The use of personal listening and IT devices in the risk behavioral survey

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ABSTRACT

The study evaluates the impact of selected behavioral, psychological, and socioeconomic factors on adolescent health in Bratislava, Slovakia. Special attention is paid to the use of selected IT devices (TV, PC, personal music players - PMPs). The data from 525 students (185 boys) attending 8 secondary schools, aged 15-20 years are presented. 90.9 % of students listen to PMP on average for 405 minutes and use mobile phones for 384 minutes per week, significantly more girls. About 50 % of students are listening to PMPs more than 200 minutes a week. Those students smoke, drink alcohol, use drugs significantly more often than students listening to PMPs less than 200 minutes a week. A high percentage of PC usage has been observed, especially during the weekend (72.1% more than three hours per day), and less interest in watching TV. The study presents a challenge for the analysis and for future prevention as well as intervention activities to protect and promote the health of children and youth.

INTRODUCTION

The environment of children, and adolescents, its physical, chemical and biological properties significantly affect the health of children from the prenatal period throughout the jdevelopment to adulthood. The health of children and young people is also negatively affected by behavioral risks such as poor lifestyle, low physical activity and risky behavior - smoking, alcohol and illegal drug abuse, sexuality problems, bullying, and, more recently, new modern information technologies [1, 2].

Adolescence is the phase of life stretching between childhood and adulthood and it encompasses elements of biological growth and major social role transitions [1]. Adolescence is a period of life with specific health and developmental needs. It is a time when girls and boys are able to acquire new knowledge and skills intensively, but also when they struggle with mood swings and emotional outbursts, when they build lifelong friendships and first, according to them, serious relationships. It is a time when they become acquainted with human and social values and, depending on the information provided and the observation of their immediate surroundings, they form value charts and prepare for life in adulthood [3].

Modern technologies and social networks have become a basic need for adolescents, but they are also a tool for satisfying basic needs such as interaction with loved ones and peers, leisure activities (listening to music, reading, watching movies, playing games), searching for information, learning, and self-development). The current generation of schoolchildren at a very young age and many times without sufficient parental control receives new technologies, uses them, but at the same time becomes exposed to external influences. The risk of the possible addictions related to the use of new technologies (excessive use of the Internet, addiction to it, excessive use of a mobile phone) could be a problem [4].

According to the EU Kids Online survey of 9-16- year- olds and their parents in 25 countries 93% of 9-16- year- old users go online at least weekly (60% go online every day or almost every day. As many as 30% of adolescents aged 11-16 show signs of Internet dependence, with excessive use of the Internet affecting the subjective well-being of individuals at the physical, psychological and social levels [5].

The aim of this ongoing cross-sectional school-based survey of students and their parents based on a bilateral US-Slovak project is to assess several behavioral factors in youth and adults according to the model CDC surveys taking into account national specificities. The project will identify persons at risk and target the attention of teachers, researchers, policymakers, and the general public on these issues.

In this contribution, special attention is paid to the use of selected telecommunication and other screen devices (TV, non-TV screen devices: PC, personal music players – PMPs, mobile phones) and their possible impact on hearing and the lifestyle of adolescents.

METHODS

The Youth and Parents Risk Factor Behavior Survey in Slovakia (YABS) originates from The Behavioral Risk Factor Surveillance System (BRFSS) and The Youth Risk Behavior Surveillance System (YRBSS), originally designed by CDC, Atlanta, USA [6, 7].

The BRFSS was a random telephone survey (since 2009 by cellular phones) of US state residents aged 18 and older with the primary focus on such behaviors that include: sedentary behavior, physical activity; nutrition, safety (e.g. the use of seatbelts and helmet); using tobacco and alcohol; getting preventive medical care, etc. [6]. The YRBSS was developed in 1990 monitoring six categories of priority health-risk behaviors among youth and young adults (aged 15–19 yrs) in a public and private school in the USA (behaviors that contribute to unintentional injuries and violence; tobacco use; alcohol and other drug use; sexual behaviors that contribute to unintended pregnancy and sexually transmitted infections; unhealthy dietary behaviors; sedentary behaviors and physical inactivity) [7].

