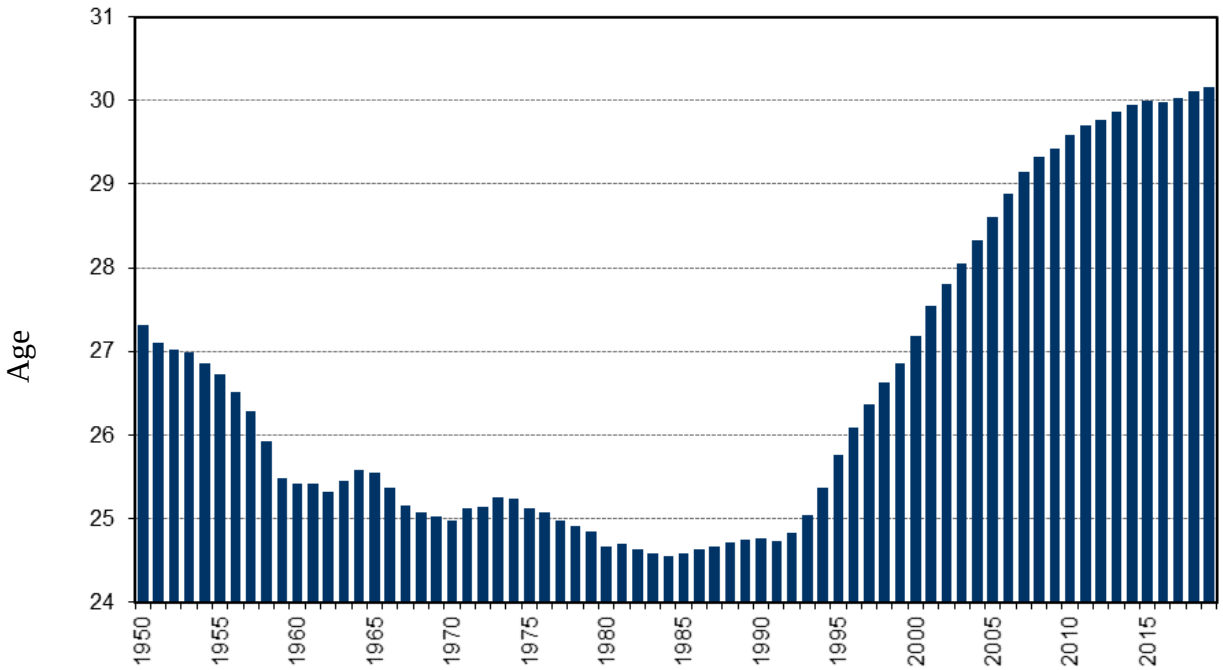

Figure 2. Average women's age at childbirth in 1950–2019.

Source: Czech Statistical Office. Average women's age at childbirth in 1950–2019 (2020)

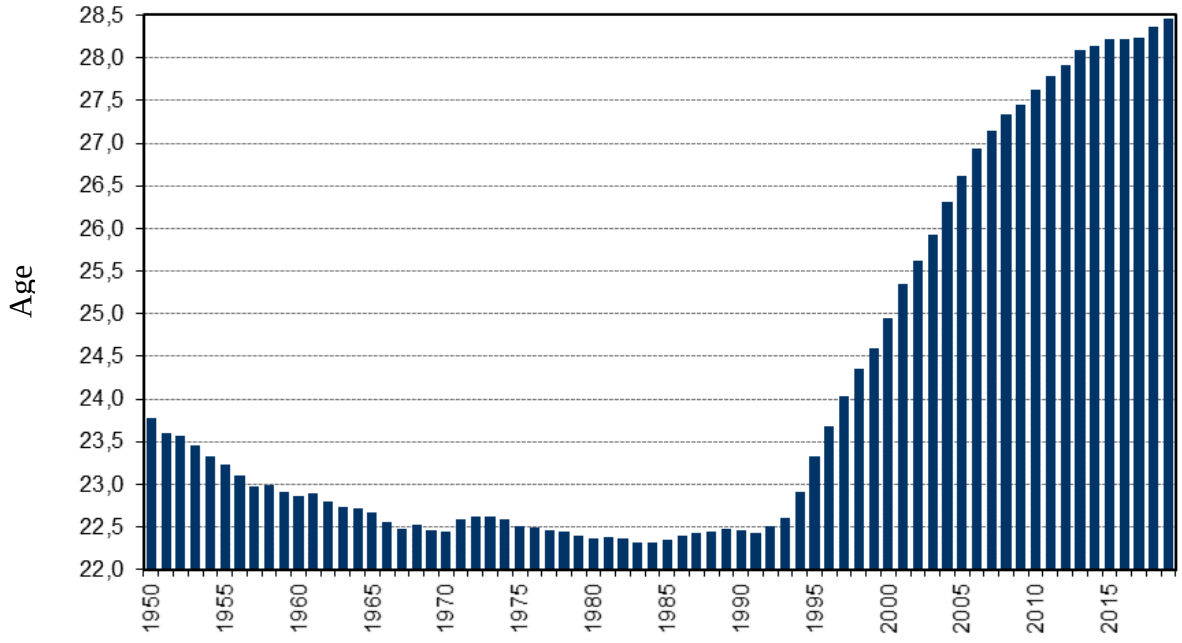

Figure 3. Average women's age at first childbirth in 1950–2019.

Source: Czech Statistical Office. Average women's age at first childbirth in 1950–2019 (2020)

According to Šťastná, Korourková, Šídlo, the shift in fertility to the higher age is considered as the most significant feature of reproductive behaviour over the past decades in the Czech Republic. This phenomenon can be identified as the trend of the so-called delayed or late pregnancy/motherhood/parenthood which is determined by polyfactorial influences with possible risk impacts on the biomedical and psychosocial aspects of the health of mothers, fathers, children and society as such (with a direct impact on for example healthcare, economy, social area, etc.).

In 2019, the Ministry of Health of the Czech Republic responded by announcing a project call *Health promotion and increasing the efficiency and quality of healthcare for 2020* within the priority axis of the project *Increasing health literacy* and the activity of the project *Education aimed at increasing the awareness of young adults regarding reproductive health with a focus on early parenthood*. In this way, the Faculty of Education, Palacký University Olomouc became the investigator of the project 50/2020/PPZ/OKD *In Time− responsible, erudite, planned and prepared parenthood. The shaping and development of health literacy in the area of reproductive health among young adults (university students)*[1].

Regarding the fact that according to Šťastná, Korourková & Šídlo (2019), one of the main factors of delayed parenthood is the expansion of university education among women (according to some studies this aspect is half responsible for the increase in age at first childbirth), the In Time project was deliberately focused on university students. Given that the current Czech education does not include the topic of the development of health literacy in the area of reproductive health with an emphasis on early motherhood/parenthood and possible risks of delayed/late parenthood, it is desirable to educate young adults in this area by means of activities outside mainstream education before the topic is implemented in both the intended and implemented curriculum (Hřivnová, Cichá, Slaná Reissmannová, Sofková & Marciánová, 2020).

One of the aims of the In Time project was to support young adults in informed decision-making in the context of planning their pregnancy/motherhood/parenthood with respect for personal choices as declared by the Sexual Rights defined by the World Health Organization (Sadková, 2017) according to which all persons without coercion, discrimination or violence have the right to choose whether and when to have children.

[1] Hereinafter referred to as In Time.

The activities of the project are of both educational and research nature.

Educational resources developed by the project team are related to the following seven core themes:

1. Planned pregnancy
2. Medical aspects of delayed parenthood
3. Assisted reproduction
4. Oocyte donation
5. Surrogacy
6. Assisted reproduction from the perspective of an integral anthropologist
7. Bio-psycho-social care for the child
    - Breastfeeding
    - Child upbringing and the age of parents

All of the educational resources are freely accessible on the project website www.intime.upol.cz in the "Educational Resources" tab (Fig. 4). The educational resources can be used in formal as well as informal education, also including other populations than university students. Currently, they are widely used in undergraduate training at the Faculty of Education at Palacký University Olomouc, Faculty of Education at Masaryk University and the Medical College in Prague.

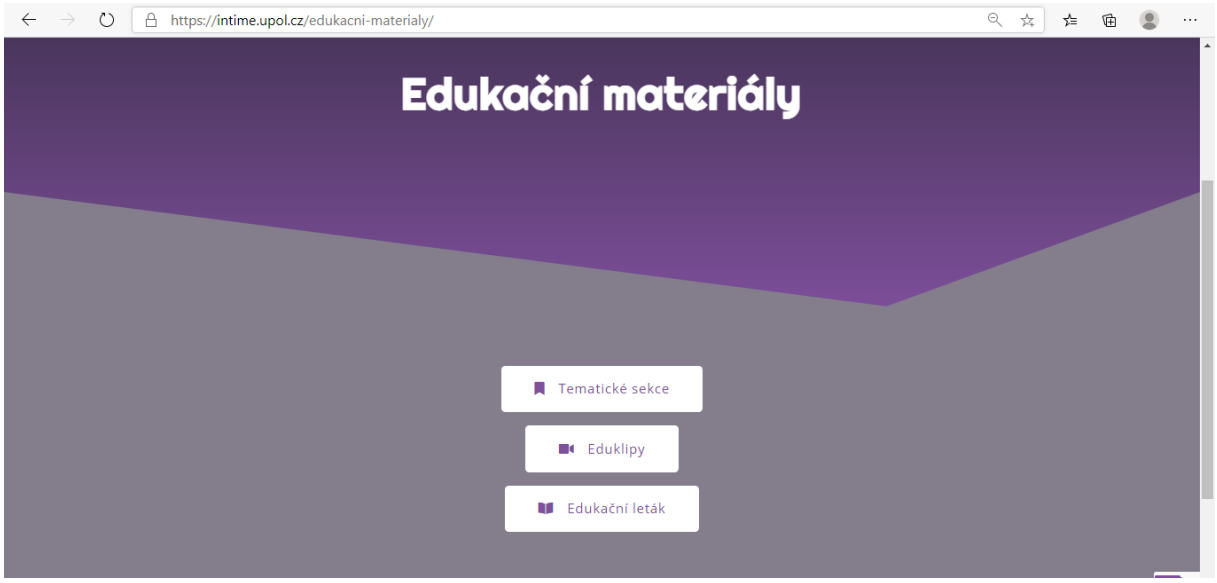

Figure 4. Website with educational resources.

Source: www.intime.upol.cz/edukacni-materialy/

Each theme includes PowerPoint presentations (12 presentations), worksheets (8 thematic multi-page worksheets including key), educational cards (9 thematic educational cards with a brief, concise and schematic presentation of the selected themes). The educational resources also include a set of 12 educational videos made in cooperation with the Department of Obstetrics and Gynaecology, University Hospital Olomouc, IVF Clinic a.s. in Olomouc and Ostrůvek Children's Centre in Olomouc. An educational leaflet was also produced to summarize the core findings.

Research of the cognitive and affective dimensions of young adults in the area of pregnancy/parenthood

A research study was carried out as part of the In Time project. The aim was to analyse and evaluate the cognitive (knowledge), affective (attitudes) and personality dimension of young adults (university students) regarding early pregnancy/parenthood and possible risks of late/delayed pregnancy/parenthood. The overall results including their correlations are included in a scientific publication (monograph)[2]. This paper describes the partial results related to the **cognitive dimension** including the items that allow the evaluation of the level of knowledge of a specific area of sexual and reproductive health.

Objectives

The main objective of the *"Research on the cognitive and affective dimensions of young adults in the area of early pregnancy/parenthood"* was to assess the level of health literacy in the area of reproductive health among university students younger than 26 years. Another aim was to analyse their attitudes to motherhood and parenthood in a bio-psycho-social context.

The objective of this paper is to:

Analyse the cognitive dimension in the area of sexual and reproductive health:

- Optimal age for pregnancy from a biological perspective;
- Optimal age for pregnancy from a psychosocial perspective;
- Women's age limit for non-risk pregnancy;
- Probability of conception during ovulation in a young woman (18–30 years).

[2] Hřivnová, M. (2020). *In time: kognitivní a afektivní dimenze mladých dospělých ve vztahu k těhotenství a rodičovství*. Univerzita Palackého v Olomouci.

Research methodology

The research was carried out in 2020; data collection took place between August and October. The research sample included 844 university students (female: 664/78.67%; male: 180/21.33%), age range 18–26, self-declared heterosexual orientation. The students in the research sample were from 14 Czech universities with an even geographical distribution of their place of residence. Of the total number of respondents, 67% women and 51% men lived with a partner, of whom 3/4 were in a long-term relationship. Data collection was performed by means of an instrument designed by the authors. This was a questionnaire made according to all generally applicable principles with good reliability (Cronbach's alpha relating to the questionnaire/test section on the cognitive dimension r = 0.53). The data were converted into MS Excel. A statistical data analysis was performed using Statistica 10.0. The data were subjected to standard statistical analyses. Statistical significance was set at $p<0.05$ (Hendl, 2006; Sheskin, 2007).

Results

Four specific questions relating to delayed/late pregnancy/parenthood were defined as follows (each with five response options):

From a biological (medical) perspective, the optimal age for pregnancy is:

From a psychosocial perspective, the optimal age for pregnancy is:

What is the probability of conception during ovulation in a young woman (18–30 years)?

Until what age is a healthy woman considered non-risk in terms of pregnancy from a medical perspective?

The results are presented in Tables 1–4 with the correct answers in bold.

In terms of the optimal age for pregnancy from a biomedical perspective (Table 1), a higher proportion of correct answers were indicated by women (83%) as opposed to men (67%).

Table 1

Frequency of answers concerning the optimal age for pregnancy from a medical perspective

	Female		**Male**	
Parameter	**Absolute**	**Relative**	**Absolute**	**Relative**
16–19 years	41	6.1	20	11.1
20–25 years	**548**	**82.5**	**120**	**66.6**
26–29 years	64	9.6	36	20.0
30–34 years	2	0.3	2	1.1
Different age	9	1.4	2	1.1
Total	**664**	**100**	**180**	**100**

$p < 0.001$

In terms of the answers concerning the optimal age for pregnancy from a psychosocial perspective (Table 2), the proportion of correct responses was comparable between women (71%) and men (67%).

Table 2

Frequency of answers concerning the optimal age for pregnancy from a psychosocial perspective

	Female		**Male**	
Parameter	**Absolute**	**Relative**	**Absolute**	**Relative**
16–19 years	0	0.0	0	0.0
20–25 years	154	23.2	34	18.8
26–29 years	**468**	**70.5**	**121**	**67.2**
30–34 years	34	5.1	22	12.2
Different age	8	1.2	3	1.7
Total	**664**	**100**	**180**	**100**

$p = 0.39$

The evaluation of the test item focused on the level of knowledge among university students concerning the probability of conception within a single ovulation cycle of a woman (Table 3) shows a sharp decrease in the number of correct responses compared with the previous two questions. The correct answer was suggested by only less than 2% of women and about 7% of men, which indicates a significantly higher success rate of men compared with women; however, the overall level of knowledge concerning the physiological processes associated with conception appears to be very low. In this specific case, we could even speak about a fatal lack of knowledge of young adults about the possibility of spontaneous conception.

Table 3

Frequency of answers concerning the probability of conception during ovulation in a young woman (18–30 years)

	Female		**Male**	
Parameter	**Absolute**	**Relative**	**Absolute**	**Relative**
10–19%	**11**	**1.7**	**12**	**6.6**
20–29%	43	6.4	24	13.3
30–39%	67	10.1	47	26.1
40–49%	189	28.4	40	22.2
50–59%	354	53.3	57	31.6
Total	**664**	**100**	**180**	**100**

$p < 0.001$

The last item of the evaluation of the cognitive dimension of young adults related to the determination of women's age which generally marks the risk in terms of conception and pregnancy (Table 4). The correct age limit of 35 years was identified by statistically significantly more women (49%) than men (41%). At the same time, this proportion indicates that more than 50% of university students gave the wrong answer.

Table 4

Frequency of answers concerning a woman who is considered non-risk in terms of pregnancy

	Female		**Male**	
Parameter	**Absolute**	**Relative**	**Absolute**	**Relative**
Less than 30 years	226	34.0	40	22.2
Less than 35 years	**322**	**48.5**	**73**	**40.5**
Less than 40 years	106	15.9	47	26.1
Less than 45 years	10	1.5	14	7.7
Less than 50 years	0	0	6	3.3
Total	**664**	**100**	**180**	**100**

$p = 0.05$

Discussion

In full harmony and with respect for the Sexual Rights defined by the World Health Organization including the right of an individual whether and when to have a child (Sadková, 2017) it is necessary to emphasise the possible risks arising from the absence of knowledge about the bio-psycho-social factors that affect fertility in relation to women's age (possibly also men's age).

As part of family planning, both negative (deliberate effort to prevent pregnancy) and positive (targeted effort to conceive a child) strategies can be used. After some time of family planning based on the negative strategy, a transition to the positive family planning strategy is expected (although this is not always the case). The interval between the negative and positive family planning strategy can last several months, years, but sometimes even one or two decades, possibly even longer (Hřivnová et al., 2020, pp. 26–27). During this period, parenthood is intentionally (deliberately) delayed. As suggested by Šťastná, Kocourková and Šídlo (2019), the most evident impact of delayed parenthood in addition to a decrease in the number of children is an increase in childlessness, including both temporary childlessness involving people younger than 30 or 35 years as well as permanent childlessness. The authors emphasise that in the generation born between early 1940s and the first half of 1960s (generation whose reproduction took place during the socialist era), permanent childlessness reached 5–6%. The current forecasts for the development of childlessness predict that in the generation of women born in 1985 the level of permanent childlessness could increase to 15–20% depending on the scenario of expected fertility development. Childlessness may stem from a free and intentional decision of an individual, which is referred to as voluntary childlessness. However, it is clear that delaying parenthood to a higher age is associated with an increase in involuntary childlessness. Schmidt (2010) gives examples of studies confirming that women often underestimate the relationship between higher age and increased risk of involuntary childlessness.

Looking at the results in the context of evidence-based facts, it should be noted that there is a series of factors that affect the timing of conception. These factors cannot be separated, nor is it possible to clearly determine which plays a more important role. Many of these factors can be influenced to a greater or lesser extent. However, some can only be affected to

a limited extent, if not at all. These include health (medical) factors. According to the recommended practices defined by a professional medical society (ČGPS ČLS JEP[3]), there is no explicit determination of the age of a pregnant woman which would represent a "specific defined risk", including for example pregnancy requiring a different recommended dispensary prenatal care or a strategy leading to the successful termination of pregnancy. The former term "elderly primipara" (primipara alta, tarda) referring to a woman giving her first birth at the age of 35 and above is no longer used and is considered by the general public to be very negative. However, it has been confirmed that pregnancy and childbirth at a higher age entail more frequent complications and risks (Hřivnová et al., 2020, p. 33). At the same time, with increasing age women report a higher incidence of associated diseases which pose a higher risk to the successful course of pregnancy and childbirth. Possible risks of delayed motherhood include infertility, spontaneous abortion, foetal chromosomal aberrations, gestational diabetes mellitus, hypertension during pregnancy, preeclampsia, preterm birth, intrauterine growth restriction and Caesarean section (Hřivnová et al., 2020, p. 36).

The most appropriate period for conception from a purely biological perspective is between 18 and 23 years. At this age, the female body is optimally prepared for pregnancy. The ovaries are fully functional and the tissues of the birth canal are elastic. The overall state of the organism is in full strength and there are usually no associated diseases. In terms of age, the risks of genetic defects of the foetus are minimal. After 24 years of age, some associated complications may occur but the risk of genetic disorders is still low. After 32 years of age, fertility begins to decrease, after 35 years of age, the chance of becoming pregnant decreases faster. A healthy 30-year-old woman has about 20% chance every month for naturally becoming pregnant. Fertility after 40 years of age is significantly reduced and the odds of becoming pregnant is lower than 5% in a single cycle (Hřivnová et al., 2020, pp. 34–35).

[3] Czech Gynaecological and Obstetrical Society of the Czech Medical Association of J. E. Purkyně.

Conclusions and practical recommendations

The current demographic trend shows an increase in women's age at childbirth, most notably at first childbirth. Since this fact is associated with possible biomedical and psychosocial risks both for women (mothers) and for the development of the foetus and the child (secondarily for the entire society), activities have been supported over the last few years that should increase the health literacy of the population in a specific area of sexual and reproductive health. The research part of the project 50/2020/PPZ/OKD *In Time – responsible, erudite, planned and prepared parenthood – The shaping and development of health literacy in the area of reproductive health among young adults (university students)* revealed a problematic level of the cognitive dimension among university students in specific areas of sexual and reproductive health. Misconceptions such as an unrealistic idea of the probability of conception within a single ovulation cycle may in connection with delayed/late pregnancy and parenthood lead to an increase of the so-called involuntary childlessness. The unfavourable level of health literacy concerning early pregnancy/parenthood may have a negative effect on the affective and behavioural dimension of young adults and support the manifestations of possible bio-psycho-social risks and complications resulting from the trends of shifting motherhood/parenthood to higher age bands.

With absolute respect for the right of an individual declared under the WHO Sexual Rights to a free choice in decision-making without pressure, discrimination and violence as to whether one should have children and when, the In Time project has helped increase the level of health literacy and informed decision-making in the context of family planning as well as possible risks of delayed/late parenthood. It seems desirable to carry out further educational activities focused on other population groups, especially adolescents, at least until the issue of delayed parenthood becomes part of the curriculum in the Czech Republic.

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Movement and Health in virtual topics of pedagogy practice of Physical Education students at FSpS MU

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Abstract: The starting point of the article is the question - how to address the pedagogic practices of university PE students at the time of pandemic measures, i.e., the closure of secondary schools and universities and the transition to alternative forms.

Overview of standard teaching practices for TV on FSPS according to accreditation valid from academic year 2019/2020 is described as so as innovative inputs are described.

Alternative performance in PP1, PP2 and PP3 practices, students pedagogy portfolio consisted of: compulsory activities - compulsory-optional activities – participation in "tripartite". *Tripartite* is a specific form for on-line personal communication of all actors of pedagogic practice at a determined school: student – guiding schoolteacher – FSpS tutor.

The basic method was the assessment of documents processed by 149 students, participating in alternative (virtual, on-line) format of pedagogical practice, i.e. analysis of their work (portfolio) and methodological sheets, pedagogical diaries and reports, schemes for teaching, video shots. Activities oriented on healthy lifestyle were formulated: theoretical topic, practical exercise focused on: a) fitness, b) relaxing. The analysed inputs were assessed by descriptive statistics.

Results show that all 149 students included the healthy lifestyle activities in determined variants in their tasks. It can be deduced students are prepared for teaching this topic. From the other hand students expressed these outputs were the simplest to realize in alternative form.

In conclusion students, guiding teachers and FSpS tutors expressed together: despite of the fact the virtual form cannot in any way replace direct pedagogic activity virtually conceived practices were not a waste of time. Outputs oriented on movement and health can also be part

of the contents for the period of teaching PE in regular conditions. This idea is in line with WHO's objectives.