The Youth and Parents Risk Factor Behavior Survey in Slovakia is an ongoing cross-sectional school-based survey of students and their parents or legal representatives initiated during the years 2015/2016 in Bratislava, the Slovak capital, as a model region. There were 2,384 questionnaires distributed in total (798 for students; 1,586 for parents), the response rates were 64 % and 46 % respectively. The sample involved 525 adolescents aged 15–19 years old from 8 randomly selected secondary schools in Bratislava (two secondary grammar schools (40%); three vocational schools (30.4%) (hairdresser, make artists, masons, transportation); one school of art (3.2%); business academy (5.3%); and a nursing school (21.1%)) from a total of 101 secondary vocational and grammar schools and 22,723 students in Bratislava on the 1st January 2016 (Figure 1).

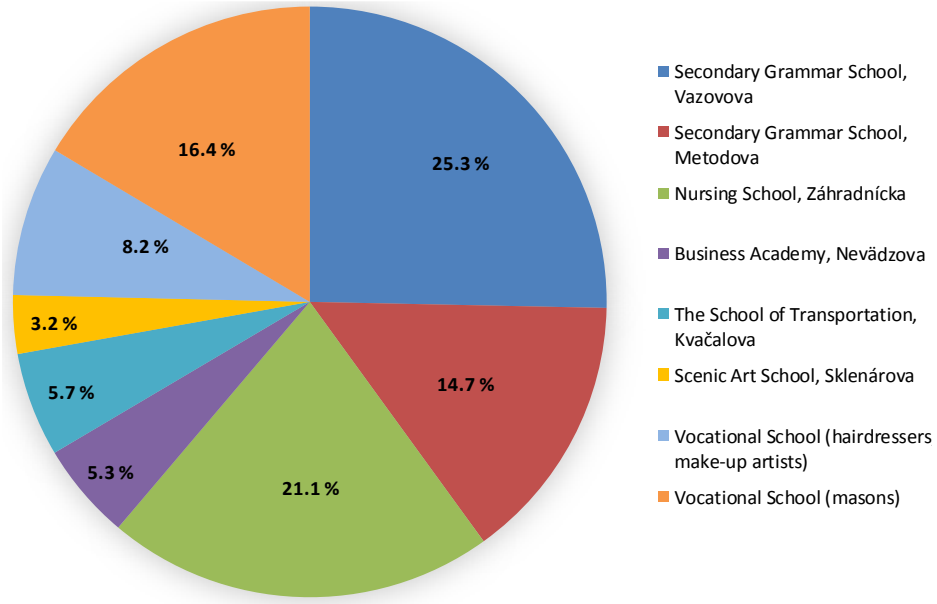


Figure 1: Schools in the project YABS – proportion of respondents (%)

The separate questionnaires were sent home to parents (in total there were 178,290 adults 40–60 years old living in Bratislava out of 618,380 inhabitants in Bratislava agglomeration on the 1st January 2016).

The Questionnaire for Students included questions on a residence, family, school, health and safety, habits and behavior, nutrition, body weight and height, lifestyle and physical activity. The special emphasis was paid to the use of selected telecommunication and other screen devices (TV, non-TV screen devices: PC, personal music players – PMPs, mobile phones).

There were 38 % boys and 62 % girls, 90.9 % of Slovak nationality, the average age of students was 17.18 ± 1 years. Age categories were distributed evenly, with most students aged 16.1 to 17.0 years old (30.4 %). In the urban areas lived 58.5 % of students, 69.8 % of students were from complete families and 82 % had at least one sibling. Fathers and mothers of students completed mostly secondary education (43 %, 47.9 %); 29.9 % of fathers and 32.7 % of mothers had a university education. More than 90 % of fathers and mothers were employed, but some families nevertheless experienced a lack of finances (48.1 %).

The survey was anonymous and voluntary, approved by the Ethics Committee of the Faculty of Medicine Comenius University and University Hospital on 25 July 2017 with the number 87/2016.

Statistical Package for Social Science (SPSS) version 25 was used for the statistical analysis. We used methods of descriptive and analytical statistics; the relations between categorical data were evaluated using bivariable analysis, contingency tables, and chi-square test. Statistical tests were two-sided at a significance level of 5 %.

Only the data from „The Questionnaire for Students“ are presented in this paper.

RESULTS

The most important health risk behaviors in the students' sample were identified (tobacco and alcohol use, violence, risky sexual and dietary behavior, inadequate physical activity). The prevalence of smoking in the students' sample was 19.9 %; 60 % of students were drinking alcohol at least once in the last month and 19.9 % more than three times a month, 22.4 % were exposed to physical violence. 90.9 % of students listen to PMPs on average for 405 minutes and use mobile phones for 384 minutes per week, significantly more girls (Table 1, Figure 2). More than 50 % of students listen to PMPs for more than 200 minutes a week and on a loud setting (Table 1).

A high percentage of PC usage has been observed, especially during the weekend, and the less interest in watching TV. The percentage of students using PC over 3 hours daily was 59.7 % on Monday-Friday and 72 % Saturday and Sunday, watching TV more than 3 hours was 8.9 % Monday-Friday and 26.3 % Saturday and Sunday (Tab. 1).

Table 1: Information technology (IT) devices in the sample of students (n=525)

Variable	**N**	**%**
Listening to PMPs		
Yes	477	90.9
No	47	9.1
Listening to PMPs		
≤ 200 min/week	210	49.8
> 200 min/week	212	50.2
Listening Volume - PMPs		
Very quiet	10	2.1
Rather quiet	34	7.1
Moderately loud	189	39.2
Rather loud	186	38.6
Very loud	63	13.1
PC usage daily (Mo-Fri)		
≤ 3 hrs	205	40.4
> 3 hrs	303	59.6
PC usage daily (Sat-Sun)		
≤ 3 hrs	139	27.9
> 3 hrs	359	72.1
Watching TV daily (Mo-Fri)		
≤ 3 hrs	462	91.1
> 3 hrs	45	8.9
Watching TV daily (Sat-Sun)		
≤ 3 hrs	371	73.8
> 3 hrs	132	26.2