Key words: pandemic period, guiding PE schoolteacher, PE student, on-line PE inputs, student´s portfolio, tripartite

Introduction

The paper informs about the activities of students of the Physical Education (further as PE) Teacher Program for primary and secondary schools at Faculty of Sport Studies (further as FSpS) of the Masaryk University within the framework of pedagogic practices, which had to be solved in the autumn and spring semesters of the academic year 2020/2021 alternatively in virtual reality, online (mostly via the MS Teams platform) due to government pandemic regulations. The existing PE curriculum is profiled as health-oriented according to the current framework educational programmes (MŠMT, 2021, p. 97).

The basic question of the survey presented here was whether the students also included the topic of “lifestyle and health” in an alternative solution by practice, since it was desirable to process this topic for pupils who had online teaching, during which their sedentary behaviour increased.

Another goal was to deduce from the results of the analytical-synthetic probe the readiness of students for orientation in this area, the possibility of inclusion in teaching and to consider application even for the period of actual implementation of the practice under normal conditions.

The accredited documentation valid at FSpS MU since the academic year 2019/2020 defines the scope of practice in the format below (see Table 1). Pedagogical practice begins in the 1st semester of master's follow-up study of PE teaching with the subject Introduction to Pedagogic Practice. However, since this was not included in the alternative implementation of practice, it is also not part of the data presented in this paper. Pedagogic practices for full-time and combined studies are under one code. An integral part of pedagogic practice is students´ reflection, which is also included as other subjects in the curriculum of teaching PE at FSpS MU. It is taught in parallel to ongoing pedagogic practices (np/nk4121 Reflection of practice 1 and n4132 Reflection of practice 2).

Table 1

Overview of standard teaching practices for TV on FSPS according to accreditation valid from academic year 2019/2020

Subject Code	**Name**	**Volume - Inclusion**	**Framework - Objective**
n4120	Pedagogic practice 1	2nd semester: exclusively at primary school, 1 day per week during the spring semester (inspection, 10 hours of independent management of teaching units in the length of 45 minutes incl. written preparations, feedback of the accompanying teacher after each teaching unit, administrative activities, other activities normal for the running of the school according to the assignment of the accompanying teacher)	– orientation in the practical and theoretical fields of primary education, – familiarization with the administrative tasks of a particular primary school, – deepening the competences to analyse and evaluate the physical education process, – implementation and reflection of various types of teaching units under the guidance of accompanying teachers and field didactics
n4130	Pedagogic practice 2	3rd semester: exclusively at the secondary school, 2 weeks of continuous practice or for students of combined study the possibility of continuous practice (inspection, 14 hours of independent management of teaching units in the length of 45 minutes incl. written preparations, feedback of the accompanying teacher after each teaching unit, familiarization with pedagogical documentation)	– orientation in the practical and theoretical field of secondary education, – familiarization with the administrative tasks of a particular secondary school, - deepening of competences to analyse and evaluate the physical education process, – implementation and reflection of various types of teaching units under the guidance of accompanying teachers and field didactics.

n4131	Pedagogic practice 3	3rd semester: exclusively for single-subject students, primary/secondary school with sports focus, continuous practice (inspection, 10 hours of independent management of teaching units for 45 minutes incl. written preparations, feedback of accompanying teacher after each teaching unit, introduction to pedagogical documentation)	– orientation in the practical and theoretical field of sports classes in primary or secondary schools, – familiarization with administrative tasks within the sports classes of a primary or secondary school, – deepening the competences to analyse and evaluate the physical education process, – skills to prepare, implement and reflect different types of teaching (training) units under the guidance of accompanying teachers or coaches and field didactics.

Government regulations related to the covid-19 pandemic situation have intervened in the teaching schedule of all schools. Contact of university students with other schools, respectively teachers and pupils, was practically closed for 3 semesters: spring 2020, autumn 2020 and spring 2021. All faculties preparing teachers had to look for adequate alternatives to fulfilling pedagogical practices. Due to the government's recommendations to delay the teaching of education, among them PE, this meant preparing the concept of alternative format of practice for FSpS MU, which was fully organized only from the autumn semester 2020. The main reason, in addition to meeting the requirements of the ZIP project for a somewhat unconventional solution by PE practice, was that students who entered a two-year master's degree from the autumn semester 2019 have at least a partial opportunity to confront pedagogical situations and thus interact with “real” pupils. Although these situations were very different from the practice we have known so far. Another reason was the possibility to provide pupils with at least some form of physical activity, which could partially compensate for the increasing sedentary behaviour enhanced by various forms of online teaching.

Alternative performance in PP1, PP2 and PP3 practices consisted of:

1. in compulsory activities: setting a timetable for practice with the accompanying teacher, creating a methodological sheet (2×) and a worksheet (2×);
2. in compulsory-optional activities (different combinations were possible to meet them, not all of them can be listed here): 2× video recording consisting of either/or 1x direct teaching via virtual platform (MS Teams, etc.) and either/or 1× video call (pre-recorded recording for pupils), 4× written preparation for the teaching unit;
3. active participation in *"tripartite"* in the presence of a student – guiding school teacher – FSpS tutor.

The alternative implementation of PP3 consisted of the same activities, with only half of the loading.

During the practice, students should keep a so-called *pedagogical diary*, based on self-notice (introspection). Its purpose was to self-reflect intentions, its filling, a critical view of themselves. By asking questions of yourself, you can understand more precisely to what extent the set goals of the practice have been met and what are the causes of success or failure. Both are important for further self-development of personal potential. The recommended guide for introspection was the scheme (not dogma): the chosen pedagogical and didactic procedure, individual approach, climate of the class or school, personal experiences. Completed inputs (task) were composed in student´s pedagogy portfolio.

Students, as well as the guiding schoolteacher and the FSpS tutor, completed the so-called self-assessment questionnaire. The questionnaire was created by the team of Pedagogy Faculty MU and used with their permission for the project ZIP purpose (OPVVV, ZIP).

Tripartite is a specific form for personal communication of all actors of pedagogic practice at a determined school. In this case, meetings were held online in MS-Teams or Zoom. The organizational side of the meeting was provided by the student. Tripartite could only take place after all declared outputs had been fulfilled and was the last point for successful implementation of the practice. An essential part, in addition to commenting on fulfilled tasks, was a discussion on the overall course of practice and forms in alternative (virtual) teaching. To achieve the above objective, we have formulated **key questions**:

1. Has the topic of lifestyle and health-oriented PE content been implemented in any of the outputs of alternative performance practices? If so, then:

- what was the frequency of occurrence of these topics,
- what specifically addressed the topics in particular,
- in what context of practice, the topics were.

2. How was the inclusion/non-inclusion of the topic reflected by the guiding schoolteachers?

Methods

Participants: the survey included all students of the PE teaching programme entered in the given semester in the academic year 2020/2021 in full-time and part-time studies who, according to the faculty schedule, completed their internships as of 30 May 2021, including completed reflections in "tripartite" on 30 June 2021 (see Table 2). The decrease of the number of participants between PP2 and PP3 was mainly due to the fact the PP3 was only for single-disciplinary TV students. Another factor in the decline in the number of participants was official postponements or interruptions of studies, which was often due to the absence of full-time teaching at higher education institutions.

Table 2

Number of students completing selected pedagogic practice in the academic year 2020/2021

Subject Code	**Male No**	**Female No**	**SUM**
PP1	37	22	55
PP2	35	21	56
PP3	18	16	34
SUM	90	59	149

Data collection and processing, investigation process

The outputs of students from their pedagogic practices in the academic year 2020/2021 served as the data for analyses. The basic method was the assessment of documents processed by students, i.e., analysis of their work and methodological sheets, pedagogical diaries and reports, schemes for teaching, video interviews. In total, there were 6 possible outputs for each student. Furthermore, reports from the so-called "tripartite" were also analysed, glossaries from reflective self-records were also used, but only as additional information used in the discussion. Students have been informed that their resulting work is archived in the FSpS MU electronic informatic and it is only available to guiding teacher and FSpS staff under a personal code and is treated anonymously for the purpose of evaluating practices and other innovative measures.

In the analysis process, account was taken of both the frequency of topics and their content focus or inclusion in the possible context of the subject. The frequency of topics (healthy lifestyle) in general without distinction according to other aspects was processed by descriptive statistics.

If 6 outputs were possible for each student, the absolute frequency number was 111 × 6, i.e., a total of 666 outputs for PP1 and PP2. For PP3, this was half the subsidy, i.e., 3 outputs × 34, i.e., a total of 102 outputs.

Results

To the purpose of virtually conceived pedagogic practices, we included in the thematic area "lifestyle" the topic of self-movement according to possibilities at home or in nature, eating, drinking regime, smoking, alcohol, movement and hygiene, sleep, sedentary activity (especially at the computer). These topics individually or comprehensively were mainly part of theoretical inputs, motivational quizzes, assigned tasks for independent work. Theoretical inputs were included by all students (149).

In the thematic area we have included two sub-areas: a) exercises of a fitness like strengthening body, limbs, exercise, exercises developing a cardiorespiratory system, b) relaxation, stretching, un-blocked exercises, yoga elements and psychomotor exercises. Again, all students (149) used exercises from sub-area a) or b), and in some, both.

Table 3 presents the use of the topic for the number of students, not in which of the 6 possible outputs. If we mechanically increase the number of student elections (447) who applied this topic regardless of the frequency in the possible outputs, to the total number of options (895), which is almost 50% of the possible outputs.

Table 3

Frequency of the topics focused of healthy lifestyle

Domain	**No of students**	**Topics, contents**
1. Theoretical	149	Exercise, nutrition, drinking regimen, alcohol, smoking, regimen of the day, sleeping, hygiene
2. Sub-area a)	149	Fitness, exercises of a body strengthening, exercises developing a cardiorespiratory system
2. Sub-area b)	149	relaxation, stretching, relaxing, yoga, postural, psychomotor exercises
Sub-area a) plus b)	103	

Discussion

We do not have relevant data on formats of pedagogical practices in PE teaching students at other universities in the Czech Republic or abroad at the pandemic stage, so only phenomena identified at FSpS MU in Brno can be discussed. The communication can then be an incentive for further initiative, for the comparative of solutions at other workplaces in the Czech Republic (3 faculties of sports and 8 pedagogical faculties) and, of course, at workplaces abroad. We are based here primarily on discussions in "tripartite" meetings and on student reflections.

I consider the inclusion of the topic "lifestyle and health" in an alternative solution by practice in almost 50% of the full range of possible outcomes to be very high. There would be a speculative conclusion that practising students consider this topic to be very serious. However, according to the students, these outputs were the simplest in terms of alternative processing of "physical activities" or in video outputs in content and implementation at home.

This is because students have already completed teaching subjects with these possibilities, many topics are circulating on video pages of various providers today, and it is possible to use "home" exercise aids: chair, carpet, met, scarves, underwear pins, small balls, massage balls, large gymnastic balls, etc. Furthermore, it is possible to encourage even little exercise or non-exercise and so-called "exclusion from PE". In preparation – worksheets – they adequately assigned sub-area a) to the main part of the hour and sub-area b) to the final. They focused intensively on video challenges with presentations of both sub-parts, these were presented as separate themes. Often, students pointed to the possibility of auto-testing fitness variables, using both well-known tests from the EUROFIT battery and modified simpler tests for seniors. These were then recommended to less able or smaller children from the 1st grade of the school, such as a modified step-test, modified sit-ups, etc.

Since the FSpS MU studies a relatively high number of so-called "top-athletes" from league level to international level, their samples from both sub-areas were highly motivating (biathlon, hockey, football, handball, weightlifting) for school pupils. Elements of training used in a sport were also presented, e.g.: interval training, circular training, tabata training, core training. Students were also often aware of smaller opportunities for various physical activities (e.g., closing sports clubs, children who had never been in line for physical activity, now had little or no physical activity, more than usual sitting at the table behind the computer, etc.) due to online learning, so they focused video content on other compensatory exercises – relaxation and stretching.

In purely theoretical lessons in addition to the above topics, the students also noticed safety, both during "home exercises" and when using sports equipment in real conditions (type and quality of balls for given activities, spatial conditions, preparation of cross-country skis, bike inspection and cycling equipment, etc.). In most schools, PE lessons were not a priority, either it was completely cancelled and practising students confronted their performances with the guiding teacher opinion, or they could hang them on the website of the school system for use by school students. Where participation in all pupil outcomes was voluntary, FSpS students were interested in feedback, but with minimal impact, which was frustrating for them. That's why at one of the schools, students created (with guiding teacher´s support) a motivational system for earning points for fulfilling video interviews with a simple exercise for the environment at home and outdoors. The point system has been adapted for both individuals and class groups. The contents were again health oriented.

According to the response, the guiding schoolteachers appreciated the knowledge of topics "movement and health", the flexibility of students relative to the given age of the pupils, respect for the limited conditions regarding to lock-down, but also local and social conditions in families. Guiding teachers also appreciated the knowledge of students in the topic of "movement and health", (but also other, not discussed here), skills working with informatic technologies.

They also stated that many of the topics with the permission of the students – trainees – would be used in further teaching under normal conditions.

Overall, the students stated that although personal contact with school pupils was limited or none, even virtual practice was important, mainly due to the high-quality personal and professional approach of guiding teachers, and that it was not a waste of time. They were aware of the principled moments of PE management in real conditions.

The advantage here was given to those students who had their own leisure experience at any performance level or experience in leading leisure groups. At the same time, they expressed regret at the impossibility of practicing in the original conditions, which also led them to prefer topics taken out of the context of the entire **curriculum of PE** or school educational programmes of determined schools. A frequent slight sigh of students was expressed: we devoted more skills to working as cameramen and editors than gym teachers. However, we also give somewhat sceptical statements: what effect will the absence of the third season in swimmers and the general impossibility of swimming in young children have. Swimming is also part of a healthy lifestyle. At the same time, the question is to what extent at least some ideas will be applied in real-world conditions, with some children almost not moving for almost a year. But also, the fact that some children can continue to be physically restricted or stimulated by the urban environment of the development and the lifestyle of the family.

Conclusion

The topic of lifestyle and health-oriented physical education all students (149 in total) involved in their tasks by practice, which in the frequency of possible chosen outputs was 447, that is almost 50 percent. We categorized the content focus into 3 areas (see Table 3):

1. theoretical inputs and information, motivational episodes as so as competitions;

2. practical solutions such as fitness-oriented exercises or relaxation-oriented exercises.

Both variants were applied by 103 students. Such oriented exercises were most often included according to the content 2a) in the main part of the training unit, according to the content; 2b) in the final relaxing part. Video challenges were as separate presentations and motivational topics. It can be deduced that students have good knowledge of this topic from the preparation at the faculty, that they are flexible enough for physical activities in limited conditions, but also objectively – short inputs with limitations can be better realized by "health topic" than practicing skills from real sports given by the curriculum.

The reflection of the guiding teachers was positive, both in terms of themes, the use of these themes in the "home environment" and in terms of motivation for everyday activities as part of the lifestyle.

The overall view of alternative solutions by practice, both guiding teachers and students, can be summarised in 2 ways:

- the virtual form cannot in any way replace direct pedagogic activity and the question is whether pandemic recommendations to delay education, including PE in schools or leisure groups, were adequate and whether measures related to physical activities could not be formulated differently,
- virtually conceived practices were not a waste of time, it was necessary to search, think, correct, prepare outputs, with very precise terminology or movement demonstrations, addressing topics that were more easily addressed by students, except for the skills to "process video challenges",
- outputs can also be part of the themes for the period of teaching PE in normal conditions.

It is all a matter of thinking and setting educational objectives in accordance with the framework of educational programmes in force and appropriately chosen innovations. The attractive exercises would encourage children to engage in various physical activities carried out more frequently and regularly, which in turn fulfils the function it is intended to perform, and which is in line with WHO's objectives.

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All information is drawn from the Information System of Masaryk University and from the internal materials of the ZIP MUNI project.

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Health promotion and health protection projects and programmes

Application of the brief intervention method in prevention of HIV/AIDS spread - 6 years of project implementation

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Abstract: The National Programme for Addressing HIV/AIDS in the Czech Republic 2018-2022 is a strategic document for combating the spread of HIV/AIDS and other sexually transmitted infections in the Czech Republic. The activities of the programme are funded by the Czech Republic's Ministry of Health's subsidy programmed called the National Programme on HIV AIDS. The target population groups of the programme are not only persons at high risk of HIV/AIDS infection due to risky sexual behaviour, but also adolescents, teenagers, and other persons of reproductive age with a lower level of health literacy. One possibility that could increase their level of knowledge is the short intervention method, which is also applicable in the field of prevention of sexually transmitted diseases.

The aim and purpose of the brief intervention method recommended by the WHO is to increase the health literacy of the intervened persons, eliminate their risky behaviour and promote their reproductive health. Reducing the incidence of HIV-positive persons in the population brings significant financial savings in terms of reduced treatment costs for both HIV-positive patients and especially those with advanced AIDS.

The application of the brief intervention method in the field of prevention of HIV/AIDS and other STIs was the essence of the 6-year project conducted by the University of Health Sciences in health care facilities across the Czech Republic. Patients were privately familiarised with the content of educational cards and were offered the opportunity for a closer consultation on the topic. After the education, the effectiveness of the intervention was evaluated by a short questionnaire.

5,146 people of reproductive age were intervened in more than 150 health care facilities across the country during the implementation of the 6-year project. A total of 1,347 patients (26%) reported that their loved ones were not adequately protected from HIV/AIDS and other STIs. Only 56% of the male and 66% of the female respondents reported that they had ever

spoken to their loved ones about STI prevention. After the education, 56% of the reproductive-age interveners requested copies of the education cards for their loved ones. Increased health literacy due to education was more often acknowledged by women than men, and especially by those in the 15–25 age group, where 74% of those in this age group who intervened confirmed increased health literacy. Women (75%) were more likely than men to believe that their loved ones were not adequately protecting themselves from STIs. Patients with lower levels of education were more likely to admit an increase in health literacy than those with university education (64%). 71% of patients with only primary education, completed at fifteen years old in the Czech Republic, said their health literacy had increased. 70% or patients who finished their schooling after secondary education, completed at eighteen years old in the Czech Republic, said their health literacy had increased.

Over the course of 6 years, more than 5,000 people of reproductive age were educated in the project. The health care environment in which the interventions were implemented contributed significantly to the success of the brief intervention method. The realisation of the project by the College of Health contributed to the implementation of the National Programme for Addressing HIV/AIDS in the Czech Republic 2018–2022 and at the same time the National Action Plan, entitled Development of Health Literacy.

Key words: brief intervention, education, intervention, HIV/AIDS prevention, health literacy

CONTRIBUTION

Introduction

The Government Resolution No. 839 on 29 November 2017 adopted a strategic document called the National Programme for Addressing HIV/AIDS in the Czech Republic 2018–2022, which mandates the implementation of a wide range of activities in society to combat the spread of HIV/AIDS and other sexually transmitted infections. A subsidy programme from the Ministry of Health in the Czech Republic called the National Programme for Addressing HIV/AIDS serves to financially support these activities. The implementation of these activities is to be carried out in cooperation between governmental and non-governmental organisations, which provide a wide range of educational and intervention activities. The activities are aimed at reducing the risks of the emergence and further spread of HIV infection in the target population by increasing health literacy and strengthening responsibility for one's own health. Patient education using the brief intervention method is in line with the

competences of non-medical health professionals, who are required by Decree 55/2011 Coll., as amended, to “motivate and educate individuals, families and groups of people to adopt a healthy lifestyle and to take care of themselves”.

Objectives

Brief interventions are WHO-designed and are clearly defined, practical procedures that use pictorial educational cards to clearly explain to intervenes the influence and impact of their behaviours that result in demonstrable increases in health risks and threats to their health. The short interventions address the most common lifestyle risk factors, namely excessive alcohol consumption, smoking, lack of physical activity, unhealthy diet and refusal of flu vaccinations, factors that have been shown to affect public health. The cards can also be used successfully to promote reproductive health and prevent the spread of sexually transmitted diseases. The application of short intervention in practice increases the health literacy of the people intervened and may eliminate or reduce the prevalence of lifestyle risk factors in the population. The long-term goal of the widespread application of brief interventions is to eliminate risky behaviours and reduce the incidence of selected diseases. An important aspect of the intervention is to reinforce the patient's motivation to change his/her own attitudes, beliefs, and behaviour. The financial and time costs of brief interventions are minimal. Within the framework of the subsidy procedure from the Ministry of Health in the Czech Republic, entitled National Programme for Addressing HIV/AIDS, a project entitled Application of the Brief Intervention Method in Preventing the Spread of HIV/AIDS and Other STIs was repeatedly supported in 2016-2021.

Methods

In the period 1. 1. 2016–31. 8. 2021, a project of the University of Health Sciences was implemented and dedicated to a short intervention of risky sexual behaviour by patients. It focused on patients of reproductive age in outpatient and inpatient health care facilities across the Czech Republic, where students of the bachelor’s degree programmes in General Nurse and Midwife were doing their professional practice or working. The students were trained in the application of the brief intervention method by the project supervisor and subsequently carried out the intervention using a set of 4 educational cards created by the State Institute of Health. The educational cards are devoted to the issue of sexually transmitted diseases with a focus on HIV/AIDS and are accompanied by colour photo documentation. Patients suitable

for the intervention were selected on the basis of a referral from the attending physician or station nurse and were offered participation in the project. The patients approached were privately familiarised with the contents of the educational cards and offered the possibility of further consultation on the topic. After the education, patients' attitudes and opinions on the benefits of the intervention were mapped with a short questionnaire. All data collected during the questionnaire were converted into an electronic form and subsequently analysed and evaluated.

Results

In the period 1 September 2016–31 August 2021, a total of 5,146 people of reproductive age were intervened in more than 150 cooperating outpatient and inpatient health facilities across the Czech Republic.

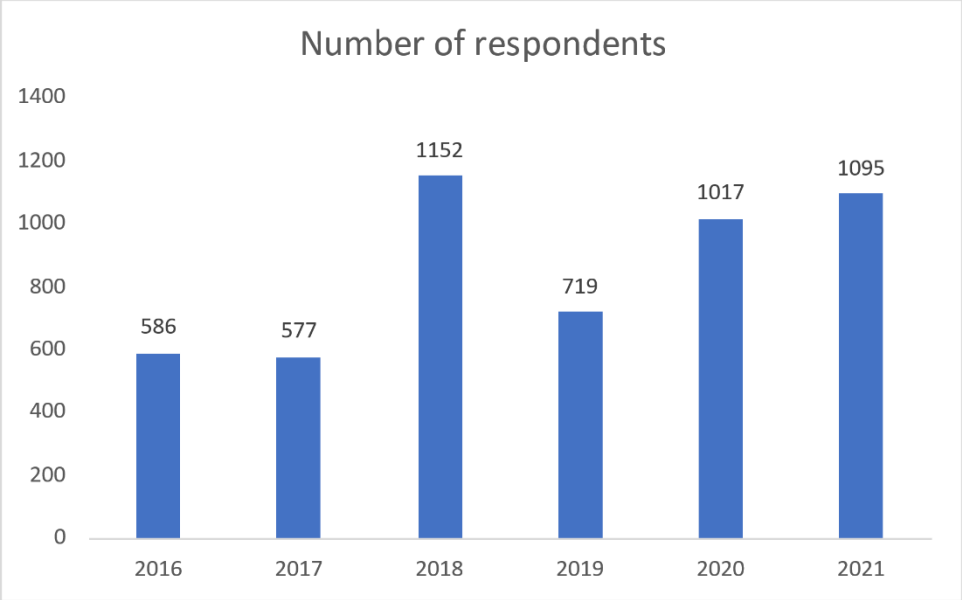

Figure 1. Number of intervention patients in individual years.