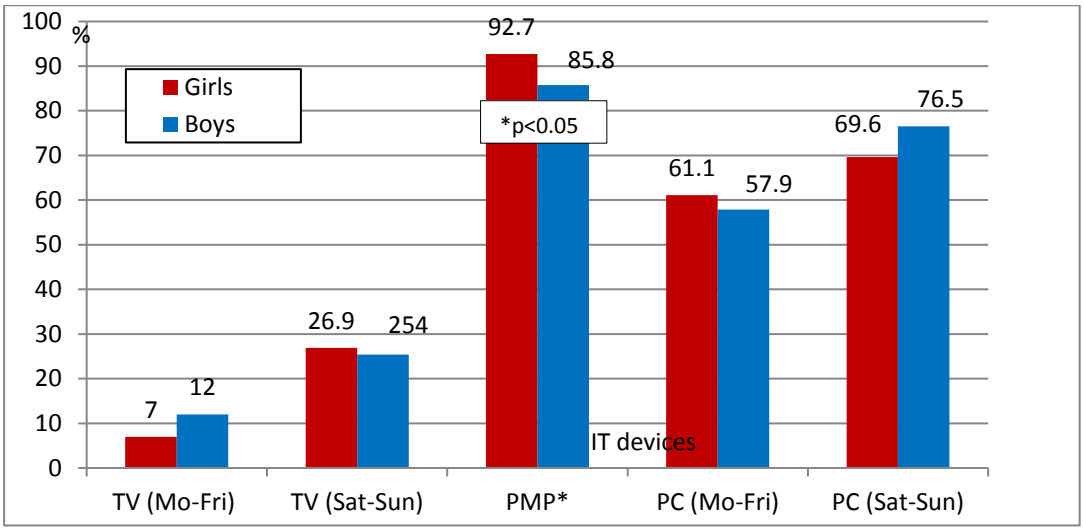
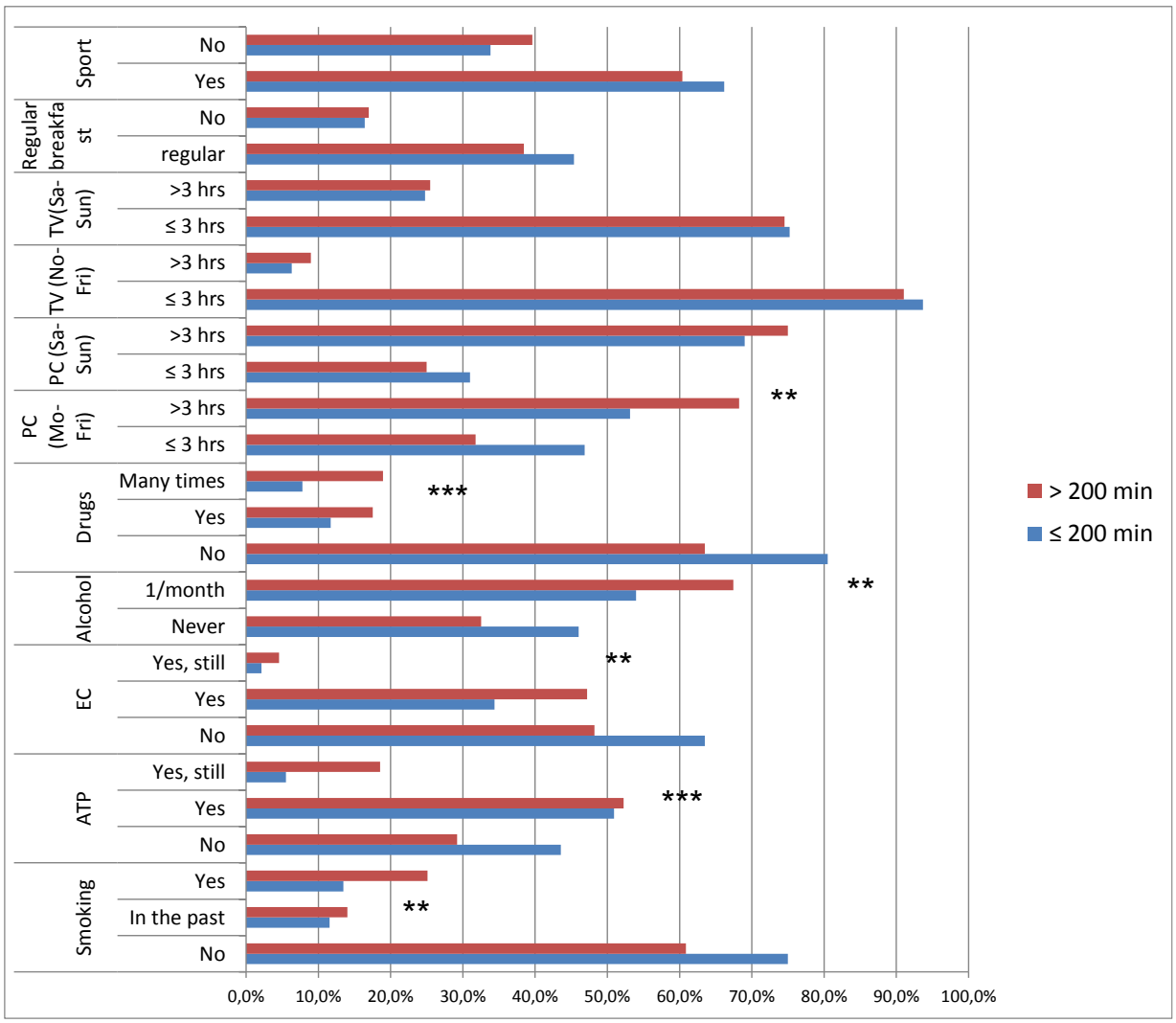
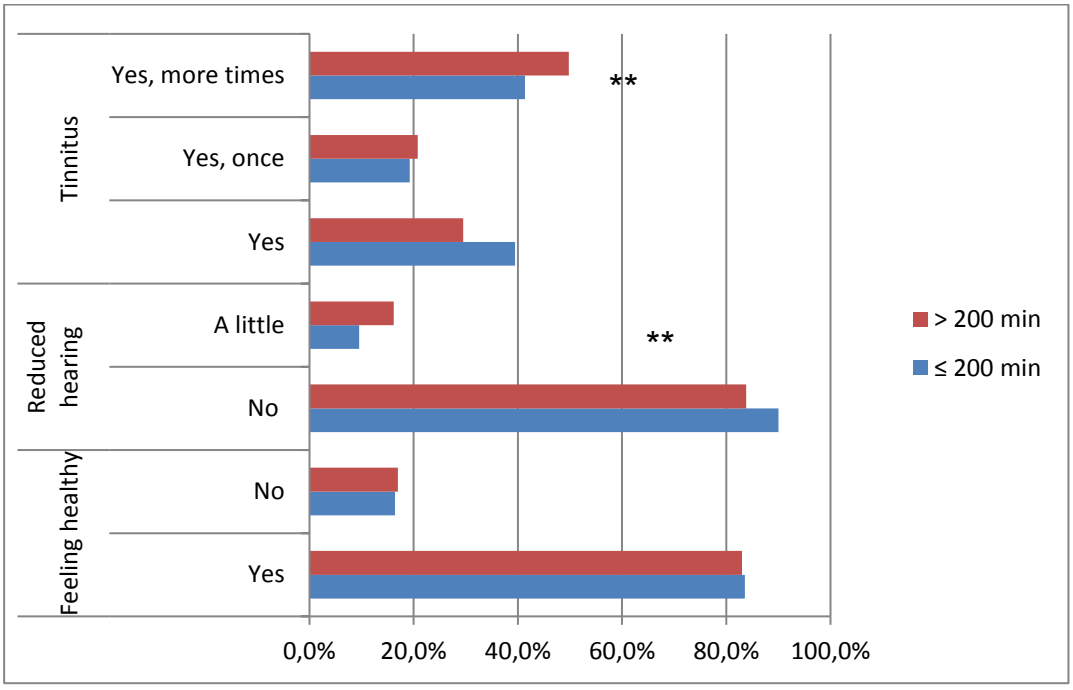