Of the 5,146 patients, 917 (37%) were male and 3,229 (63%) were female. The age structure of the intervention population is shown in Figure 2 and the level of education is shown in Figure 3.

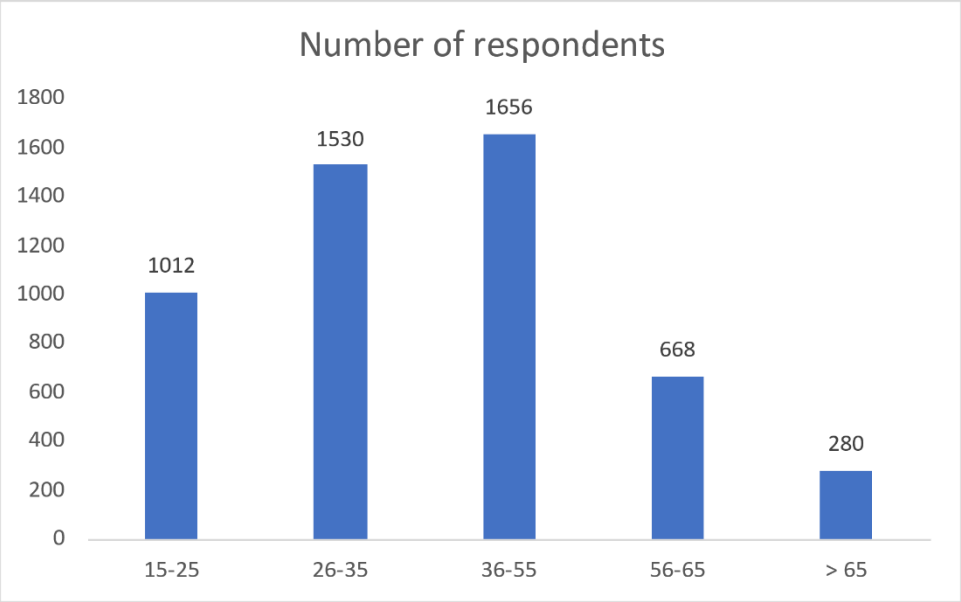

Figure 2. Age of the group of intervention patients.

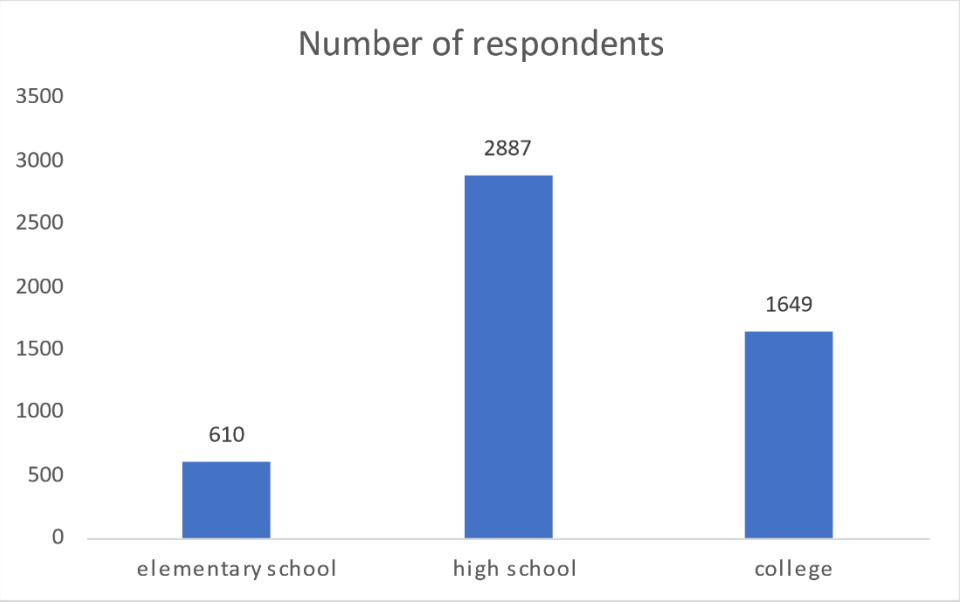

Figure 3. Education of the group of intervention patients.

The results of the questionnaire are presented in Figure 4.

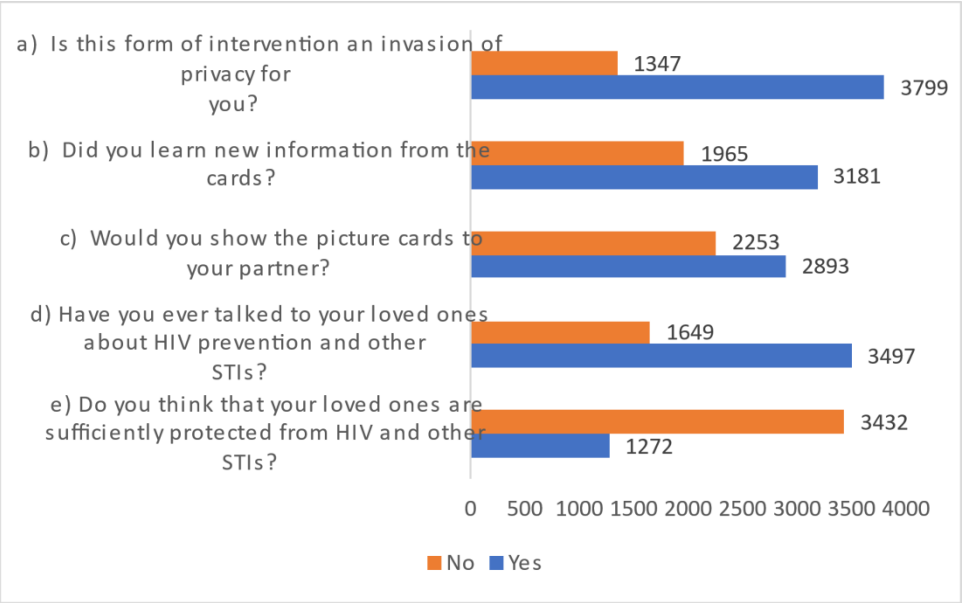

Figure 4. Questionnaire after the intervention.

A total of 1,347 intervention patients (26%) indicated that they did not think that their relatives were sufficiently protected against STDs. Only 56% of the male and 66% of the female respondents reported that they had ever spoken to their loved ones about STD prevention. After the education, 56% of the reproductive-age interveners requested copies of the education cards for their loved ones. Women were more likely than men to admit an increase in health literacy due to education, especially those in the 15-25 age group, where 74% of those in this age group who intervened confirmed an increase in health literacy. Women (75%) were more likely than men to believe that their loved ones are not adequately protected from STIs. Patients with lower levels of education were more likely to admit an increase in health literacy than those with university education (64%). 71% of patients with only primary education, completed at fifteen years old in the Czech Republic, said their health literacy had increased. 70% or patients who finished their schooling after secondary education, completed at eighteen years old in the Czech Republic, said their health literacy had increased. Men are more likely to consider the intervention as an invasion of privacy than women, and patients with only primary and secondary education are the most likely to consider the intervention as an invasion of privacy.

Conclusions

The implementation of the 6-year project was evaluated annually by the evaluation committee of the Ministry of Health in the Czech Republic and the project received a rating of 1 in all 6 evaluated years. The project was completed in an excellent manner and the effect was fully achieved. The project brought increased awareness of STD prevention to both inpatients and outpatients. The information was mainly targeted at preventing the spread of HIV infection and AIDS in the population, but also addressed other sexually transmitted diseases and motivated patients to engage in safer sexual behaviour. It guided patients to change attitudes that influence decision-making in favour of healthy reproductive behaviour and empowered them to take responsibility for their own health. From the implementation of the 6-year project, it has become clear that adolescents and young people gained the highest increase in health literacy through education, and this population group should be targeted for reproductive health promotion activities. The implementation of the project by the University of Health Sciences has contributed to the implementation of the important strategic document National Programme for Addressing HIV/AIDS in the Czech Republic 2018-2022. The action plans were approved by the Government of the Czech Republic, in particular AP 4 Reduction of Health Risk Behaviour, AP 6 Management of Infectious Diseases, AP 9 Ensuring Quality and Safety of Health Services, AP 10 Lifelong Learning of Health Workers and AP 12 Health Literacy Development.

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Contributions of the School Settings to the Promotion of Health-enhancing Physical Activity – dissemination of the HEPAS project results in the context of the Czech curriculum changes

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Abstract: This text presents one of the steps in the dissemination process of the 'HEPAS' project in the Czech Republic. HEPAS (Healthy and Physically Active Schools in Europe) was funded under the Erasmus+ Programme, Key Action 2: Strategic Partnerships led by the University of Luxembourg. HEPAS Associated Partners (according to the service agreement) was to perform the activities specified in the agreement to successfully promote and implement the project results in their respective country. In the Czech Republic, the Czech Society of PE Teachers (CSPET) was the HEPAS associated partner.

The objective of this paper is to point out an unpublished report elaborated by the HEPAS project team and use the data to consider the specifics of the Czech curriculum currently being revised. The report brought evidence from the last ten years of the contributions of school-based physical activity, physical education, and school sport on the promotion of health-enhancing physical activity.

The study used a 'rapid reviewing' method, in which sources were identified and analysed using systematic reviewing techniques, but subsequent stages were adapted to facilitate flexible and practical interpretation.

The authors used the results to discuss the plausibility of introducing an 'Active Schools' concept in the Czech curricula, in which physical education lessons designed to equip students with the prerequisite knowledge, skills, attitudes, and values supportive of a physically active lifestyle are augmented by other school-based contexts which provide the opportunity to meet the recommended guidelines for physical activity participation.

Key words: Physical Education; School Sport; Physical Activity; Healthy lifestyle; Active School; Curriculum Change; Czech Republic

Introduction

The educational systems of post-communist countries have transitioned over the last 30 years from a system where central control was absolute and politically directed. This transition has taken place in the context of holistic government reform and has been accompanied by political instability, confusion between stakeholders as to the direction of reform, and a lack of resources; nevertheless, a relatively stable educational system has emerged, particularly in the Czech Republic.

Despite the Czech educational reforms since 1989, which were significantly aimed at health and physical activity promotion, there is a large body of research, which indicates serious issues concerning the levels of PA and health status of the Czech population (Antošová & Kodl, 2014; Bunc, 2010; Bláha & Cihlář, 2010; OECD/European Observatory on Health Systems and Policies, 2017; Mitáš & Frömel, 2013; Mužík, Kuchařová & Vodáková, 2010; Mužík & Vlček, 2010; Vašíčková & Frömel, 2009).

In 2018 the Czech Ministry of Education, Youth and Sport announced a new cycle of revision for the Czech curriculum documents – Framework Education Programmes – FEPs, which will also affect the educational area 'Men and Health' and its curriculum. This project is now referred to as the Revision of the FEP and preparation of the Education Policy Strategy of the Czech Republic until 2030+ (Strategy 2030+). In January 2019 an expert group was established under the leadership of prof. Arnošt Veselý. Their task was to prepare the initial documents Guidelines for Education Policy of the Czech Republic 2030+, in which they would define the vision, priorities, and objectives of education policy beyond 2030. It should describe what should be achieved and how to achieve these goals.

Identifying the problem within the topic (in our case in the level of physical activity and health status) is the critical scientific act. The aim of this text is to provide learnings from abroad that might assist the Czech curriculum makers to enhance the quality of the Czech-designed curriculum in the respective educational area. Our findings and recommendations are based on the research conducted by the team of the project Healthy and Physically Active Schools in Europe – HEPAS.

Theoretical basis

Schools are expected to fulfill many different roles and functions, but most would probably agree that two ambitions are central: the development of students' well-being, and the knowledge, skills, attitudes, and values that are likely to encourage a happy and successful life (De Ruyter, 2015; Kristjánsson, 2019). Curriculum content has developed to support the constitutive elements of these ambitions, and among them, physical education, sport, and other forms of physical activity have been recruited to play a role. Traditionally, however, these activities have held relatively low prestige, often justified as a break from the real business of schooling, namely academic work (McNamee & Bailey, 2009). This situation changed significantly in recent years as falling levels of physical activity have led international agencies, such as the World Health Organisation (WHO) and the United National Educational, Scientific and Cultural Organisation (UNESCO), as well as national governments and agencies, have started to point out to rising incidents of non-communicable diseases, like Type 2 diabetes, heart disease, and obesity.

In this context, schools hold a unique role. Public health strategies require access to the largest possible population, and schools are the only societal institutions in which a very large proportion of youth can be reached. In addition, schools have an established role in communicating vital messages, whilst connecting with an extended network of parents, families, and communities. They also deal with people at an early stage when their behaviors and values are still being shaped. Compulsory schooling coincides with a window of opportunity for affecting the knowledge, skills, attitudes, and values associated with PA. It makes sense, therefore, that their remit to support students' well-being will be expected to respond to the increasing alarm about inactivity.

While specialist agencies have called on schools to create cultures of health where youth have opportunities to engage in and learn about healthy lifestyles, implementing this culture in practice has often proved a challenge for various reasons (Centeio et al., 2018). Subsequent research suggests that whole school, multi-component interventions are most effective when key stakeholders are empowered to commit and make the interventions sustainable (Langford et al., 2015). Many of the models of healthy schools as hubs of health promotion build on the groundwork laid down by the WHO's Health Promoting School framework (2020), and its aim of "a whole-school approach and focuses on reorienting school systems toward health promotion through embedding health and well-being in the curriculum, creating healthy social

and physical environments and engaging with parents and the wider community" (Bartelink et al., 2019, p. 2). The US 'Whole School, Whole Community, Whole Child' (WSCC) model is, perhaps, the most widely disseminated approach, highlighting the dynamic relationship between intrapersonal, interpersonal, and community levels. It highlights the importance of evidence-based school policies and practices, and explicitly identifies 10 'components' of an effective school-based health-promotion strategy (including PE's response to the increasing alarm about inactivity and PA, Nutrition environment and services, Social and emotional school climate, and Community involvement) (ASCD & CDC, 2014). These components reiterate findings from other studies demonstrating the importance of the inclusion of specific activities and practices that can act as focal points for leveraging the promotion of healthy and active lifestyles in schools (Storey et al, 2016).

The report was elaborated during the HEPAS project investigation in 2020 and presented a series of reviews of the scientific literature to summarize the current evidence of the contributions of different school-based settings on the promotion of health-enhancing PA. In the HEPAS project, the Czech Society of PE Teachers (CSPET) cooperated as the European Physical Education Association (EUPEA) member associated partner[4].

Methods

Evidence for the review was gathered using a 'rapid reviewing', methodology following a broadly similar approach to that taken by an earlier set of PA reviews by Public Health England (Chalkley et al., 2015). Rapid reviews have emerged as a useful approach to provide actionable and relevant evidence in a timely and cost-effective manner (Tricco et al., 2017). They follow many of the strategies established by systematic reviewing, such as transparency of approach, a clear statement of review objectives, predefinition of eligibility criteria, and assessment of the quality of sources, but the process is simplified for a faster and more variegated response. It differs from systematic reviewing - which requires a considerable amount of time and investment in human resources and produces findings that are highly focused ─ by its capacity for quicker results and more diverse coverage of subject matter

[4] The project HEPAS was funded under the Erasmus+ Programme, Key Action 2: Strategic Partnerships led by the University of Luxembourg as project coordinator. HEPAS Associated Partner (according to the service agreement) was to perform the activities specified in the present agreement in order to successfully promote and implement the project in their respective country.

(Munn et al., 2018). For these reasons, rapid reviewing is increasingly used by policymakers, decision-makers, and other knowledge users (Tricco et al., 2017).

Searches were undertaken using specialist academic databases (PsycARTICLES, PsycINFO, SPORTdiscus, CINAHL Complete) and Google Scholar. Recommendations were also made by members of the project team. The following criteria were used:

- Published from 1 January 2010 to 30 May 2020.
- Conducted in either primary or secondary schools.
- Investigated PA outcomes either as the sole or substantial focus.
- Empirical study or systematic review.

The objectives of the report were: to review evidence from the last ten years of the contributions of school-based physical activity, physical education, and school sport on the promotion of health-enhancing physical activity; to consider the role of certain transversal factors in supporting the promotion of health-enhancing physical activity; to present a series of practical, evidence-based recommendations in support of the subsequent activities in the HEPAS project.

The settings as it is shown in Figure 1 were: Physical activity (including Active Breaks; Active Learning; Active Recess; Active Transport; Active Homework); Physical Education (Curriculum Physical Education Lessons; Teacher Education / Workforce); and School Sport.

Figure 1. Elements of healthy and physically active schools model.

The settings were supplemented by a set of 'transversal categories', which represent mediating factors for the effective realisation of the promotion of health-enhancing physical activity are Inclusion and Diversity; Continuous Professional Development; Facilities, Equipment, and Resources; Community Partnerships; and School Events, Project Weeks, Camps.

Results

The number and quality of studies in different settings and elements of the HEPAS framework were considered and rated STRONG, MODERATE, or WEAK.

- *Active Breaks are relatively brief bouts of physical activity, usually led by a teacher during classroom lessons. Evidence shows Active Breaks increase students' physical activity levels, as well as contributing to healthier weight status, improved behaviour, enhanced cognition, and greater enjoyment. The number and quality of studies in this area suggest that the evidence in favour of Active Breaks is STRONG.*
- *Active Homework, in which students carry out physical activity-related practices after school, is a potentially useful way of increasing physical activity. The small number of*

identified studies report positive outcomes from Active Homework for both girls and boys, although effects tended to be relatively small across the school week. Due to the small number of studies and limited methodologies used. The evidence for Active Homework is rated as WEAK.

- *Active Learning refers to the strategy of integrating physical activity into classroom lessons, across the school curriculum. The findings reported here demonstrate that Active Learning is a cost-effective, enjoyable, motivating strategy to increase students' daily physical activity at school without undermining other educational goals. On the contrary, the available evidence suggests Active Learning often enhances other educational outcomes. Assuming proactive leadership, teacher support, and teacher efficacy, the case for Active Learning is STRONG.*
- *Active Recess, promoting physical activity during the non-curricular time allocated by schools between lessons, promises to add a significant amount of activity to all European schools. Effective Active Recess strategies have been found to provide up to 40% of students recommended daily physical activity, with greater benefits going to younger children and boys. There is a growing high-quality scientific literature on Active Recess, although this research is of variable quality. There has been no European-level evaluation of the concept. The evidence for Active Recess is rated as MODERATE.*
- *To be added Active transport to and from school, such as walking or cycling, has been proposed as an important source of daily physical activity. Research demonstrates that walking and cycling to and from school are associated with increased moderate-to-vigorous-physical-activity, and Active Transport interventions are effective. Due to the quality and number of scientific papers informing this domain, Active Transport is judged to be STRONG.*
- *Physical education has a unique position in school-based physical activity promotion as the only protected, regular, supervised setting for physical activity during the school day. Students are more active during physical education lessons than in any other context but generally fail to reach a target of 50% of lessons at moderate-to-vigorous-physical-activity. Due to the relatively large number of reviews and empirical studies in this area, publication quality, and consistency of findings, physical education is rated STRONG.*

- *Physical education teacher education and workforce training are vital elements in the implementation of effective practice, and this may be especially the case when innovations are introduced.*
- *No directly relevant reviews or empirical studies were identified to inform discussion of this topic, and the only indirectly related article reported limited impact of professional training in health-enhancing physical activity promotion. Considering the poor evidence base, Teacher Education and Workforce is rated WEAK.*
- *School sport, especially after school, has been a popular setting of physical activity, despite cautious support from policymakers. The studies reviewed in this section suggest that sporting activities, both competitive and non-competitive, can increase both moderate-to-vigorous-physical-activity and vigorous-physical activity, especially if played multiple times during the week; however, attention needs to be paid to the needs of girls and overweight/obese students, who are heightened risk of exclusion. There have been numerous studies of the relationship between school sport, including some of the high quality, and their findings are relatively consistent, leading to the rating of STRONG.*

The international review of the general contributions of school-based physical activity, physical education, and school sport to the promotion of health-enhancing physical activity brought the following results.

- *Physical activity's benefits can be understood in terms of physical, developmental, psychological, cognitive, and social health, as well as academic achievement.*
- *Even though physical activity is acknowledged to be an important part of healthy functioning and well-being, there is evidence that large numbers of youth are inactive to the extent that they are compromising their well-being, both now and in later life. In fact, schools are among the most sedentary environments for children and young people.*
- *Public health entities throughout the world have advocated an increase of physical activity opportunities for children and young people through comprehensive or whole-school approaches, with access to the largest possible population, and the only societal institutions in which a very large proportion of youth can be reached.*

- *In an Active School, all school's components and resources operate in a coordinated and dynamic manner to provide access, encouragement, and programmes that enable all students to engage in 60 minutes or more of physical activity each day.*
- *Without opportunities to develop a foundation of movement skills and to experience a variety of physical activity experiences, children and young people will be severely restricted in their capability to engagement in different forms of physical activity, both at that time and throughout the life course.*
- *School-based interventions have been found to have significant effects on young people's physical activity and sedentary behaviours, although the effects have varied considerably. The key variable in determining the positivity and scale of the outcomes of participation in physical activities is the social environment in which they take place.*
- *A range of factors influences teachers' engagement with health-related issues, such as professional preparation, competing pressures from other stakeholders, curriculum and assessment requirements at the policy levels, and personal knowledge, skills, attitudes, and values.*

Discussion

Even though regular PA is near-universally acknowledged to be an important part of children's and young people's healthy functioning and well-being, there is compelling and alarming evidence that large numbers of youth are inactive to the extent that they are compromising their well-being, both now and in later life (Kohl et al., 2012). The trend towards sedentary lifestyles across almost every developed country also in the Czech Republic.

As the comparison of both the systematic reviews and the summary of the empirical studies of physical activity during physical education lessons demonstrate (Vlček et al., 2021), other school contexts and settings would be needed to create 'active schools'. The PE curriculum has a key role in continuing to equip children with the knowledge and motor competencies that will allow them to engage in various physical activities throughout their lifespan. Thus, physical education should not just be framed in terms of increasing the quantity of physical activity; equally necessary is the implementation of quality learning opportunities and the enjoyment of successful physical activity experiences. There have been numerous models promoting healthy schools as hubs of health promotion, in general, and healthy physical

activity, in particular (Daly-Smith et al., 2020; Webster & Nesbitt, 2017). The common theme of these developments is the claim that health promotion can and should be delivered through a school-wide approach, in which different elements are integrated into a synergistic whole.