Figure 2: The use of IT devices in relation to gender



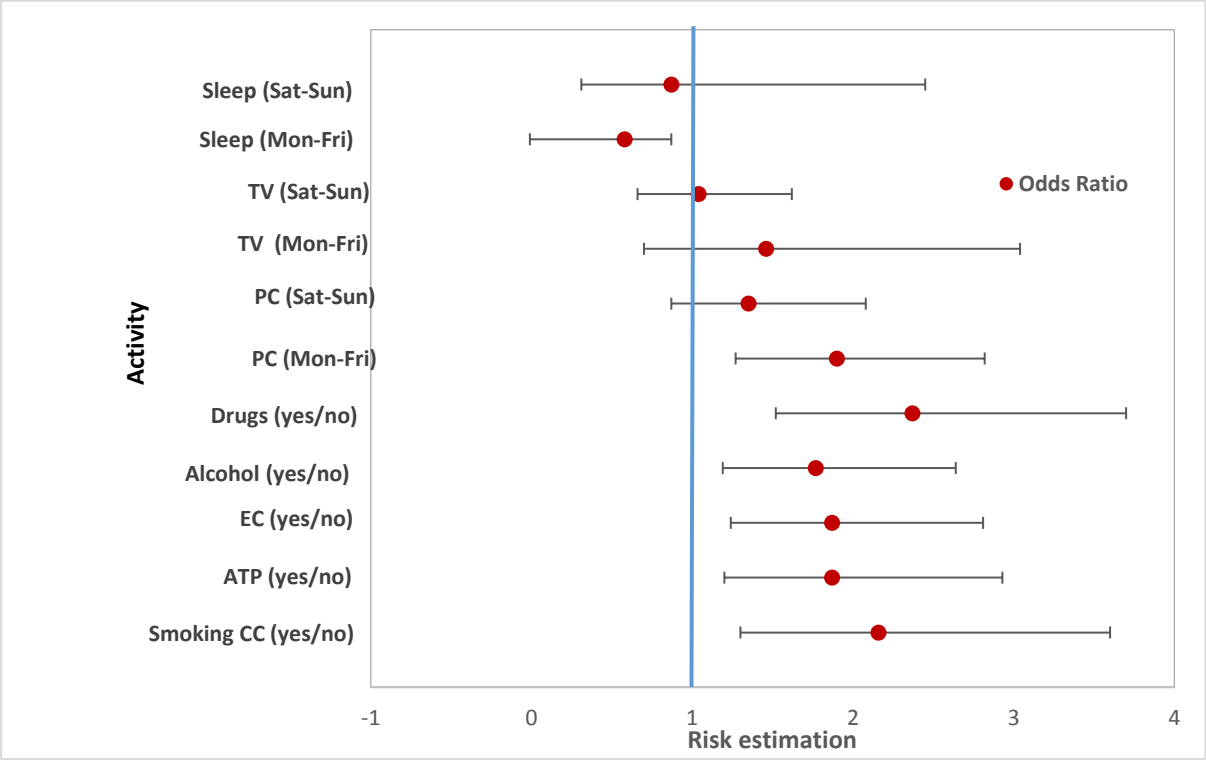
Legend: ** p<0.01 *** p<0.001 ATP=alternative tobacco products EC=electronic cigarettes
Figure 3: Listening to PMPs in relation to the lifestyle factors

Those students who have been listening to PMPs for more than 200 minutes a week have a worse lifestyle as well. They smoke conventional cigarettes, drink alcohol, use drugs, and experience with alternative tobacco products (ATP) significantly more often than students listening to PMPs less than 200 minutes a week (Figure 3). In this group, we observed a higher percentage of PC use especially during Monday through Friday ($p<0.01$). The tinnitus and subjectively reduced hearing were also present ($p<0.01$) (Figure 4).



Legend: ** p<0.01
Figure 3: Listening to PMPs in relation to subjective health evaluation

From the results of the bivariate analysis, we can conclude that the length of listening to PMPs is significantly associated with smoking of classical cigarettes (OR 2.16 (95% CI 1.30-3.58)), electronic cigarettes (OR 1.87 (95% CI 1, 24-2.81)) and ATPs (OR 1.87 (95% CI 1.20-2.93)), with the use of drugs (OR 2.37 (95% CI 1.52-3.70) and alcohol consumption (OR 1.77 (95% CI 1.19-2.64)). Interesting is the significant negative association with the length of sleep in the working week (OR 0.58 (95% CI 0.38-0.87)) (Figure 4).



Legend: PC=using computer>3 hrs/daily; TV=watching TV>3hrs/daily; Sleep= >7 hrs
CC=conventional cigarettes; EC=electronic cigarettes; ATP= alternative tobacco products

Figure 4: Listening to PMPs (≤ 200 min/> 200 min/week) in relation to lifestyle factors (bivariate analysis)

DISCUSSION

In this study, the most important health risk behaviors in Bratislava students' sample were identified (tobacco and alcohol use, violence, risky sexual and dietary behavior, inadequate physical activity, the use of IT devices). The study revealed a very high prevalence of PMP listening and mobile phone use. More than 90 % of students listen to PMPs on average for 405 minutes and use mobile phones for 384 minutes per week, significantly more girls. More than 50 % of students have been listening to PMPs for more than 200 minutes a week and more than 50 % of them on a loud setting. Those students have a worse lifestyle. Tinnitus is also present. This finding is very important and needs more investigation. This issue was not addressed in the Youth Risk Behavior Surveillance System Survey (YRBSS) or in the other international studies such as HBSC or national studies such as Respect for Health.