If it is the case, as has been suggested in the cited HEPAS report, that schools hold a great deal of potential as settings for the promotion of health-enhancing physical activity among its students (and staff), it is also important to acknowledge that most schools do not realize this potential (Egan et al., 2019; Messing et al., 2019; Russ et al., 2015; Viciana et al., 2016). As the HEPAS literature review report showed, for most students in Europe, school is, in fact, the most sedentary part of their day (da Costa et al., 2017; Skage & Dyrstad, 2019; Yli-Piipari et al., 2016). This is also the case of the Czech Republic (Havel et al., 2016) and as it was already mentioned current studies present worrying data on the health of Czech children, youth, and adults (Antošová & Kodl, 2014; OECD/European Observatory on Health Systems and Policies, 2017; Mitáš & Frömel, 2013). Measures of physical activity, lifestyle and health indicators in children and youth (which is also part of the Czech curriculum) are unsatisfactory and have not shown improvement for a long time (Havel et al., 2016; Kalman & Vašíčková, 2013; Madarasová Gecková et al., 2016). Although most of those involved in the curriculum development in the Czech Republic consider the direction of the curriculum revisions to be right, they have reservations about or ambivalent attitudes towards the way curriculum changes are put into practice. The process of the current revision of the curriculum must not end with the design of a new curriculum. It is just the beginning.

Conclusion

The vital part of any changes or interventions in the curriculum is sustainability. In 2013, for example, the Czech Ministry of Education, Youth and Sports announced a three-year project called Physical Activity and Nutrition which was very similar to the project to HEPAS regarding the content and educational outcomes to be affected. The project also focused on changes in physical activity and nutrition regimen of primary school pupils. The solution consisted of three parts: to develop an educational programme affecting pupils´ physical activity and nutrition regimen, to verify this programme in pilot schools practice and to assess the possibilities of using the programme in all schools in the country. 33 primary schools from all major regions of the country participated in verification. More than 260 classroom teachers and nearly 5, 500 pupils worked with the programme during the school year 2014/2015. Pilot verification pointed out that it is possible to influence physical activity and nutrition regimen

of pupils at school and outside of school. Unfortunately, although it was widely agreed among the Czech stakeholders, that the results were important both for school practice and primary teacher training, the educational content of the project has not been widely implemented in the Czech educational system.

Thus, a question for intensive research into the curriculum and other discussions within the current revisions and the consequent overhaul of the curriculum in the Czech Republic is what changes should be made to the Czech designed curriculum (Framework Education Programmes) to ensure that the comprehensive or whole-school approaches will be applied and focused on reorienting Czech school system toward health promotion as it is suggested in the international project HEPAS and the Czech project Physical Activity and Nutrition.

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Education in health promotion

and health protection – curriculum and/or didactics

Analysis of the projected curriculum of the educational field of Health Education

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Abstract: The Analysis of the projected curriculum of the educational field of Health education dealt with the current projected curriculum of Health education in connection with current conceptual materials. The main goal of the research was the analysis of school educational programs at selected elementary schools. The theoretical basis for this research was the curriculum, its forms and conducted researches on the curriculum. Then the research was based on the development of the field of Health education and projects and programs related to this educational field. It also contains basic methodological data on research, which focuses on the projected form of Health education curriculum evaluated based on a deeper analysis of school educational programs of selected elementary schools.

At the end, the results are summarized and conclusions and recommendations especially for school practice are formulated. The acquired results show that the time allocation for Health education ranges from 1 to 4 hours per week, most schools teach Health education as a separate subject, almost all schools have all the thematic areas of Health education included and each school provides interdisciplinary relationships. The result of the presented research is the formulation of starting points for the improvement of Health education.

Key words: curriculum, Framework Education Programme (FEP), school education program (SEP), lower secondary education, health education

Introduction

Curricular reform took place in the Czech education system about fifteen years ago. As a result, schools have got more freedom, but also responsibility in how education will take place in their institution. In the past, curricular documents lacked a separate subject that would deal with human health. In 2008, the subject of Health education was implemented in the FEP. The educational field of Health education should lead an individual to the active development and protection of health in the interconnection of all its components (social,

mental and physical) and teaches him to be responsible for them (RVP ZV, 2017). We therefore assume that we should gradually learn the basics of health literacy already during school attendance. Even though health is an integral part of everyone's life, Health education is still a neglected subject in many schools.

There are many definitions of health that have changed throughout history. However, it is important to mention that health is irreplaceable, and therefore everyone should know how to take the best care of their health. The requirement to increase health literacy is a long-term goal of documents such as the Health 2030 or the previously valid document Health 2020 – National Strategy for the Protection and Promotion of Health and Disease Prevention. These documents are approved by the Government of the Czech Republic and their implementation should be binding.

The concept of the curriculum is the theoretical basis of this project and a general overview of curriculum research with a focus on research in the field of Health education is the starting point for the research. The research deals with curricular documents across the history of Czech education, projects and programs that are related to health promotion and enter the educational environment as an important determinant of Health education.

Important curricular documents, such as Standard of basic education from 1995, have enshrined Health education in the primary education system.

The projects complete the content of the educational program and enable the integration of the curriculum. They connect curricula from different educational areas, and above all teach students teamwork. They can also help to fulfill the thematic curriculum and at the same time provide students with an interesting form of teaching essential health-related topics. Therefore, important programs and projects dealing with health promotion are mentioned in our research. We mentioned for example *Health 2020, Health 2030, Health promoting school, Really healthy school* and other health promotion projects.

The main goal of the research was to assess the curricular framework of Health education. To verify the projected form of Health education curriculum by evaluating the inclusion of Health education in the school educational programs of selected schools. The curriculum of Health education in the Czech Republic was examined only by individuals. For example, Hřivnová analysed and evaluated the curriculum in 2014–2016, then she presented the results in her habilitation thesis from 2018.

The analysis of the SEP itself may be a reflection of how schools have embraced curricular reform. The results can be a valuable guide for the implementation of other changes or recommendations in the Czech education system.

Objective(s):

The main objective of the research was the analysis of school educational programs of primary schools. Based on the main objective of the work, we determined in advance three research questions that we monitored in the SEP.

It was mainly about the basic structure of the curriculum of Health education at the second level of elementary school, about the content related to Health education and about finding out the interdisciplinary connection.

Three main research questions:

- What is the structure of Health education curriculum at the second level of primary school?
- What is the content of the subject Health Education?
- Is interdisciplinary connection ensured?

Methods

Several techniques can be used to collect data (Švaříček et al., 2014; Hendl, 2016), mainly through observation, interview, questionnaire and content analysis. Vlček (2015, p. 405) states that the mentioned techniques are used mainly in research with a small number of compared phenomena, which corresponds to our research. The basis was qualitative research (content analysis of educational documents), but at the same time it was necessary to compare the SEPs of individual schools to find out what the differences are between them. Thus, elements of quantitative research were also used.

In the first phase of the research, we defined research questions, in the second phase, a selection of educational documents (school educational programs) for research took place. In the third phase, the educational documents were assessed and in the fourth phase they were interpreted to find answers to the questions asked.

It should also be added that the research is focused only on what the selected schools declare in writing in their SEPs. We randomly selected ten Brno primary schools for the analysis. The necessary information was found on the schools' websites. We almost always found SEP in the bookmarks for school documents.

Results

Partial results are based on both continuous data collection and work directly with SEP. As for the first research question, we can state that schools differ in many ways. The hourly subsidy dedicated to Health education was very various. It ranged from 1 hour per week to a 4-hour weekly subsidy (some schools had Health education integrated into other subjects and it was not possible to determine the exact number of hours).

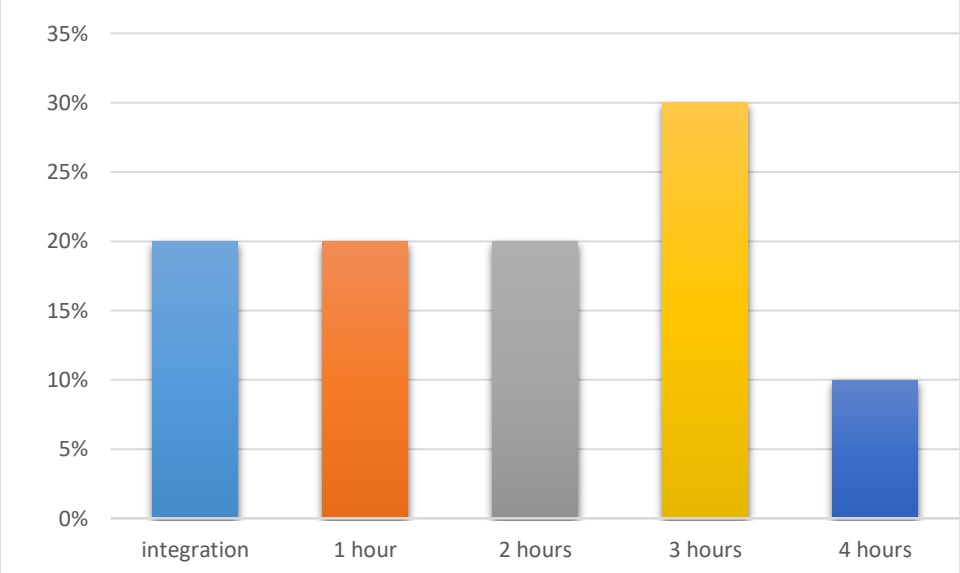

Figure 1. Percentage of SEP according to the hourly subsidy for Health education.

The second research question focused on the content of subject Health education showed that almost all schools have in their SEPs all thematic areas related to the teaching of Health education. Almost half of the schools had all six cross-cutting themes included in the subject of Health education, only one school did not have this information included and the remaining schools included only some cross-cutting themes. Half of the schools did not draw up the curriculum of Health education cyclically. It was cyclically drew up by a third of schools and the remaining schools drew up it cyclically only partially. If the school does not work with the cyclical curriculum, we see it as problematic, as there is no deepening and expansion of the acquired curriculum.

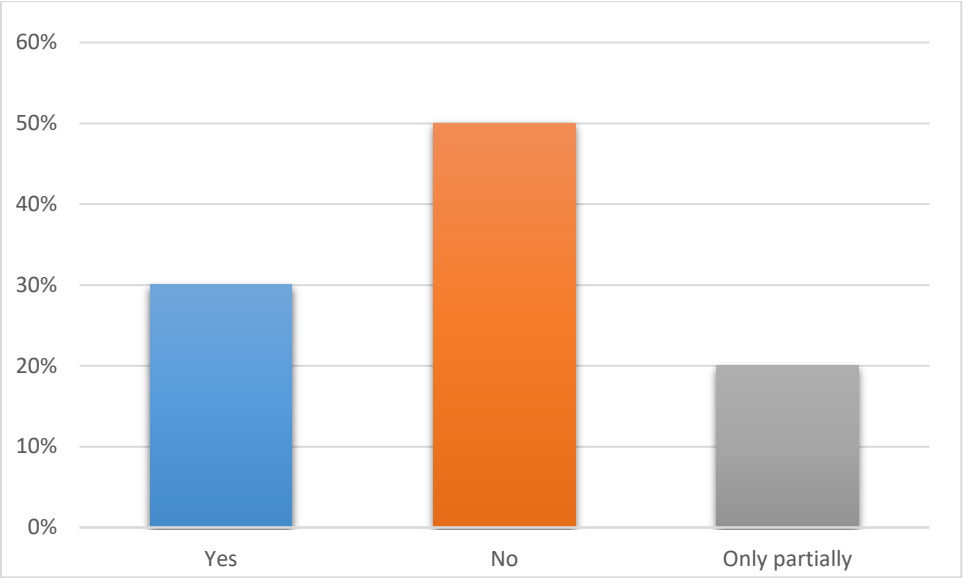

Figure 2. Percentage representation of cyclical curriculum of Health education curriculum.

For the third research question, we looked at whether interdisciplinary interconnection is ensured. In terms of horizontal interdisciplinary interconnection, the subject of Health education at each of the selected schools corresponded with other educational areas. Interdisciplinary vertical interconnection was also ensured in all 10 schools.

It was striking that some SEPs were a clear copy of the FEP formulations. Some schools did not pay attention to the elaboration of topics and did not place them in connection with the subjects taught in individual grades. The form of their SEP from the point of view of Health education was very formal.

Some school educational programs gave us the impression of a thoughtless concept that could lead to poor quality teaching of Health education. On the other hand, evaluating the level of education was not the goal of our research. And it is not possible to assess the level of education only on the basis of the analysis of the projected curriculum. We noted many other stimuli for research, but the epidemiological situation did not allow us to conduct further research directly in the schools. We did not have the necessary methods available.

Discussion

The definition of the educational field of Health Education in the FEP is not clearly defined, which is also reflected in the data obtained. The sample examined consisted of only ten

primary schools, and yet we came to different results. In the area of time allocation, these differences were probably the most significant.

If in the school educational program, the time allowance is not increased from the allocated time, the two-hour time allowance does not allow for a continuous stratification of the content into all years of lower secondary education.

The division of the educational content of Health education into several subjects may reduce the overall quality of education of pupils in the field of health promotion as a result of the division of the holistically defined educational content of Health education. Therefore, diversification of the educational content of Health education between more subjects should be a rather temporary solution.

Obtained findings should be supported by further research directly in schools - especially by interviewing the school management to check the qualification of the teaching staff, didactic apparatus, aids, etc.

Conclusions

The research dealt with the analysis of the projected curriculum of the educational field of Health Education. In accordance with the research objectives, research questions were set and subsequently analysed.

Based on the results of the work, which we obtained through the analysis, there are recommendations for the authors of the projected curriculum and school documents, for schools and for the entire field of Health education.

- It would be appropriate to declare more clearly the concept (structure of the curriculum - distribution of the curriculum between grades, hourly allowance) of Health education in state-level curricular documents so that there are no misconceptions in school-level documents. Further develop teacher education, organize methodological seminars for school principals for FEP innovation, etc.
- School principals could contribute to increasing children's health literacy by improving the teaching of Health education. It follows from the responsibilities of school principals that they should monitor the quality of the subjects taught, in this case Health education.

- The quality of teaching is related to the qualifications of a Health education teacher, who can significantly contribute to the quality of teaching of this subject.

We have thoroughly evaluated and described the results of the SEP analysis, which can be a starting point for further research. It was qualitative research conducted in ten schools. Further investigation should therefore be area-wide research. It is necessary to analyse all schools in the Czech Republic and evaluate the state of the implemented Health education curriculum. Further investigation could clarify whether shortcomings related to the Health education curriculum are common throughout the Czech Republic.

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Prevention of self-destructive addictions

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Abstract: Self-destructive addictions include for example overuse alcohol use or smoking. In the Czech Republic, alcohol consumption is still very popular and for many people it is not risky to overuse it. Unfortunately, the number of people addicted to alcohol is not declining, which is why primary prevention is still very important. Primary prevention takes place from an early age in the family, but the school itself is an irreplaceable component of primary prevention. In the schools primary prevention takes place mainly in the subject of health education. Unfortunately, despite the exclusive position of primary prevention in schools, its effectiveness is ineffective. The biggest mistakes in primary prevention include intimidation, targeting the pupil's cognitive component, unconceptual conception or condemnation of addicts and emphasizing their weakness.

The paper focuses on alcoholism as a maladaptation to a crisis situation in connection with its prevention in elementary school. Sinha (2009) draws attention to the connection between alcoholism and maladaptation in his research. The research used an analysis of the literature, research and articles from which the theoretical basis was created and then the qualitative research itself was conducted, which consisted of narrative interviews with five respondents who had experienced a crisis, used maladaptive strategies and subsequently became alcoholics. Then, case studies were written from the statements of the respondents, which were also used in the methodological materials created as didactic transformations for elementary school teachers.

The results of the research show the connection between maladaptive strategies and the progress of alcohol dependence and the necessary systematic connection in primary prevention so that the student understands this issue in a context not randomly.

In connection with primary prevention at elementary school were created 10 methodological materials for elementary school teachers, which will provide didactic transformation. The methodological materials therefore form a complex of preparations on the topic of self-

destructive addictions, where in addition to the issue of addictions, students are also introduced to topics such as mental illness, violent behavior, adaptive and maladaptive strategies, crises and the use of relaxation techniques. Thus, the materials point to an important connection between these topics, thanks to which students would be given a systematic and comprehensive view of self-destructive addictions.

Keywords: self-destructive addiction; mental illness; risky behavior; violent behavior; health education

Self-destructive addictions such as alcoholism are still a topical issue in the Czech Republic and are unfortunately overlooked in many respects. Within the curricular document Framework Educational Program for Elementary Schools (2021), the topic of self-destructive addictions is included in the field of Health Education, which is defined within the area of Human and Health. In connection with these topics, primary prevention is very important, which should be focused within these topics. Unfortunately, according to Střelec (2015), primary prevention is ineffective, due to the fact that it is focused unsystematically, for example, stimulation of pupil attitudes is focused on the cognitive rather than emotional or conative component and one of the problems is insufficient education and knowledge of the issue. Heller and Pecinovská (1996) recommend focusing the process as a continuous and systematic process in which students learn to talk about their problems and information are given comprehensively without condemning addicts and rather understanding their actions. The research itself focuses on expanding the topic of alcoholism in connection with maladaptive strategies in a crisis situation and its connection with primary prevention in primary school. From the conclusions of the research, interconnected methodological preparations are created and extended by other topics related to self-destructive addictions.

Objective

The aim of the research is:

1. Identify and describe alcoholism as a specific maladaptation to a crisis situation.
2. Use knowledge from professional literature, research results and case studies in didactic transformation.
3. Creation of 10 methodological preparations as a basis for primary prevention of topics of self-destructive addiction.

Methods

1. Analysis of professional literature.
2. Qualitative research using the technique of narrative interviews.
3. Creating case studies.
4. Pedagogical implications of self-destructive topics in the form of methodological preparations.

Results

1. Identify and describe alcoholism as a specific maladaptation to a crisis situation.

Alcoholism as a maladaptation to a crisis situation has various specifics, which can be very individual. Each of the respondents experienced a different stressful situation (tragic death of a husband, divorce, birth of a child with a intellectual disability, loss of financial security or infertility), however, all these events caused a traumatic, chronic and obvious crisis, which was very difficult for respondents to cope with. We could all see a great effort to manage our crisis, but their adaptive strategies were not sufficient, so they all resorted to maladaptation, in which they used the effects of alcohol. Unfortunately, maladaptation did not help solve and overcome the crisis in anyone, but also caused addiction, which brought the respondents many other problems into their life, although it was mainly psychological aspects or social problems in the family. The results also show that lay help is very important, which can become crucial in the treatment of alcoholism itself.

2. Use knowledge from the literature, research results and case studies in didactic transformation.

Theoretical knowledge created thanks to the analysis of the literature was used in the theoretical part of didactic preparations for teachers, so that each teacher who uses didactic training can orient themselves and educate themselves in a specific topic.

The results of the research created a greater perspective on the issue and thanks to them were selected 10 related topics.

The fifth didactic training entitled Alcoholism in the Context of the Crisis was just based mainly on the work of students with case studies that were created within the research.

3. Creation of 10 methodological preparations as a basis for primary prevention of topics of self-destructive addiction.

All created preparations have a uniform structure so that the teacher can orient himself in them simply and easily. The introduction always states the time allowance of the lesson, the necessary aids, the inclusion of the lesson in teaching according to the FEP ZV (2021), the objectives of the lesson, important concepts and key competencies. After this introduction, theoretical preparation for teachers is always included, which brings a simple but complex look to the theory of the topic. Furthermore, in the methodological preparation you can find the scenario and the course of the lesson. All lessons form all important parts of the lesson (motivation, exposure, fixation, applications), which are described in detail so that the teacher knows exactly how to lead the lesson. The lessons are based mainly on activation methods, pupils 'activity, uses discussions and space to express pupils' opinions (Sieglová, 2019; Sitná, 2013). The preparations are also enriched with appendices with pictures, created didactic aids and also worksheets for pupils.

Topics of didactic preparations:

1. Crisis in human life

This topic is to acquaint students with the topic of the crisis, with their causes, how to know the crisis, how to work with it, the most important point of the lesson is to create their own crisis plan using the submitted worksheet.

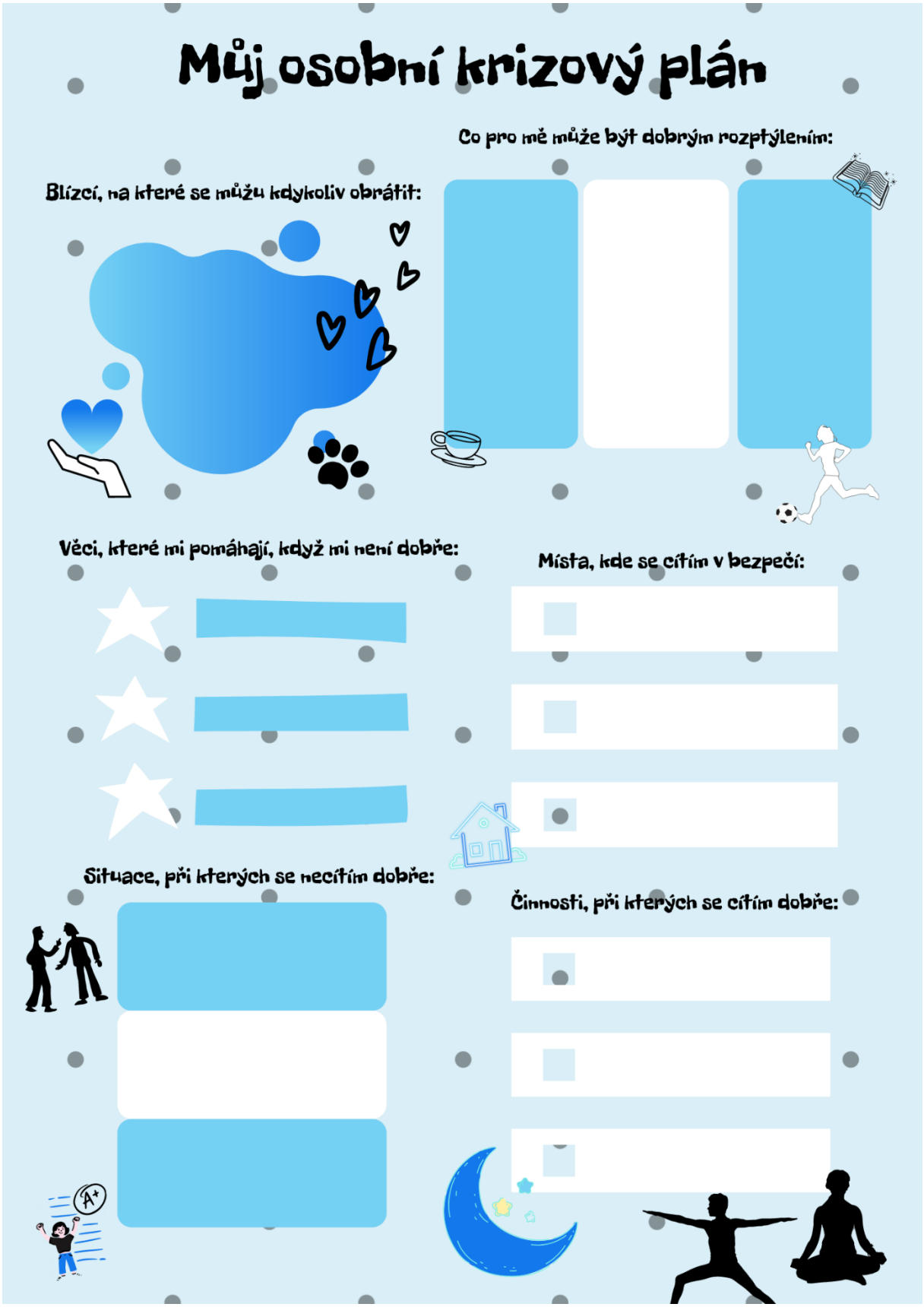

Figure 1. Crisis plan.