In the project The Support of Cardiometabolic Health in 62 high schools (n=2, 629, average age 17.1 ± 1.04 years, 45.8 % boys) in the territory of the Bratislava Self-governing Region (Respect

for Health), focused on similar age groups but more on cardiometabolic risk factors the high prevalence of smoking was found (40.4 % including ex-smokers), significantly more girls. There were significant differences in the length and frequency of mobile phone use and in listening to PMPs, where girls unambiguously dominate [8].

According to a collaborative WHO study *Health Behavior in School-aged Children* (HBSC), which collected data of 11-, 13- and 15-year-old boys and girls from 42 countries in Europe and North America including Slovakia, 46 % school children spend two or three hours daily watching TV. About 40% of schoolchildren devote two hours of their working time to computer games during weekday [9].

According to the latest results of the HBSC study from 2017/2018, which involved almost 9,000 schoolchildren in Slovakia aged 11 to 15, the incidence of smoking and alcohol consumption has a declining trend with a still high incidence, which can be at least partially attributed to changes in the social environment. It could be related to widespread online communication. About a third of schoolchildren (29–30%) and two-fifths of girls (37–38%) said they were told they used their cell phones more often than they should. Nearly 40% of schoolchildren (37-39%) said they use mobile phones to make them feel better [4].

In the Spanish study, the excessive use of mobile phones and tablets in adolescents was associated with sleep disorders [10]. In our study, more than 31.9% of students do not sleep long enough (less than 7 hours Monday through Friday). During weekends, students sleep much longer (96.6% of students sleep seven hours or more). Students listening to PMPs more than 200 minutes a week during the working week slept significantly less ($p = 0.009$; OR 1.74 (95% IS 1.15-2.64). Older students, students from vocational schools also slept significantly less. Using a mobile phone more than 200 minutes a week did not have a significant effect on the sleep duration of our respondents during the weekend.

In our previous study on a sample of 1,003 young adults - university students (306 men and 697 women, average age 23.1± 2 years old) living in Bratislava for four and more years, 79.2% reported the use of PMPs in the course of the last week, and the average time was 285 min. Among PMP users 26% exceeded the lower action value (LAV) for industry ($L_{Aeq,8h} = 80$ dB). On a pilot sample of volunteers (n = 41), audiometry testing was performed indicating a hearing threshold shift at higher frequencies in 22% of subjects [11].

Personal music players are now available to everyone in the form of MP3 players or smartphones, and listening to music through PMPs is extremely popular among older and even younger adolescents and young adults. Leisure time activities with high-intensity noise exposure are also very popular as well (rock concerts, discotheques, cinema, sports, etc.). All these activities may be responsible for an early hearing impairment (temporary or permanent hearing threshold shift, hearing loss) starting at a younger age.

Hearing loss of ≥25 dB at one or more frequencies was found in 7.3% among 177 Malaysian PMP users [12]. In a Bavarian group of 9th grade students (n=1,843), the prevalence of audiometric notches was only 2.4% suggesting the need to follow subjects longitudinally [13]. The results of the study in Slovenia showed that nearly 12.4% of students of age 12 to 19 (out of the 1, 635 respondents from elementary and high schools in Slovenia), might be at risk for permanent hearing damage if they persist in their frequent and long-lasting listening of loud music, using PMPs [14].

Conclusion

The results presented in this paper are the pilot results of the YABS project. This is a comprehensive study, based on a combination of two validated studies. Parents are directly involved in the study, which makes challenges for the analysis and for future prevention and intervention. The data from parents will be analyzed and paired with students. The interesting results are expected and intervention proposals suggested in the future. The study presents a challenge for the analysis and for future prevention as well as intervention activities to protect and promote the health of children and youth. After summarization of the study results, we will formulate the proposals and interventional procedures and effectively target the preventive measures in the vulnerable groups of adolescents, their parents, and teachers as well.

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