2. Adaptive and maladaptive strategies

The lesson informs students about adaptive and maladaptive strategies, presents them with basic adaptive strategies that can be used in everyday life. Under this theme, students will create their own list of adaptive and maladaptive strategies.

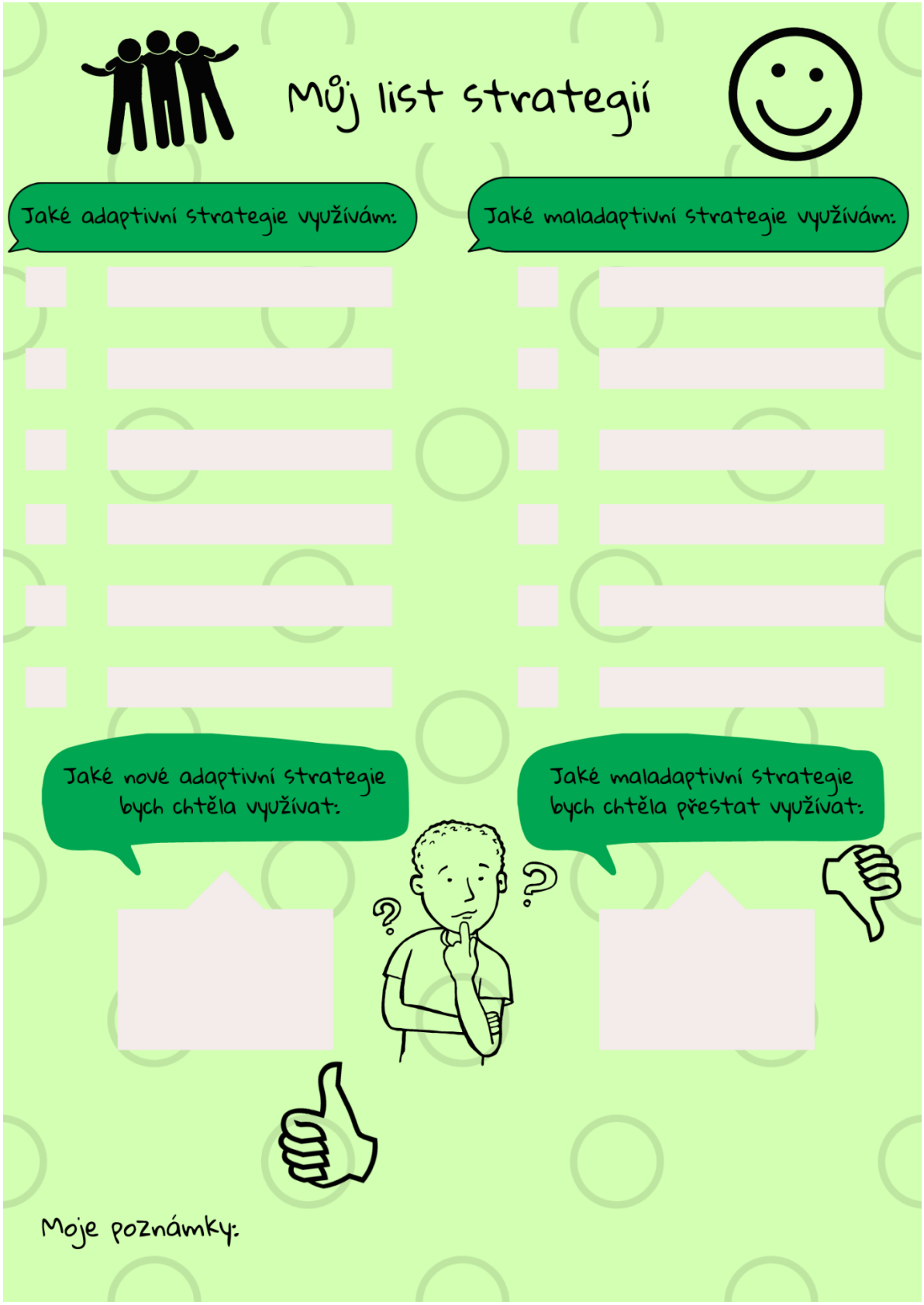

Figure 2. List of strategies.

3. Relaxation methods

The relaxation method lesson is mainly based on the very practice of the relaxation technique of mindfulness and progressive muscle relaxation according to Jacobson. For homework, students will have to fill out a worksheet *(Figure 3).*

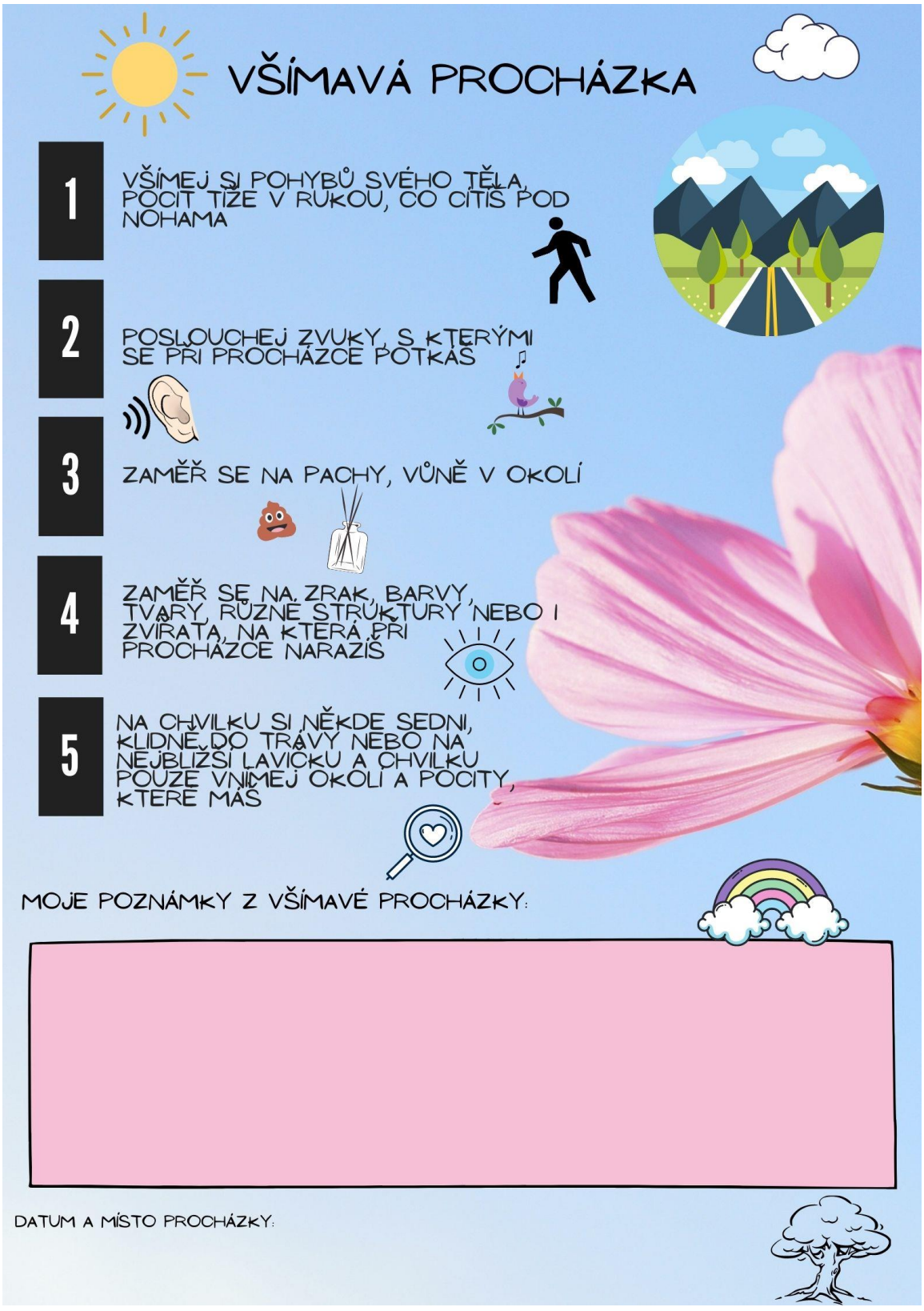

Figure 3. Attentive walk.

4. Addictions with a focus on alcoholism

The lesson informs students about alcohol addiction. The main part of the lesson is devoted to time for group work - creating a poster and subsequent presentations to other groups.

5. Alcoholism in the context of the crisis

In this didactic preparation, the pupils' activity is based on working with case studies and their evaluation.

6. Mental illness I

Pupils will get acquainted with schizophrenia in this lesson, where the intention is mainly to dispel myths about this mental illness. Furthermore, the part is devoted to mood disorders, which include depression, mania or bipolar disorder, and the last topic is eating disorders, which include anorexia nervosa and bulimia nervosa.

7. Mental illness II

This lesson extends the topic of the previous lesson to include anxiety disorders such as phobias, obsessive-compulsive disorder, personality disorders and pervasive developmental disorders with a focus on childhood autism and Asperger's syndrome *(Figure 4).*

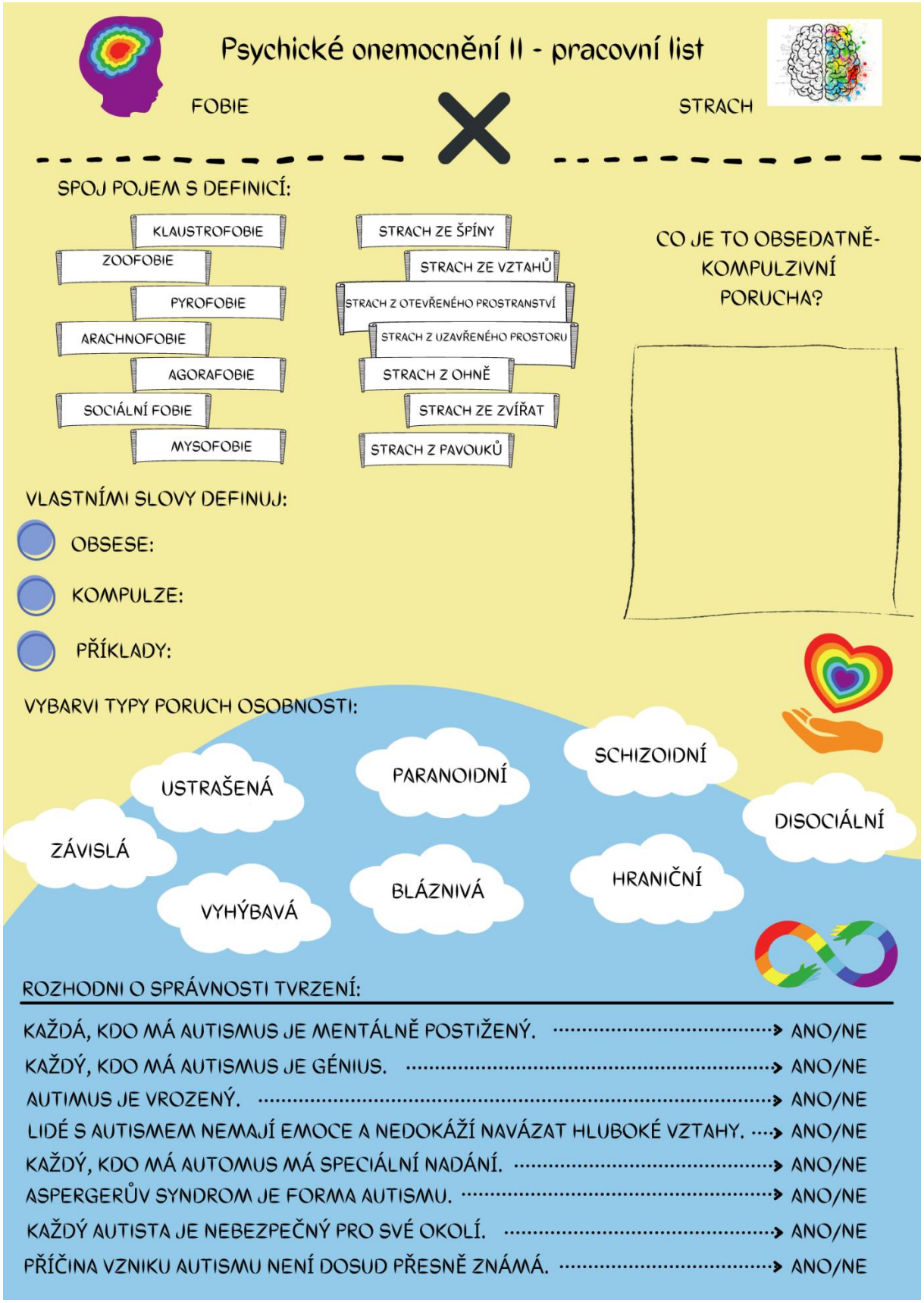

Figure 4. Worksheet – Mental illness II.

8. Risk behavior I

Didactic training is focused on addiction specifically to smoking. The main point of the lesson is the practice of cigarette rejection, which is done by dramatizing the students.

9. Violent behavior II

The teaching unit imagined a very important topic and that is violence against oneself or self-harm or suicidal behavior. Very important in this topic is the focus on the idea versus the reality of suicidal behavior, which should help students to recognize warning signs in everyday life. In class, students will work with submitting a worksheet *(Figure 5).*

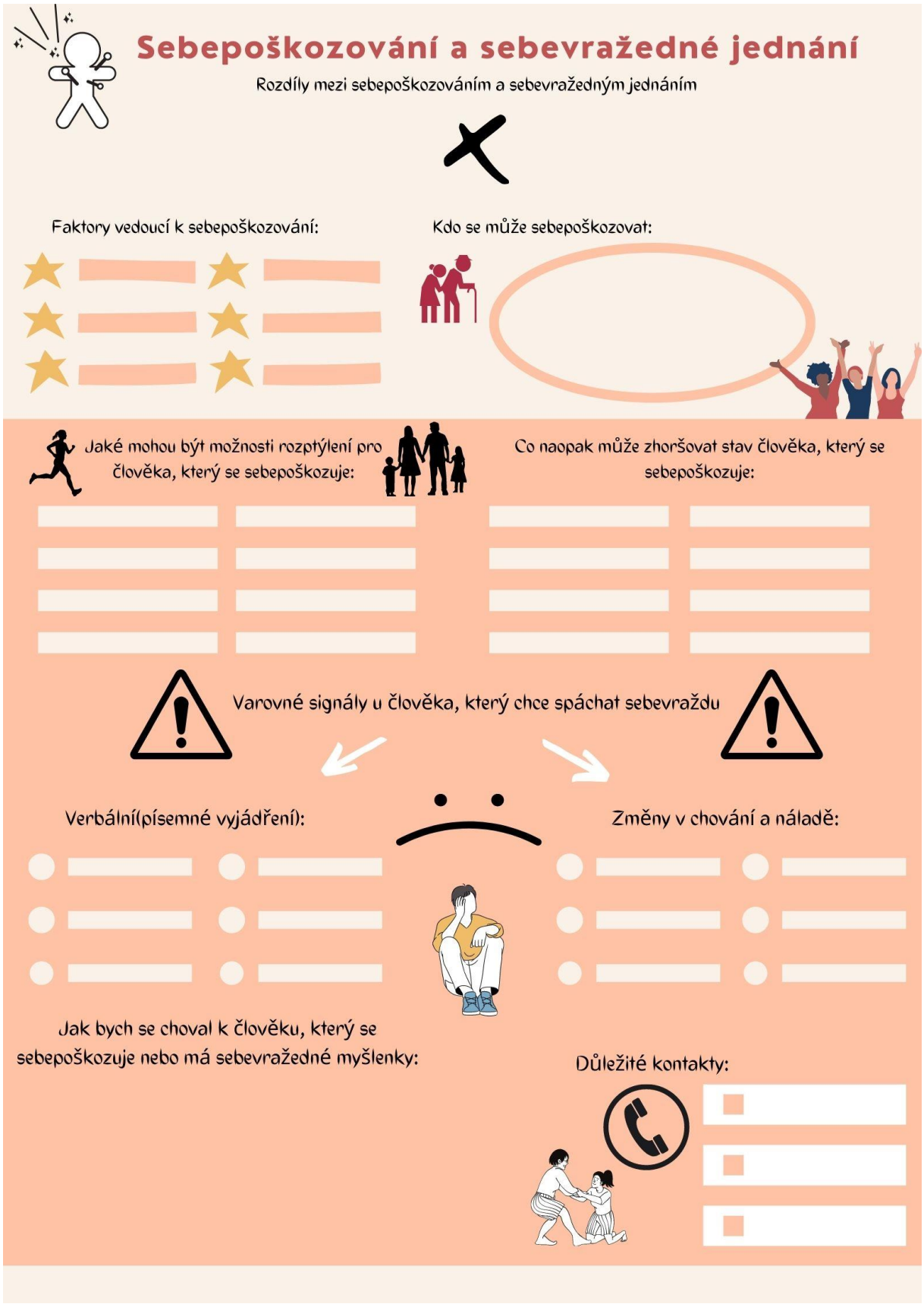

Figure 5. Worksheet – Self-harm and suicidal behavior.

10. Violent behavior – bullying

The last didactic preparation deals with the topic of bullying. The teacher uses a video to provide students with a view of the bullying on the part of the aggressor and vice versa on the part of the victim. Subsequently, the work is focused on the worksheet (Figure 6) and then the key activity is the *class circle*, which has the main goal of improving class relationships or insight into the diagnostics of the class team.

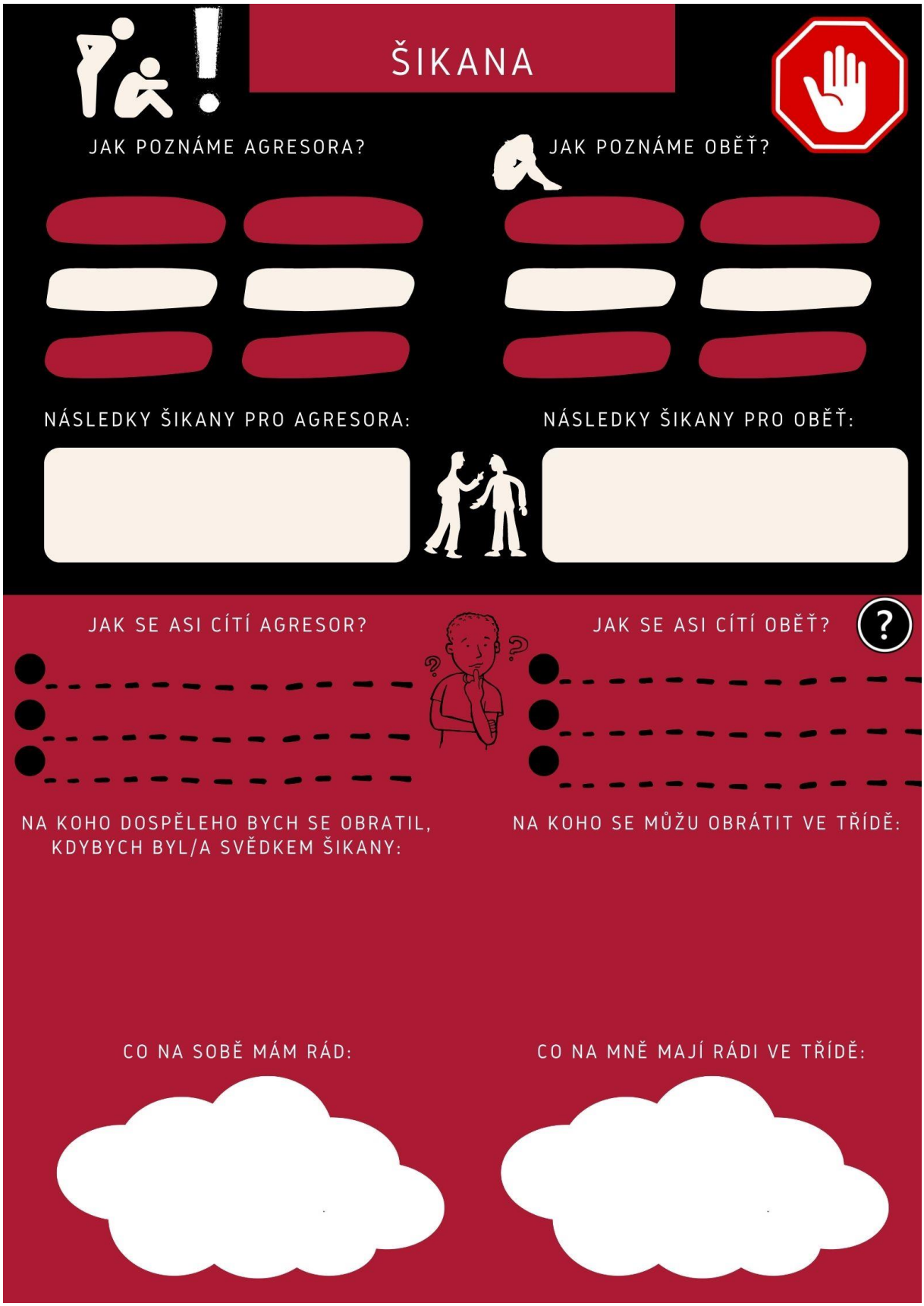

Figure 6. Worksheet – Bullying.

Conclusions

In conclusion, it can be said that the topics of self-destructive addictions can be viewed from a broader angle and it is very important to convey this issue to students through causal prevention, which is not judged by man and his addiction or problem, but is viewed differently. Furthermore, it can be said that primary prevention in elementary school has an irreplaceable place, however, it needs to be passed on to students comprehensively and so that the activity is targeted at students and they can use the knowledge from teaching for their personal development and private life. Also important for effective primary prevention is the erudition of the teachers themselves and their interest in the topic and, of course, quality didactic support, which unfortunately is missing in the subject of health education due to the absent textbook.

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Health Promotion by Physical Activity in Relation to Body Composition

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Abstract: Regular physical activity is a natural tool in weight control. Appropriate indicators for conclusive evidence of somatic condition are individual body components. Our research objective was to analyse selected body composition fractions in relation to meeting recommended physical activity in young adult females. 258 women participated in our study; women were divided into two groups according to the physical activity level achieved, either meeting or not meeting the recommended physical activity level in terms of intensity (moderate physical activity, 3 to 5.99 MET) and level (≥ 150 min/week). To determine the physical activity parameters, namely the level and intensity within one week and average daily number of steps, ActiGraph GT1M Accelerometer was used. Direct Multi-frequency Bioelectrical Impedance Analysis Method (DSM-BIA Method) using InBody 720 Body Composition Analyser was used to determine body composition parameters. The differences between the groups according to the physical activity level reached were statistically insignificant for the selected body composition fractions we investigated. Lower relative risk of damage to health as measured by the somatic indices (body mass index: BMI, body fat mass index: BFMI) was observed in women carrying out moderate physical activity level (MPA, 3 to 5.99 MET), i.e. 150 to 300 minutes. In the assessment of habitual recommended physical activity level, the women were classified either as active or women with typical daily activities. Research study verified positive relationship between meeting the recommended physical activity level and its impact on health risk indicators, namely lowering body fat mass index (BFMI), lowering body fat (BFP, BFM) and smaller visceral fat area (VFA). Positive approach to the physical activity may lead to the decrease in number of health problems associated with excess weight and obesity in later age.

Key words: healthy lifestyle; body fat; accelerometer; walking; young adult females

Introduction

Data relating to the human body composition are the prerequisite for understanding its performance in health and sickness. Body composition is a suitable indicator of the functional state of the organism and its fitness. The body composition is genetically influenced; it is further shaped by exogenous factors, including physical activity. Appropriate indicators for the conclusive evidence of somatic condition are individual body components, above all body fat (BFP, health recommendations at ≤ 35%), fat-free mass (FFM) and health indicators relating to the body composition, e.g. body fat mass index (BFMI) and fat-free mass index (FFMI) (Heyward & Wagner, 2004; Kyle, Morabia, Schutz, & Pichard, 2004).

In addition to new amenities, the current times bring with it higher demands on individuals, such as higher workload, lack of free time, loss of typical manual work, increased number of transport means and endlessly new entertainment technologies within the household. The accompanying phenomenon of the current lifestyle is lack of physical exercise and the resulting health complications. The most common consequence is the increase in overweight and obesity, which is reflected in inadequate representation of individual body components and adverse body composition health risk indicators (Corder, van Sluijs, Ekelund, Jones, & Griffin, 2010; Hoeger & Heger, 2009; Pratt, Norris, Lobelo, Roux, & Wang, 2014; Thompson, Rakow, & Perdue, 2004).

The social environment, economic conditions, education and cultural society habits, as well as the personal values, preferences and characteristics play a significant role in shaping each person's lifestyle. Physical activity is one of the most important components of health and healthy lifestyle.

Accelerometers which are simple and easy to operate are used to determine the extent and level of physical activity. ActiGraph GT1M is a small and unobtrusive device measuring the exercise frequency, duration and level in a vertical plane; it saves average readings at minute intervals. We are able to find out how many minutes an individual spends carrying out light, moderate or vigorous physical activity during a specific time period (Murphy, 2009; Welk, 2005).

Physical activity level is the key indicator which determines what impact it has on body weight. This is determined by the level and duration of the given physical activity and frequency of exercise units. Physical activity should be carried out by rhythmic contractions

of large muscle groups. The American Association of Sports Medicine recommendations state that the optimum aerobic exercise of moderate intensity (such as brisk walking, 3 to 5.99 MET) of at least 30 minutes for five days a week should be undertaken by people who wish to maintain good health. Equally, combination of moderate and high intensity exercise with duration of 30 or 20 minutes is suggested. Exercise time may be divided into several shorter sections; each exercise must be at least 10 minutes long. Habitual physical activity (HPA) includes all daily activities. The day "universal" standard recommends walking at least 10,000 steps to promote health. Research provides preliminary support that approximately less than 5,000 footsteps a day is indicative of the sedentarism index related to out of condition body composition (Cerin et al., 2014; Gomes et al., 2011; Ham, Kruger, & Tudor-Locke, 2009; Haskell et al, 2007; Saris et al., 2003; Saelens & Handy, 2008).

Objective: Our study objective was to evaluate selected body composition fractions in relation to meeting recommended physical activity in young adult females.

Methods

Participants

The research group consisted of 258 randomly selected female students from Pedagogical Faculty of Palacký University in Olomouc teaching programs within the age range of 18 to 30 years (22.3 ± 2.6 years). Namely, first and third year of the bachelor level course, graduating in Physical Anthropology (full-time attendance or combined study).

Standardised anthropometric methods for determining the key somatic parameters and indices were used in our investigation. Body height was determined with the accuracy of 0.5 cm by P-226 anthropometer (Trystom, Czech Republic). Body composition was determined using InBody 720 analyser. We evaluated selected somatic characteristics based on the recommended physical activity (PA): Inactive category (MPA: 3 to 5.99 MET and level < 150 min/week, n = 82) and Active category (MPA: 3 to 5.99 MET and level ≥ 150 min/week, n = 176). Our study was carried out during April 2019. Each woman signed agreement to carry out measurements and was introduced to the research particulars. Furthermore, the women were familiarised with the guidelines whose observance was essential to acquire valid data relating to the body composition, instructed in accelerometer use and entry of data into the record sheet. The project was approved by the Ethics Committee of the Faculty of Education, Palacký University Olomouc, under no. 09/2018.

Body composition measurement

InBody 720 analyser was used to analyse body composition by direct multi-frequency bioelectric impedance (1 to 1,000 kHz). The principle of the bioelectric impedance method is based on the differences in the propagation of high-frequency alternating current of different intensity in different biological structures. It is a non-invasive and time-saving method. The device differentiates body mass into three components, namely the total body water (intracellular and extracellular water), the dry matter (proteins and minerals) and the body fat. InBody 720 also analyses the amount of visceral fat that is defined as the transversal cross-sectional area in the abdominal region at vertebrae L4-L5. The correlation between Computed Tomography and InBody 720 methods is defined at $r = 0.92$ level (Biospace, 2008).

Physical activity monitoring

Physical activity level and average daily number of steps monitoring was carried out for one week using ActiGraph GT1M accelerometer with data entered into the record sheet. Women were instructed that the device must be worn at least 10 hours a day for seven days and only taken off for sleep or water related activities (swimming, hygiene). Seven day physical activity monitoring is considered sufficiently reliable for adults (Murphy, 2009).

Data analysis

To analyse the relationship between the body composition and physical activity level, the monitored group was divided into two groups in accordance with achieved recommendations related to moderate physical activity. Data acquired by InBody 720 Body Composition Analyser was processed using appropriate procedures by Lookin 'Body 3.0 software package and ActiGraph GT1M software ActiPA 2006.

Descriptive characteristics and data analysis were carried out using the Statistica 10.0, statistics and analytics software package (StatSoft, 2011). Differences were compared by means of the Mann-Whitney U-test. Statistical significance level was set at $p < 0.05$.

Results

The target group was the Pedagogical Faculty of Palacký University in Olomouc female students, within the age range of 18 to 30 years (22.3 ± 2.6 years). Future educators were divided into two groups, either meeting or not meeting the recommended physical activity level in terms of intensity (MPA, 3 to 5.99 MET) and level ($\geq$ 150 min/week). The research included somatic examination and physical activity monitoring.

Relative risk of damage to health, as measured by the BMI (Body Mass Index, kg/m^2), was found to be normal. The average BMI values were within the normal category (BMI < 25 kg/m^2). BMI does not cover variability and changes in body fat and fat-free mass. For more objective assessment of the relative risk of damage to health the Body Fat Mass Index (BFMI, kg/m^2) and Fat-Free Mass Index (FFMI, kg/m^2) were used, for example. BMI < 25 kg/m^2 classification is set to be equivalent to the BFMI: 3.9–8.1 kg/m^2 and FFMI: 14.6–16.7 kg/m^2 (Kyle et al, 2004). BFMI and FFMI group average in our results corresponded to the recommended values for women, where we recorded almost identical FFMI values.

Table 1

Selected health indicators in relation to physical activity category

Variable	Inactive	Active	p
Height (cm)	166.4±5.9	166,3±6.3	0.97
Weight (kg)	62.9±12.1	61.2±9.6	0.61
BMI(kg/m^2)	22.7±4.0	22.1±3.2	0.40
BFMI (kg/m^2)	6.8±3.0	6.3±2.4	0.30
FFMI (kg/m^2)	15.9±1.5	15.9±1.3	0.97

Note: BMI – body mass index, BFMI – body fat mass index, FFMI – fat-free mass index

Selected body composition somatic characteristics for different groups differentiated by the level of physical activity are presented in Table 2.

Table 2

Selected somatic characteristics in relation to physical activity category

Variable	Inactive	Active	p
TBW (l)	32.2±4.0	32.1±3.4	0.55
TBW (%)	52.1±5.7	53.0±4.9	0.28
FFM (kg)	44.0±5.5	43.9±4.7	0.54
BFM (kg)	18.9±8.6	17.4±6.5	0.29
BFP (%)	29.2±7.7	27.6±6.6	0.25
SMM (kg)	24.0±3.3	24.2±2.8	0.51
VFA (cm²)	53.3±30.7	48.0±24.1	0.43

Note: TBW – total body water, FFM – fat-free mass, BFM – body fat mass, BFP – body fat percentage, SMM – skeletal muscle mass, VFA – visceral fat area

The total body water did exceed 50% threshold in groups which corresponds to the assumption that the amount of total body water is in the reciprocal relationship to body fat. Representation of the relative value of the BFP (body fat percentage, %) reached approximately 28%. Range within 27.6% to 29.2% corresponds to the health recommendation for women (Heyward & Wagner, 2004). In inactive women we observed higher values of the VFA (visceral fat area, cm²), which did not exceed the recommended value (> 100 cm²). Women who achieved active level of physical activity reached lower average values of monitored parameters, i.e. the fat fraction (BFM, BFP as shown in Figure 1) and also VFA.

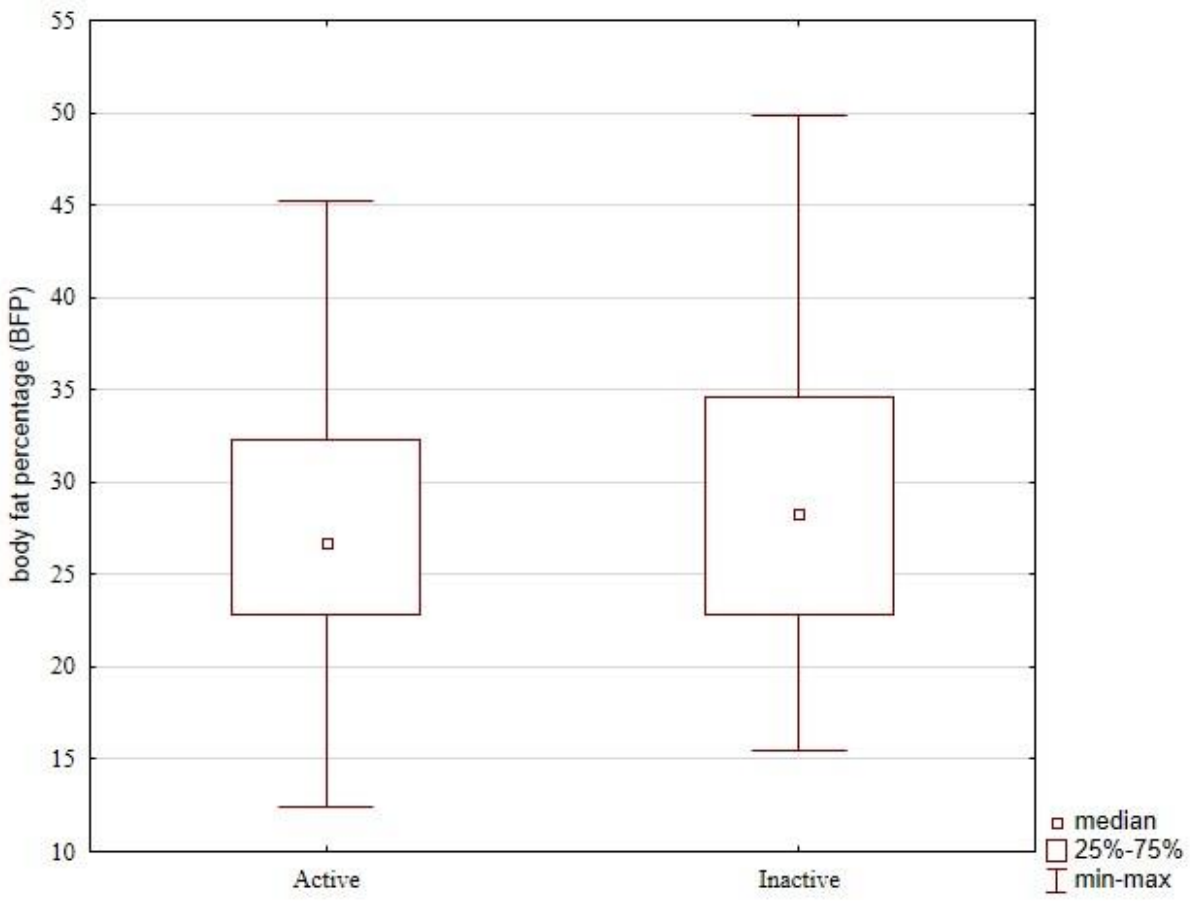

Figure 1. Body fat percentage in relation to physical activity category.

The average daily number of steps (HPA, step) in individual categories did not exceed the recommended limit of 10,000 steps per day; however, it did exceed 5,000 steps per day, which corresponds to the assumption that women do not lead sedentary lifestyle. According to the classification of the daily number of steps in accordance with Tudor-Locke and Bassett (2004), women in inactive category may be assessed as women with typical daily activity (5,000 to 7,499 steps per day). Women in active category who meet the general

recommendations related to the moderate physical activity in terms of intensity (MPA, 3–5.99 MET) and level (≥ 150 min/week) may be classified as optimally active individuals (HPA = 8,262.1 steps per day) (Table 3).

Table 3

Selected physical characteristics in relation to physical activity category

Variable	Inactive	Active	p
HPA (step/day)	5214.2±1399.7	8262.1±2001.4	0.01
LPA (min/day)	38.4±14.4	45.3±14.8	0.01
MPA (min/day)	15.1±4.3	35.1±10.7	0.01
VPA (min/day)	2.5±3.5	6.2±7.0	0.01
PA (hrs/day)	5.1±1.4	6.1±1.3	0.01
SB (hrs/day)	6.1±1.6	6.6±1.6	0.01

Note: HPA – average daily number of steps, LPA – light PA (1 to 2.99 MET), MPA – moderate PA (3 to 5.99 MET), VPA – vigorous PA (6 to 9 MET), PA – physical activity, SB – sedentary behavior.

We find positive findings based on a comparison of the percentage of women who met different recommendations related to the moderate exercise activity. Whilst the recommendation of 150 minutes of weekly moderate physical activity was actually achieved by 68.2% of women, the moderate physical activity lower than 150 minutes was met by 31.8%. The average moderate physical activity values in individual categories are as follows: women in inactive category have MPA = 105.7 min/week, in active category meet the general recommendations of MPA = 245.7 min/week. We did not record the average physical activity vigorous level values (VPA, 6–9 MET), i.e. the recommended ≥ 60 min/week, in any monitored women physical activity categories.

Discussion

Sufficient exercise is the prerequisite for the harmonious development process, but it also is the consequence of optimal effects of organism functions in general. We support health benefits by carrying out regular physical activity, prevent the onset of many diseases and furthermore improve social connectivity and quality of life. Long-term physical activity has unquestionable effect on maintaining healthy body weight (Rahl, 2010; Reiner, Niermann, Jekauc, & Woll, 2013).

Formulating physical activity using accelerometer is, after evaluation, good propensity and motivating feature and it may also be used to show how important the awareness of the physical activity volume and intensity carried out is. The positive impact of physical activity on the body composition, as well as on their indices (BFMI, FFMI), was confirmed repeatedly (Gába, 2014; Chan, Ryan, Tudor-Locke, 2004; Shutz, Nguiyen, Byrne, Hills, 2014; Sofková & Přidalová, 2018). From the somatic point of view, the effect of physical activity is perceived in the loss of fat component and increase in muscle mass. In physically active individuals, BFMI decreases and FFMI increases. Furthermore, the correlation was found between indicators related to the body fat distribution (VFA) and physical activity. Meeting the recommended physical activity level per week has a positive impact on lower VFA levels and may have the effect of reducing the risk associated with the development of abdominal obesity in later life. Ross and Janiszewski (2008) and King, Hopkins, Caudwell, Stubbs and Blundell (2009) have also shown that the physical activity can bring health benefits and improve mental well-being.

Women with active physical activity levels may be classified as active individuals and women with inactive physical activity levels as individuals with typical daily activity according to the daily number of steps and the Tudor-Locke and Bassett (2004) classification. Walking is the most commonly carried out during the day and it is also recommended as the key form of physical activity. The most general and used recommendations is to carry out at least 10,000 steps per day, although many studies suggest that for some people this limit is unattainable (Bohannon, 2007; Tudor-Locke et al., 2001). Chan, Spangler, Valcour and Tudor-Locke (2003) and Wyatt, Peters, Reed, Barry a Hill (2005) pointed out that fewer steps are associated with higher BMI, which our study did not prove.

Vašíčková, Roberson and Frömel (2012) state that people with university degree more often belong to the category of people with low physical activity levels. The issue of sedentary adult behaviour points to high specificity and cannot be understood as the physical activity absence (Rhodes, Mark, & Temmel, 2012).

Physical activity is one of the important health determinants and its adequate level is primarily of a preventive nature. In recent years, the issue of physical activity has been revised and now it is deemed as the integral part of healthy lifestyle. Physical activity is also the most important factor that contributes to the reduction of some negative nutritional effects.

Conclusion

Based on the physical activity carried out, it was proved that university female students, studying pedagogical subjects, do not lead sedentary lifestyle. Based on meeting the recommended limit of 150 to 300 minutes per week relating to the moderate physical activity level (PAme: 3–5.99 METs), we are able to state that statistically significant differences in the body composition somatic parameters were not found in younger adult women. The risk of damage to health assessed by somatic indices in young women is low. Our research study showed positive relationship between meeting the recommended physical activity level and the body fat volume. The amount of body and visceral fat is lower in women with higher moderate physical activity ≥ 150 min/week. Adequate physical activity level is primarily of a preventive nature in young adult females.

Currently, the issue of finding a way to promote healthy lifestyle through physical activity is very topical. The results show run of the mill attitude towards healthy lifestyle. The motivation for healthy lifestyle may be the awareness that physical activity level may be monitored by using accelerometer.

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Remedial Physical Education in the Czech education system

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Abstract: Remedial Physical Education (RPE) in the context of education is a school subject focused on promoting health and developing physical literacy in children with special educational needs (SEN). The subject RPE has more than seventy-years long tradition in Czech Republic and support in legislation and the Framework Educational Program. However, despite the emphasis on the importance of supporting children with SEN, the number of schools that offer this subject is declining. For systemic change, it is extremely important to carefully analyze factors leading to this situation. These include, e.g. possibility to exempt pupils from physical education classes, organizational demands and non-enforcement of the provision of SEN, insufficient preparation of future teachers, the outdated paradigm of the field, and negative attitudes of students and parents to physical education in schools.

Key words: Adapted Physical Education, Special Educational Needs, Physical Education in Schools, Framework Educational Program

Introduction

Remedial Physical Education (RPE, also sometimes translated as Physical Health Education, Health PE, Health Related PE or Health Enhancing PE) in the context of basic education is understood as a form of physical education (PE), which is primarily focused on using health aspects of movement for the benefit of students. The Framework Educational Program for Basic Education (FEP BE) states that physical education includes, in addition to comprehensive physical development, also preventive influence on the field of health impairments (RVP ZV, 2017). It is literally stated here: "It is particularly important to discern pupils' physical weaknesses and to correct these through joint and individual forms of physical education – both through mandatory physical education as well as, if necessary, through physical health education. For this reason, an inseparable part of physical education

are corrective and special balancing exercises applied preventively during physical education for all pupils as needed or assigned to pupils with physical impairment in place of activities which are counterindicative of their impairment." (RVP ZV, 2017, p. 92, FEP BE, p. 83).

The role of health related PE in the field of prevention of movement disorders is desirable. Understanding the basic principles of physical activity as prevention and mastering the basic compensatory tools can be clearly considered a suitable educational content falling within the development of basic physical literacy and beneficial for the whole life. In this article we present the basic RPE definition in the context of the Czech education tradition and current legislation. We outline the factors that need to be taken into account when developing physical literacy from the point of view of health and physical education.

Remedial Physical Education

RPE could be understood as an area of PE consisting in the application of movement in order to promote health. RPE as an educational subject that has preventive and therapeutic significance in maintaining and improving health (Dostálová, Sigmund, Kvintová, 2013, Hošková, Matoušová 2007). The term RPE can be encountered in three different meanings that need to be differentiated. These are a) RPE as a synonym for health exercises, b) RPE as a school educational subject and c) RPE as didactic taught as a subject at universities with a focus on physical education (PE). Understanding the context is important, as it may be confusing if it is insufficiently specified. While the history of health exercise dates back to antiquity and we consider the entire population as a potential target group for RPE, including groups with special needs (young children, seniors, pregnant women, individuals with disorders and disabilities), the emergence of Special PE (later renamed Health PE) as a school subject dates to years 1948/1949 and the target group were clearly pupils or students (including pupils with special educational needs, SEN).

a) **RPE as health exercise** can be defined as a set of specific physical education procedures aimed for promoting health. It can be applied to healthy individuals (primary prevention, self-development and health promotion) or individuals with pre-existing disorders (secondary prevention). It can be implemented both in the field of education and in the context of comprehensive rehabilitation or leisure and can be intended for individuals of any age. This includes individually led lessons and individual exercises. In this broad context, we perceive RPE as an umbrella term, which also includes, for example, exercises for seniors, exercises for pregnant women, RPE at children's clubs and youth

homes or other children's leisure organizations, but also RPE as an optional subject for university students in non-pedagogical fields of study (for example at technical universities or medical schools).

b) **RPE in the context of school education** has a tradition of more than 70 years in our country (Strnad, Krejčík, Vařeková, 2019). Ješina et al. (2020) classifies RPE among one of the forms of adapted physical education (APE), ie PE provided for pupils or students with special educational needs (SEN), while the conditions and content of education are modified (Ješina and Kudláček 2011).

School RPE is defined by the Framework Educational Program (FEP) as a specific form of PE, which is intended primarily (but not only) for students/pupils with special needs. "Schools are recommended to offset the movement deficits of pupils and to provide corrective exercises by assigning a mandatory or elective subject" (FEP BE, p. 77). It's content includes health-oriented activities that can be used as prevention or as a therapy. RPE can be taught in schools:

- as a part of **regular PE lessons**, when it has a character of health exercises for all pupils in order to increase their physical literacy.
- as a **subject for students with SEN**. According to the Framework Education Programme, RPE is provided "as a satisfactory replacement for mandatory physical education or for expanding the range of physical exercises" (FEP BE, p. 77, RVP ZV, 2017, p. 100).
- as a **subject of special pedagogical care** (SSPC) within support measures for pupils with SEN (for example, with physical or visual disabilities, mental illness, specific learning disabilities, etc.). According to the current legislation (Decree No. 27/2016 Coll., Appendices), pupils with SEN are entitled to 1st - 5th level support measures on the basis of school counseling center recommendation. From the 2nd level (support for pupils with mild problems) to the 5th level, the possibility of establishing a special pedagogical care subject (SSPC), where an individual approach in assessing the pupil's needs and methods for correction are offered. The decree thus clearly allows pupils to be diagnosed with specific needs in the field of psychomotor development and to offer methods for their development. RPE in this form can be organized for pupils with SEN in groups of up to 4 pupils in a time allowance of one hour per week.

As in other subjects, the goal of educational activities in RPE is to gain literacy. In RPE, this means that the subject is not just about performing health exercises, but also about gaining knowledge, habits and motivation for their further use during life. The following tasks are further subject to gain the Physical Literacy (Silverman, Mercier 2015):

- **Skills** - to have a positive effect on motor and other (mental, cardiovascular, etc.) functions of the pupil / student with the use of basic means of RPE;
- **Knowledge** - to deepen the individual's knowledge of one's own body, health, about risk factors for the development of functional disorders of the musculoskeletal system and the possibilities of influencing them;
- **Attitude** - to teach individuals to have a lifelong habit of performing healthy physical activity, to motivate to move regularly, to develop a positive attitude towards their own body and to movement. (Beránková, Grmela, Kopřivová, Sebera, 2012, Vašíčková, 2021).

c) RPE as a didactic subject for future educators

The third meaning in which we can meet the term RPE is a didactic subject taught at pedagogically or health-oriented universities preparing future professionals (PE teachers, special pedagogues, physiotherapists) for the implementation of RPE in practice (Šimeková, 2017).

If the school subject RPE implemented in primary and secondary schools is to educate students to physical literacy in relation to RPE and to fulfill the above-mentioned tasks of health, education and training, the training of future teachers should also aim towards these goals. There is currently a demand from many pedagogical faculties to pay more attention to the didactics of the fields studied, ie learning skills themselves (eg. https://otevreno.org/nase-vize/).

With teacher training, any change in education begins. If we are striving for systemic change in the field of RPE, it is necessary to carefully analyze educational plans, ask about the competencies of existing students and graduates of relevant fields, and then innovate educational plans in an appropriate way.

Analysis of factors influencing the current situation of RPE in schools

The 2016 Czech School Inspectorate's (CSI) survey showed that less than a 10% of schools already provide RPE, while all schools had pupils exempted from PE. Despite the CSI's recommendations for wider support of RPE in schools for further decline (Krejčík, Vařeková, 2020). So what are the factors that lead to this situation?

1) Obsolete paradigm

RPE is a unique system concept with great potential, however, the paradigm of the field has not been adequately revised in the long run. The Czech Republic is a country with a strong kinesiological tradition: we have top experts in the field of physical education, physiotherapy, psychomotorics and applied physical activities. There is an interest in new and traditional methods and concepts in vocational schools and courses, considerable attention is paid to research, and the general public pays attention to various types of health exercises. University teachers publish original texts including the creative use of physical means to influence children's psychomotor development. Nevertheless, in RPE textbooks, chapters are often rigidly arranged, some information is taken over for decades, and new perspectives are rarely intercorporated.

RPE aims to promote health which is perceived in a biological, psychological and social context. Thus, RPE uses a diverse range of psychomotor agents with a comprehensive impact on the child's development in all aspects.

In the biological context, it is, for example, support of posture, improvement of muscle balance, coordination, breathing stereotype, physical condition, fine and gross motor skills. In the psychological context, the goal is to support the child's psychological development by improving his/her psychological resilience, experiencing feelings of victory and managing losses, experiencing feelings of joy in play and artistic activities, practicing relaxation and self-awareness. In the social context, it is about supporting relationships, communication, cooperation, inclusion (Vařeková, 2020).

These goals can be achieved through means that may be differentiated differently according to different authors. Here we offer the concept of Five Pillars of Prevention of Movement Disorders (Vařeková, Fiedlerová 2021):

1. **Movement**. Exercise is the basis of RPE. In the 21st century, we will no longer be able to get along with "stretch and strengthen" thesis. The range of exercises is very broad and is inspired by both modern kinesiological knowledge (exercises on a neurodevelopmental basis) and psychological and special pedagogical knowledge (movement exercises for the development of rhythm, coordination, body scheme, etc.). They intersect with all the other pillars mentioned.
2. **Postural correction**. At RPE, we lead children to conscious work with posture and develop it through exercise as well as physical self-awareness and habit building.
3. **Breathing exercises** are a key element in RPE. Through the breath we work with the body's self-awareness, during the practice of relaxation and in strength training.
4. **Perception.** Sensorimotor relationships are important and the development of different types of perception undoubtedly belongs to RPE. We strive to develop tactile perception (necessary especially for the development of hand and foot function), but also body self-awareness (kinesthetic perception, proprioception), visual and auditory perception.
5. **Working with the mind** or the use of psychomotor principles for the development of alternating relaxation and activation, motivation, concentration.

All the mentioned pillars intertwine in individual activities. The choice and understanding of their principles must be based on appropriate education, which will connect elements of physical education, health and special education.

2) Legislative contradictions and organizational demands

The biggest paradox of the current system is how affordable and easy it is to completely free a student from physical education, and how organizationally difficult it is to organize RPE. We encounter the practice that the form "Application for releasing of a pupil / student from PE" will be automatically received by parents in schools in the first days of September. This situation is set directly by the Education Act (Act No. 561/2004 Coll. § 50 para. 2), which allows school principals to release a pupil from the PE without compensation only on the basis of a doctor-confirmed application submitted by the parents (Ješina, 2017, Kotlík, Jansa 2020).

On the other hand, the establishment of a separate subject RPE as a replacement for PE or its addition in the extended offer is very demanding. Due to the fact that RPE lessons are

organised together for students from different grades, it is difficult to schedule the lessons and they are usually organised as early morning lessons (before the start of classes) or during late afternoons.

Teaching RPE as a subject of special pedagogical care (SSPC) also for small groups of pupils with the number 1 - 4 (according to Decree No. 27/2016 Coll.) For pupils with SEN could be a desirable reeducation of psychomotor development disorders, which are often related to specific disorders learning. However, the decree states that the subject is provided by pedagogical staff of the school with extended competence in the field of special pedagogy, special pedagogues or psychologists of the school or school counseling facility. Thus, PE teachers are not listed here - and, conversely, there are experts who do not have the necessary competencies to teach RPE. This legislative ambiguity thus further exacerbates the ability of RPE schools to provide as a subject.

In this context, it is important to strive to amend the existing legislation so that the subject of RPE can be taught by certified PE teachers or graduates of study fields focused on applied physical activities.

3) Training of future teachers

One of the factors that have long contributed to the current state of RPE is the preparation of PE and sport students for the implementation of RPE in practice. At the faculties or universities of physical education and sport, RPE classes are reduced, and teaching does not contain a sufficient didactic framework for teaching in schools (clear guidelines for diagnosing specific psychomotor difficulties of pupils and the possibilities of influencing them, the context of health and physical education literacy, linking to health education). Another negative factor is also that students do not encounter RPE in any form within their compulsory study practice at schools, which further reduces their commitment to RPE in their future practice (Šubertová, 2020).

4) Science and research

As an area of research, RPE has long been underestimated. In order to systematically support the state of RPE in schools, it is necessary to substantiate sufficient factual arguments as a basis for further negotiations. The CSI dealt with the state of RPE in 2016 and called on schools to change it. However, no more data is available. We consider it appropriate to focus

attention on the regional and comprehensive investigation of the current situation of the school subject RPE in all its three forms (within PE, independent classes and as SSPC). It is appropriate to examine the self-efficacy of future teachers to implement PE in schools and other factors. It is also necessary to collect, compare and present research.

5) Patronage of professional organizations

There is no organization that specializes in RPE in the context of a school subject in the Czech Republic. In 2021, the RPE working group was established under the auspices of the Czech Association of Adapted Physical Activities (ČAAPA). At the professional meetings of this group, a call was made to continue and expand further cooperation.

6) Public education

The demise of RPE teaching in schools is gradual and smooth, so it has escaped from the attention of experts, parents, and the media long time ago. There is no media discussion about RPE, nor are parents demanding it. There is a need for a wider discussion on topics related to RPE: legislative norms, the position of RPE in school curricula, the recommendations of RPE as a SSPC from counseling facilities, the issue of release (and its prevention through offering RPE), etc. Parents often find it difficult to arrange health exercises for their children, time-limited or regionally limited programs are supported for considerable resources, while the traditional systemic solution is neglected.

Conclusion

The CSI survey (2016) shows the dreary state of teaching the subject of RPE in schools and a high percentage of pupils released from PE. At present, worsening of this situation can be expected, also due to the Covid-19 pandemic, when there was a significant reduction not only in special RPE classes, but physical education as a subject itself was significantly affected as a school subject, whose teaching was reduced for entire school groups for a very long time.

When returning to regular classes, there should be no complete omission of RPE. Remedial Physical Education was established more than 70 years ago as a unique bridge between medical rehabilitation and school physical education with the aim of offering health-promoting physical activities to children and young people with disabilities. Today, RPE can be offered in schools in three forms (part of PE, separate RPE lessons or RPE as a subject of special pedagogical care) and we believe that this unique concept should be maintained and

further developed in accordance with modern knowledge so that RPE can be easily organized and professionally provided within each school. Promoting research, collaboration, education and quality training for future teachers in relation to RPE is a prerequisite.

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Health and safety education in the context of social and curricular changes

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Abstract: Health and safety education implemented in the accordance with the framework curriculum of elementary education develops pupils' relationship to health and provides a space for consolidating their skills to promote health and safety. It participates in shaping the health and safety literacy, which is necessary for life, to a large extent. The effective fulfillment of expected results of education in the given issue is determined by a number of social factors and circumstances. The teacher's personality plays there a key role. The article deals with current issue of health promotion and safety protection in education in the context of current social needs and challenges, which call for curriculum revision and adequate changes in teacher education. The attention is paid to the rapid rise of digital technologies into everyday life and the need to manage the reality of health and safety threat due to emergency.

Key words: health and safety education, digital technologies, Framework Education Program for Elementary Education, teacher education

Introduction

Inclusion of health and safety education in the Framework Education Program for Elementary Education (MEYS, 2007) was an important prerequisite for the development of pupil's health and safety literacy. The background study *Human and the health* (Tupý, 2018), which includes an analysis of the current development of education in this issue, points out that the legislative anchoring of the projected curriculum does not mean that the predicted goals are actually fulfilled in educational practice. Within the formal and informal school curriculum the insufficient acceptance of the importance of health and safety education seems to be a problem. The low hourly teaching allowances for health education in the school curriculum do not provide conditions for the implementation of all expected outcomes. The constant increase of the educational content and expected results of education (in the connection with

current social needs) is a specific feature of the given issue development, which cannot be overlooked in the creation of framework educational programs' revision.

The presented study points out the current problems associated with the change of social requirements in the issue of health and safety education in the Czech Republic and the European region. Specifically, it is focused on the need to respond adequately to the current security risks associated with the Covid-19 pandemic in the health and safety education. It presents also basic goals and recommendations for didactic processing of educational content in connection with the development of pupils' digital competence. It emphasizes the need to ensure the consistency between changes in the curriculum and future teacher educational programs.

Social changes associated with the development of digital technologies

Processes and phenomens associated with new information and communication technologies have created a new type of society whose basic element is information - the term information society is used. This concept has pushed into the background the concept of the educational society and knowledge society, which have been developed and discussed for decades. (Kolesárová, 2016 In Sak, 2018) How are children's lives changing in the information society? What is childhood like in the digital age? The OECD project “21st Century Children” seeks to answer these questions. One of the outputs of the project - the study “Educating 21st Century Children: Emotional Well-being in the Digital Age” (2019) brings us interesting key findings for the further direction of health and safety education.

According to the above-mentioned study, children gain their first experience with digital technologies before they reach the age of two years. Preschool children actually encounter digital devices before coming into contact with books (Hopkins, Brookes & Green, 2013 In Educating 21st Century Children, p. 41). The fact that children connect to the Internet or have access to online tools does not mean that they have the necessary knowledge and skills to be able to use these tools effectively. All education systems in OECD countries focus on development these skills. Currently, the subject of ongoing discussions is also the revision of the curriculum in the issue of digital competences in the Czech Republic (MEYS, 2020).

The above-cited study emphasizes that the current social environment of young people is a combination of offline and online relationships. Friendship on the Internet helps children who feel alienated from groups of their peers and classmates. It allows to meet people with

similar interests who may not meet the norm of their social context, for example with those who suffer from social anxiety, have a disability or belong to the LGTBQ+community (ibid, p. 96). It has been found that if an online friendship lasts longer than one year, its quality is comparable to an offline friendship so the boundary between real and virtual friendship is increasingly blurring. (ibid, p. 97)

The Internet is an essential means of finding information. For example, it is the second most common source of knowledge about sex for 15-18 years old pupils, right after the direct contact with peers. It is necessary to developed media literacy and safe behavior in the online environment. There are also changes in the style of parenthood. In connection with digital technologies there is talk of so-called “data-qualified children” - children who are monitored by their parents from the earliest stages of their development (ibid, p. 33). These are digital applications related to fertility, pregnancy, babysitters to alleviate parents' concerns about the health and safety of the child, applications to monitor the movement of children (sharenting), gathering and sharing a large amount of information about children on social networks. These facts affect the perception of the concept of privacy by children and affect children's relationship to the future data protection. Thus, the family does not become an essential part of building digital security awareness.

Based on selected conclusions of the OECD study “21st Century Children”, it is clear that targeted strengthening of digital literacy aimed at health and safety support is in the curriculum for elementary education necessary. Rapid changes in this issue will require closer cooperation between the school and external partners. Also, undergraduate education of health and safety education teachers will not be possible without reinforcing content involving cyber risks and integrating technology into teaching. The situation of the Covid-19 pandemic has shown us that risks cannot be completely eliminated, but it is necessary to learn to live with them. This skill should be developed through systematic education.

Social needs related to the real threat of emergencies

The concept of population protection until 2025 with a view to 2030 (MoI, 2020) views the protection of the population from a broader perspective and seeks to introduce a system of prevention. It points out the attention to the growing safety risks and the need to implement systematic health and safety education which is based on developing the self-protection and mutual assistance of the population. Excessive reliance on technology leads to a loss of skills

and habits which are important to self-protection. Therefore, it is necessary to create sufficient space for the implementation of "safety education" in elementary and secondary education. It recommends interconnecting the topics of health promotion, human protection under common risks, emergencies and crisis situations, traffic education, preparation of citizens for the defense of the state, medical training (including public health promotion and prevention of infectious diseases), crime prevention, the fight against terrorism and extremism, possibly also other topics related to the health and safety of the individual. Unfortunately, the current situation of the Covid-19 pandemic confirmed the validity of the request.

Covid-19 pandemic significantly affected the implementation of educational goals in schools. We are witnessing of changes, even paradoxes in education that need to be examined and discussed.

Strategies to support health and safety in schools in the European region

Three main approaches to the overall concept of education supplemented by prevention programs can be currently registered:

- a holistic approach (involving the responsibility of school, family, society),
- an approach based on the emphasis on integrating the issue into educational programs,
- an emphasis-based approach outside formal education.

In connection with current strategies to support health and safety education abroad, it is necessary to mention the term "risk prevention culture", which first appears in the European Community Agency for Safety and Health at Work strategy, where there an integrated approach to health promotion is proposed as a part of lifelong learning and safety education (Brück, 2013). This term is based on the terms "safety culture" and "health culture". Safety culture is defined as a set of characteristics and personal attitudes in the organization and thinking of people, which ensures that safety issues are given the highest priority, corresponding to their significance (Zwetsloot, Steijger, 2015).The term health culture can be defined similarly. In this context, it is desirable to point out to the obvious common platform of the safety and health culture defined above, which is the basis for the joint development of safety and health literacy. Health education and safety protection are therefore offered to be conceived in interdependence as one issue of education, which builds on key paradigms:

- the goals are based on the principles of personal responsibility,

- educational content is subject to updating based on the definition of new risks,
- is a natural part of lifelong learning,
- requires an active inter-ministerial approach by the managing authorities,
- is significantly influenced by non-formal education,
- success in education is based on cooperation, not “prescribing”.

The integrated model Health and Risk Education fulfills the idea of a school strategy of health and safety promotion (pic 1). Achieving a state of physical, mental and social well-being in the issue of health and safety presupposes the setting of conditions of the school environment in the field of material conditions and human resources for safe and healthy learning. This proposal is relevant in the context of the ongoing revision of the framework educational programs and searching for a suitable model of the issue of education in security topics (Kovaříková, 2018). In this context, for example, OSHA publications use the term “Health and Risk Education” (Antoine, Théveny, 2013).

Figure 1. Model of integration of health and safety education.
Adjusted according toCarsten Brück Mainstreaming OSH into education
https://oshwiki.eu/wiki/Mainstreaming_OSH_into_education

The above model of integrating health and safety education is based on the unity of the intertwining of formal and informal curriculum at school. The formal curriculum is understood as a complex project of goals, content, means and organization of education. It is the implementation of the projected curriculum in the educational process, methods of control and evaluation of teaching results (Kovaříková, Marádová, 2020). The formal curriculum of

health and safety education represents the implementation of the goals and content of education, which is based on the relevant framework educational programs. The informal curriculum includes all school-related activities, such as extra-class and extracurricularactivities organized by the school (for example excursions, trips, competitions, hobby activities), but also home studying, homeworks preparation of pupils for learning. In the issue of health and safety, the school in an informal curriculum gives pupils the opportunity to "experience" in the real life of the school values declared by formal teaching. The pupil finds out what attention is paid to the issue of health and safety in the reality of school life whether the information obtained in formal teaching is in line with (or differs from) the pupil's own experience with the school and what conditions does the school really create to support the pupils' health and safety. From the point of view of the formation and acquisition of desirable values in pupils, the informal curriculum can have a more significant influence than the formal content of education on this issue. The model in pic. 1 represents a state where the formal and informal curriculum intertwine and are in the value agreement (Kovaříková, 2018).

In connection with curricular reforms in European countries and the integration of security issues into education, the issue of "education securitization" is discussed in the literature, especially in connection with the revision of the English national curriculum in 2014 (Dvořák, Holec, Dvořáková, 2018). The problem with reforms is finding ways to prevent the radicalization of young people through the education and to develope respect for basic social values ensuring safety and not to succumb to the militarization of education (Kovaříková, 2018).

Health and safety education in Covid-19 conditions

The Covid-19 pandemic has undoubtedly affected the goals and content of health and safety education. This is an educational issue in which it is assumed that it will always directly reflect the current social situation and personal needs of pupils. The Covid-19 pandemic and the more frequent occurrence of other emergencies (natural character) threatening the health and lives of people in the Czech Republic were reflected in a social approach to the issue of health and safety protection. The importance of ensuring the necessary readiness of all citizens to live in difficult situations has become apparent. This fact is reflected in the increased importance of health education in the curriculum of elementary education and it opens a new perspective on the choice of educational content of health and safety education.

Above all, it raises the need to provide teachers with sufficient time for its implementation in teaching. Above all, it raises the need to provide teacherssufficient hourly teaching allowance for its implementation. In the 2021/2022 school year, health education should respond to the current epidemiological situation and the set preventive measures and make a significant contribution to thes mooth return of pupils to the normal daily school routine.

The main outputs and topics should be:

- infectious diseases, their transmission and prevention,
- principles of physical and mental hygiene, daily routine, healthy lifestyle, daily health and safety protection,
- an appropriate use of digital technologies,
- participation in dealing with current events and emergencies.

Teaching is focused on explaining responsible behavior and motivation to integrate active health promotion into the daily life of pupils and providing individual assistance in developing their personal potential and interpersonal relationships. Teachers should respond to the social situation and strive to manage a pandemic with all hygiene and social aspects, reflect pupils' experiences during a pandemic and support pupils' interest in current health and safety issue.

Digital technologies in health and safety education

In lessons, which are based on the educational field of Health Education according to the Framework Education Program for Elementary Education, pupils can develop their digital competences by using many of digital technologies and various digital resources. They learn to search, store, sort and evaluate specific information from verified sources focused on health and safety issue - from the own or social interest point of view. Digital technologies allow pupils to measure, store, evaluate, or share specific data about their person in the relationship to health and safety. They help them to monitor the health and safety of a specific situation in their immediate area, process the measured data, store them in appropriate formats, share, evaluate, discuss the results and make suggestions for possible measures to improve the situation.

Current requirements for teachers' education

If health and safety issue is to be given the highest priority commensurate with its importanceit is necessary that this issue have to be a part of university preparation of future teachers and also professionals in other disciplines.

The didactics of health and safety education points out to the breadth of the influences of formal and informal education of pupils. These influences are reflected in the formation of pupils' preconcepts, but they also influence the process of education, the realization of educational goals with the use of appropriate forms and methods of teaching. (Kovaříková, Marádová, 2020) For the preparation of health and safety education teachers, there is a requirement to strengthen the content of the study program on cyber security. Cyber security includes not only information and its processing, but also a new virtual reality, with artificial intelligence being the pinnacle of this type of threat (Sak, 2018). Cybercrime and the issue of crime committed with the help of information technologies are gradually becoming the part of the educational content of health and safety education.“Life in cyberspace” affects a human's physical, mental and social health and the development of society leads to the digitization of lifestyle (Sak, 2018).

The changes must be reflected in the content of study programs for teacher education in terms of professional and didactic.Teachers need to be prepared to use digital technology in their teaching, moving from “paper, chalk and blackboard” to mobile phones and whiteboards. Social networks become a communication tool and pupils can easily interact with each other, share study materials or discuss with others in a group in their environment. There is also a boom in virtual tours with the integration of augmented or virtual reality. Subject didactics in the issue of methods and forms of learning also comes with a trend of gamification - the use of game elements in a non-game environment. The principle of gamification is specific, it for example constantly encourages pupils to solve tasks of various difficulties and gradually rewards them for their fulfillment. Due to the rapid development in the field of digital technologies and changing threats to human, the development of the issue of health and safety education will not be possible without the cooperation with external partners.

In connection with the need to create opportunities for the development of pupils' digital competences in health and safety education, teachers' education must ensure that teachers are able to:

- make credible health and safety resources available to pupils, enable them to search, sort and verify information and to create archives of suitable digital sources as well as portfolios of interesting information and their own knowledge in the issue of health and safety,
- lead pupils to realize that not everything that appears in the digital environment is healthy or safe and to discuss with students specific examples of appropriate and inappropriate behavior in the issue of health and safety,
- develop pupils' ability to master digital technologies that will enable them to record data on their health and safety (eating, exercise, environment, relaxation, etc.) or to monitor situations around them (transport, safe and dangerous situations, etc.) and to lead pupils to evaluate the data obtained and to formulate suggestions for improving the situation,
- lead pupils to communicate securely through digital technologies and to emphasize the possible risks of losing privacy and personal security if the basic rules of communication are not followed,
- point out pupils' to the issue of bullying and cyberbullying and to lead them to act ethically and to reject all manifestations of violence and aggression when interacting in the digital environment,
- acquaint pupils with the use of digital technologies in communication with rescue services and safety lines (in situations of danger, accident, emergencies), etc. and to make the issue of legal liability available to pupils when using and sharing information (image data) in a digital environment that relates to health and safety (protection of personal data, alarm message, etc.) by using examples.

Conclusion

As follows from the above analysis, the current time brings changes in individual's and whole society life, and it is necessary to respond immediately to these changes in the issue of education. The possible risks of health and safety threat raise the need to pay increased attention to the educational concept in the health and safety issue related the revision of the framework educational programs. The extension of the content focus of the educational issue by security topics and the requirement of the curriculum to systematically support the development of pupils' key competences requires the creation of sufficient space for the implementation of the expected learning outcomes in the curriculum. There is the long-term

problem of insufficient hourly teaching allowances for the implementation of health and safety topics, and it deepens in connection with the current social situation. The forthcoming "major revisions" of the framework educational programs are an opportunity to eliminate this deficit and to conceive education in this issue in a new concept that meets social needs. In this sense, an update of the educational content and expected learning outcomes can be expected. The creation of an updated curriculum cannot be done without inter-ministerial cooperation which is established in an experts from the resorts of education, health, defense, interior and transportation. Due to the broad content of the issue of education, a discussion with other institutions and professional companies is open. Content overlaps with some educational issues are solved - real and relative ones, where there is justified to present certain content from different perspectives of the issue. It will be also necessary to consider the planned educational concept changes in the issue of health and safety support in the direct relation to ensuring teacher readiness and realize the expected learning outcomes. To monitor the creation of "major revisions", to participate in the process of creating new curricular documents and (if it is possible) to respond operatively by changing accredited educational programs is undoubtedly a challenge for faculties preparing teachers.

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Challenges and opportunities for health promotion in the school environment in the context of the COVID-19 pandemic

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Abstract: The text responds to current problems associated with the impact of the COVID-19 pandemic on education in the Czech Republic and abroad and discusses the current situation based on the latest available information. Specifically, it focuses on the influence of this severe health threat on the societal perception of the importance of health promotion and safety in school education. The COVID-19 pandemic constitutes a new milestone in formal and informal health and safety education development. Based on the results of research in the Czech Republic and abroad, the text demonstrates the need to expand activities to promote health and safety in schools in the future (in terms of ensuring physical, mental and social wellbeing), and thus the need to increase the number of lessons per week for health and safety education in the primary and lower secondary education curriculum. We propose that the Framework Education Programme for Primary and Lower Secondary Educationin corporates (as part of the forthcoming revision) the necessary adequate changes aimed at broader health promotion both in the overall concept of school life and especially in the educational field, including health and safety topics.

Keywords: health and safety education, education during COVID-19 pandemic, Framework Education Programme for Elementary Education

Introduction

The COVID-19 pandemic has had a vast, unprecedented impact on all aspects of human life worldwide. This extraordinary and unexpected event, accompanied by a severe health threat, took everyone by surprise and, above all, raised concerns about their health and the health of their loved ones. The state of emergency declared by the Czech government and similar restrictions in other countries meant a significant limitation in everyday personal and professional life. It is clear that, unfortunately, nationwide anti-epidemic measures in the

Czech Republic and elsewhere are likely to continue, and we must adapt our lifestyle to these conditions.

One of the areas most affected by the pandemic has been education. All at once, schools closed, and millions of pupils and students were deprived of the opportunity to learn in their familiar environment and be in personal contact with their friends and teachers. Consequently, changes in the organisation of education were necessary. The enforced distance education with its accompanying phenomena and contexts was new for all its stakeholders (teachers, pupils, parents) in many ways and undoubtedly represented a significant burden for many of them.

At present, when most pupils return to reopened schools, we are gathering and examiningexperience gained from the course of online education during school closures. Findings of research surveys conducted in the Czech Republic and abroad allow us to evaluate what the use of digital technologies in education has brought to schools and what consequences schools will have to cope with concerning the quality of education. The available information on the concept of the curriculum and the practical implementation of health promotion and safety in schools in the context of the current health and safety situation deserves precise reflection. What changes will the current situation require in education?

The COVID-19 pandemic can be described as a new milestone in the current development of formal and informal education focused on health and safety education. Given that the risky epidemiological situation persists, it is appropriate to monitor specific changes in health promotion and safety paradigms, point out the situation “before COVID” and the new topics brought by the time “in COVID”. Inspiration can also be drawn from the comparison with selected studies published abroad.

Health and safety education in the Czech Republic before the COVID-19 pandemic

According to the Framework Education Programme for Primary and Lower Secondary Education (MEYS, 2007), the basis of education in the field of Man and Health is knowledge leading to understanding health and safety issues, to a positive way of thinking and making the right decisions in favour of health and personal safety. Besides, the field is based on skills that actively influence the pupil’s physical and mental condition, and the experiences and habits acquired and verified in their daily routine situations.

The curriculum creates an opportunity to observe interrelated individual and social factors that significantly affect the health status of an individual, group of people or society (Fialová, Marádová, Mužík, Flemr, 2014). The impact of the following aspects on health is emphasised:

- lifestyle (50%) – for example, individual lifestyle, attitude to health, care of one's own and others' health, compliance with preventive measures, nutritional habits, physical activity, risky behaviour;
- environmental factors (20%) – for example, climatic conditions, natural and social environment;
- genetic predispositions (20%) – for example, susceptibility to certain diseases, developmental disabilities;
- quality of health care (only 10%) – for example, health care system, development of medicine, availability of medical care, health policy.

The curriculum strives to develop health literacy (Marádová, 2014). In connection with the occurrence of emergencies in the Czech Republic and abroad, the curriculum expanded education in safety topics related to the protection of people in ordinary risks and emergencies, traffic education, health protection and first aid, crime prevention, the fight against terrorism and extremism. Preparation for state defence and cybersecurity issues were newly included (MEYS, 2017). Pupils learn how to behave in situations of potential danger. They solve model situations "what to do if…" They are encouraged to offer and provide assistance adequately to their abilities. The educational content of health education is closely connected with safety topics (Kovaříková, Marádová, 2020).

In short, thecritical paradigm in health and safety education in the period before the COVID-19 pandemic was the effort to adopt appropriate behaviours in terms of a healthy lifestyle and safety. The real threat of pandemics in a country with quality health care was considered a theoretical, unlikely possibility.

Health and safety education in the context of the COVID-19 pandemic

The COVID-19 pandemic significantly affected the implementation of educational goals in schools. We are witnessing changes, even paradoxes, in education that need to be examined and discussed.

Digital learning and its implications for health

After the outbreak of the COVID-19 pandemic, vast numbers of pupils and students worldwide were affected by school closures. Suddenly, they lost the daily routine and security that school attendance represented for them. Besides, their personal contact with their friends and teachers was disrupted, they could not use school services such as sports facilities or canteen lunch. Some of them were left without protection against domestic violence or abuse. Many were experiencing difficult family situations associated with the pandemic-related restrictions or loss of employment of family members, theever-present atmosphere of insecurity and fear. Generally, their quality of lifechanged significantly.

According to Ashikkali, Carroll and Johnson (2020), although children and young people were less directly affected by COVID-19 disease than adults, the indirect consequences of the pandemic for their health should not be ignored. Long periods of school closures encouraged obesogenic behaviours in children and young people, including lack of daily structure, changes in sleeping routine, unhealthy diet, decreased physical activity and increased screen time.

School closures lead to an urgent need to find alternative ways and methods of teaching. In many countries, digital teaching and learning were adopted and applied where possible.

Digital education and inequality

Digital education is a subject of several recent studies, and the discussion over the evaluation of its implications for both students and teachers are likely to continue in the future. However, one real drawback of digital learning is that it highlights inequalities caused by poverty and deprivation. Many children had limited internet access or equipment, and some parents had problems providing adequate supervision (Ashikkali, Carroll, Johnson, 2020).

In their study, González-Betancor, López-Puig and Cardenal (2021) look at the role of the family's socioeconomic status and the role of the school concerning the frequency and quality of use of digital media and ICT access. They used data from the last PISA cycle in 2018 with 161,443 students from 21 European countries. The results confirm that for most European countries, ICT access at home is influenced to a greater extent by the family's socioeconomic status, while both the frequency and quality of use of ICT at home are influenced more by the

integration of ICT at school. Thus the results suggest that the integration of ICT at school could alleviate students' social inequalities.

Digital education and wellbeing of the school as a whole

Although most texts dealing with the impacts of the COVID-19 pandemic focus on either students/pupils or teachers as separate groups, the study of O'Toole and Simovska (2021) presents findings based on interviews with 15 school professionals from Irish schools regarding the impact of the pandemic on the wellbeing of students, school staff and school communities as a whole. Although educational professionals were deeply engaged in work with their students during school closures, students were faced with challenges such as isolation, worry, loneliness, self-harm or suicide, and the role of the school as a place of safety, socialisation and predictability for young people was missing.

The educational professionals made significant efforts to connect with the students through various online platforms or email. For vulnerable and socially marginalised students, they even used more imaginative ways of maintaining contacts like delivery by post, personal visits or phone calls. On the other hand, this endeavour caused them increased stress and exhaustion, and they felt not adequately acknowledged and supported by educational authorities.School leaders, who were also under considerable pressure from the new situation, felt angry and frustrated concerning the state Department of Education due to the lack of good governance and collaboration.

The authors conclude that the principles of wellbeing must extend to all three stakeholders: students, educational professionals and school leaders, and meeting the human needs for safety, belonging and social inclusion must be prioritised through whole-school approaches.

Priority subjects emphasised, health education abandoned

Some subjects get priority over other subjects. The priority subjects in Czech schools include mainly mathematics, Czech and English languages, while health education and physical education together with music and art are perceived as less important. The situation is similar in many countries. Health education had already struggled with this problem before the pandemic, and it became even more pronounced with the introduction of digital education during school closures.

The Methodical Recommendation for Distance Education of the Ministry of Education, Youth and Sports (MEYS, 2020) for the distance education implemented by schools recommends "focusing on priority subjects", "focusing on key outputs in the Czech language, mathematics and foreign language", which of course has its justification. However, in a situation where everyone is primarily concerned with health, we lack any mention of the importance of health promotion (physical, mental and social) in this risky period. Physical education was significantly reduced, and there was no time left for school health education.

Future challenges and development of health and safety education

Health and safety education and health promotion play an important role in disease prevention and health protection in general, but their significance even increases in times of disease outbreaks and emergencies. With changes implied by the COVID-19 pandemic in the lives of individual people and the entire society, health and safety education also needs to undergo necessary changes, overcome challenges and advance.

Support of pupils after school reopening

In a thematic survey, the Czech School Inspectorate (CSI) monitored the experiences of primary school pupils and teachers with distance learning. In addition to the findings on the quality of education (at least 36.5 thousand pupils from 1465 primary schools included in the research after a long period of distance learning have significant gaps in knowledge and skills), considerable health (primarily psychosocial) problems of pupils related to their long-term absence from school were revealed. Some students find it challenging to get used to the previous routine regime likegetting up in the morning, spending the morning at school, taking part in lessons, having fun with others during the break, spending the afternoon with hobby activities. Pupils need ample support from schoolsto overcome challenges related to their return to school. The school environment should provide sufficient opportunities for promoting pupils' health in physical, psychological and social respects. Pupils should feel safe and have enough time and space to renew social ties and build a positive self-concept.Therefore, the recommendation for the period after returning to full-time education is: "to support schools in the development of all dimensions of pupil personality and targeted compensation of psychological and social deprivation caused by distance learning (for example, by a varied and targeted offer of activities in schools that contribute to pupils' personal and social development)"(CSI, 2021).

Health teachers as promoters of vaccination and compliance with imposed measures

Health, which was often taken for granted, is talked about everywhere. Everyone asks how to protect their health and the health of their loved ones. Pupils cannot overlook the efforts of the entire society to find a way to promote and protect health effectively. Health education has become part of not only the formal but especially the informal curriculum. In teaching health issues, it is appropriate to continuously explain to pupils the need to observe valid preventive measures, the importance of vaccination and provide sufficient space for discussion on current health and safety issues (Marádová, 2021).

Plutzer and Warner (2021) proposethat health teachers could become an effective communication channel for providing students with medically accurate information on vaccination. The authors describe the situation in the United States and demonstrate that little attention is given to vaccine literacy in secondary education. Vaccines are mentioned in the education content standards of only a few states. However, these standards are binding concerning topics covered in the classes. If the standards changed, teachers could include the topic of vaccination and immunisation in their classes, which could improve vaccination uptake and health outcome in the country.

New educational materials and activities

The fundamental purpose of healtheducation is to explain responsible behaviour and motivation to apply active health promotion to pupils' everyday lives and provide individual assistance to pupils in developing their potential and interpersonal relationships. Teachers must make extensiveefforts to manage the pandemic with all the hygienic and social aspects, reflect pupils' experiences fromthe pandemic, and support pupils' interest in current health and safety issues. Besides, health and safety teachers use theirexpertise in health education and also knowledge of the class, the social climate and the atmosphere in which the educational process takes place to design and use new educational materials reflecting the current needs and implement activities with regard to the individual pupils' abilities and skills.

According to Gray et al. (2020), materials conveying information on COVID-19 to children are scarce and often unsatisfactory. The authors call for creating materials that would provide accurate information adjusted appropriately to each children's age group. The materials must be attractive to children, so the selected format is crucial. Gray et al. suggest the use of cartoons which can reinforce desired behaviour in children better than text-based materials.

Role of medicine and health professionals

In the present pandemic-affected situation, we rely on quality medical care more than ever. People admire the work of medical staff and monitor the development of effective drugs or vaccines with hope. A newly acquired experience must be reflected in the health education curriculum. In the event of an emergency, the influence of individual and social factors on the population's health status can change significantly, andthe determinant of medical care plays a crucial role in such situations.

Since people often view and evaluate health from the perspective of medicine, the involvement of health professionals in the development of school health seems logical. Jourdan et al. (2021) suggest four areas where health professionals could contribute to the promotion of health at school: advocacy for health promotion in school, education and prevention of health issues, medical contribution to education and learning, development of schools' capacity to protect health. The authors see the mutual cooperation of health professionals and educators as essential for pupils and students to develop skills and capabilities for lifelong health and wellbeing.

Preparation for possible future crisis

The COVID-19 pandemic showed that the Czech educational system was not thoroughly prepared for the unpredictable general health crisis and school closures, but this is quite understandable. On the other hand, many teachers and school leaders' expertise, creativity, effort, and dedication helped facilitate distance learning for pupils, students, and parents. We should use the experience gained during the hard times to design systems and strategies for possible future crises of similar character. In particular, the crucial role of school health promotion in times of health crisis should be pointed out as one of the most important factors for maintaining the wellbeing of pupils and students.

Based on the German education system as an example of school health promotion significance during the pandemic, Levin-Zamir et al. (2021) call for redesigning the educational system to provide a more inclusive and health-literate system supporting health promotion. Students must have the necessary digital infrastructure and skills for participation in digital learning, and teachers should be trained in an emergency strategy for education. Educational approaches should use practical methods and keep health promotion activities effective.

Health literacy as a vital precondition for a healthy life in the 21st century

Health literacy is a core concept and key priority of health education. The term "literacy" is frequently used in the contemporary world, usually in connection with abilities and skills acquired at school (for example, writing and reading) or other skills necessary for life, such as digital or financial literacy. Like the other literacies, health literacyhas all-life importance, but apart from that, it can make all the difference between our life or death. Vamos and McDermott (2021) point out the fundamental significance of health literacy for gaining control over one's life, which becomes even more pronounced during a global health crisis like the COVID-19 pandemic.

According to the findings of Kučera, Pelikan and Šteflová (2016), nearly 60% of the Czech population show limited general health literacy. This strikingly high number calls for immediate action and presents a fundamental challenge for health and safety education in the Czech Republic.

Challenges of the school year 2021-2022 in Czech schools

During pupils' return to full-time education, health promotion (in a holistic sense) and protection of pupils' safety are indispensable. In the school year 2021-2022, it is essential in health education to lead each pupil to find their path to life satisfaction based on vibrant health, good relationships and responsibility to oneself and other people. Pupils should have the possibility to know the benefits of a healthy and safe life, learn to protect health in all its components (physical, mental, social), to make decisions in favour of health and safety in everyday situations. It is essential to acquire practical skills based on personal experience and apply acquired behaviours in everyday life. At the same time, the current society-wide situation and pupils' personal needs must be taken into account.

Significance of health and safety education

The COVID-19 pandemic and the more frequent occurrence of other extraordinary events (of a natural or climatic character) threatening the health and lives of people in the Czech Republic were reflected in a society-wide approach to health and safety with an emphasis on ensuring the necessary readiness of all citizens for life in difficult situations. This fact is reflected in the increased importance of health education in the primary and lower secondary education curriculum. It opens a new perspective on the choice of the educational content of health education and raises the need to provide teachers with a sufficient number of lessons for its implementation at school.

Fundamental topics of health and safety education

In the school year 2021-2022, health education should significantly respond to the current epidemiological situation and the set preventive measures. At the same time, it should make a significant contribution to the smooth return of pupils to the regular daily routine of schooling. Therefore, the following topics can be considered essential: infectious diseases, their transmission and prevention; principles of physical and mental hygiene, daily routine, healthy living, daily health and safety; appropriate use of digital technologies; participation in dealing with ordinary and extraordinary events. Topics that are directly related to the current epidemiological situation and managing the consequences of emergencies and topics that are part of the active support of health and safety during the return of pupils to school lifeare of utmost importance for the school year 2021-2022.

New educational content

In addition, there is a need to expand the educational content in some topics in line with the current requirements. In particular, this applies to the actual content of topics concerning behaviour in emergencies, behaviour in connection with communicable diseases, and responsibility for health. These topics relate to the occurrence of a pandemic, compliance with pandemic measures, managing the impact of the pandemic on everyday life, the origin and consequences of natural disasters (tornadoes, floods).

Conclusion

The COVID-19 pandemic undoubtedly influenced societal attitudes towards the inclusion of health promotion and safety protection in school education in the Czech Republic and abroad. It turned out that health and safety issues have an irreplaceable place in the primary and lower secondary education curriculum and form essential readiness for life. The currently planned revisions of the framework educational programs in the Czech Republic should reflect the “experience with COVID”, include health and safety issues in the core educational content, provide schools with sufficient space to implement health promotion and safety in direct connection with school life and culture.

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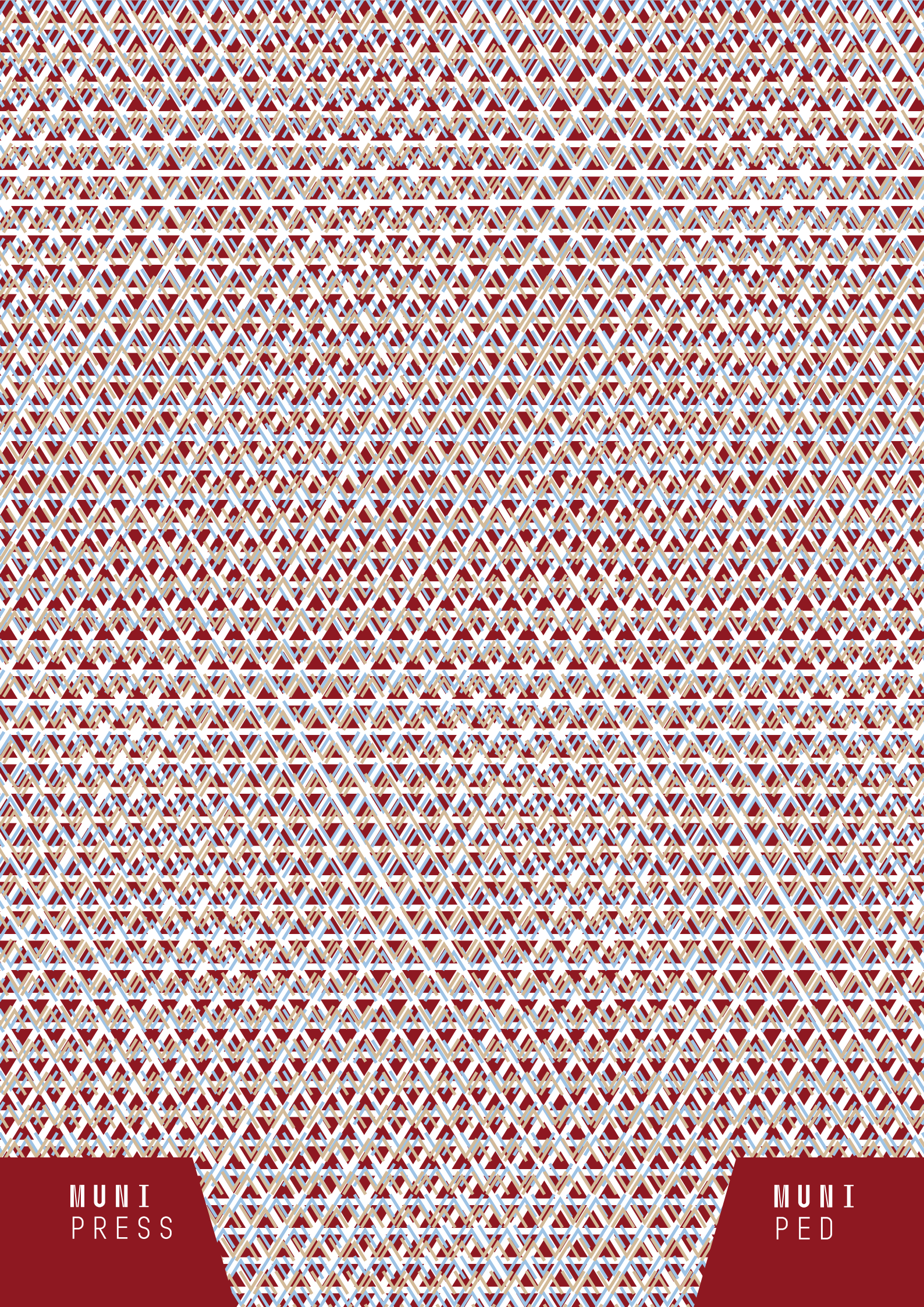
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