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Does Physical Activity Protect Adolescents against Risk Behaviour?

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Abstract

The aim of this work is an evaluation of the relation between risk behaviour of adolescents (bad eating habits, sedentary behaviour and abuse of psychoactive substances and stimulants) and fulfilling pro-health recommendations related with physical activity. The survey study was conducted in 2016 in Warsaw middle and high schools among 609 students using standardised international tools. World Health Organisation recommendations concerning pro-health physical activity level are met only by 24.2% of surveyed teenagers. Physical activity is a factor protecting teenagers from sitting for over 2 hours a day and bad eating habits. Prophylactic programs should consider promotion of physical activity.

Keywords: *physical activity, IPAQ, adolescents, sedentary behaviour, eating habits, psychoactive substances, WHO*

Introduction

Risk behaviour such as smoking, taking drugs, eating junk food or sedentary life style (Razende et al., 2014) – raise fears over public health of adolescents (Tabak et al., 2015). Despite being typical during juvenescence (Lavery and Siegel, 1993), they lead to serious health, psychological and social consequences (CDCP, 2001). They increase the risk of illnesses, disorders, accidents and injuries (Ponczek and

Olszowy, 2012), result in mental problems (Brettschneider and Naul, 2004, Kaess et al., 2014), and often in breaking the law (McWhirter et al., 2001).

Researchers wonder whether physical activity (PA) can limit such behaviour, be a counterweight for it. There is a clear influence of PA on smoking marihuana (Tabak et al., 2015; Delisle et al., 2010) and taking other psychoactive drugs (Werch et al., 2005). Pro-health behaviour is more often observed among physically active adolescents (Ali et al., 2015; Szczerbiński et al., 2010). The sporting activity is positively correlated with healthy nutrition (Brettschneider and Naul, 2004), a coexistence of high PA and limitation of screen time is a factor protecting against overweight and obesity (McMillan et al., 2015). On the other hand, excessive eating is positively correlated with physical inactivity and sedentariness (Raithel, 2002) and a passive way of spending free time predisposes to taking psychoactive substances (mainly alcohol); (Peltzer, 2010).

However, not all results are so unequivocal. According to the meta-analysis conducted by Lish and Sussman (2010), among 15 studies devoted to smoking, 14 was positively correlated with PA, but only in 9 of 16 studies analysing drug abuse, there was a negative relationship between sport activity and taking psychoactive substances. A similar observation was made in the case of drinking alcohol, as a negative correlation was stated only in 2 of 34 reports. Also Mazur et al. (2014) revealed that increasing PA during adolescence is not always related to a decrease in the use of psychoactive substances, and Marshall et al. (2002) pointed out a lack of relation between media use and PA.

Despite these ambiguous reports, one fact is unquestioned, namely, that each counteraction risk behaviour translates into tangible benefits and that popularisation of PA can be a healthy substitute of such behaviour , e.g., in the form of enabling self-esteem development, acceptance among peers as well as mental well-being (Guszkowska, 2005). Thus, the aim of this study is an evaluation of the relationship between risk behaviour of adolescents (bad eating habits, sedentary behaviour and abuse of psychoactive substances and stimulants) and fulfilling pro-health recommendations related to PA. Monitoring of this phenomenon and considering it at various levels of education (middle school, secondary technical school, and high school) can explain numerous issues and support the quality and efficiency of interventional and preventive programs.

Research Methodology

The study was conducted in 2016 in Warsaw middle and high schools (3 middle schools, 3 secondary technical schools and 3 high schools) – randomly selected from the list of schools and educational institutions[1]. The study was conducted among students from grades 1–3 (apart from middle school grade 1, due to the condition of used International Physical Activity Questionnaire (IPAQ), addressed to people aged 15–69). The authors used a random survey (after initial training for teachers realising the project). The level of PA among adolescents was estimated on the basis of a short version of IPAQ (Biernat et al., 2007), while risk behaviour (bad eating habits, sedentary behaviour, abuse of psychoactive substances) with the use of the Health Behaviour in School-aged Children (HBSC) questionnaire (A WHO Collaborative Cross-national Study); (Mazur, 2015).

On the basis of the time and frequency of the declared vigorous (VPA), moderate physical activity (MPA) and walking using IPAQ, the respondents were divided into those meeting (daily MVPA and walking at least 60 min) and not meeting the pro-health activity level recommendations of the World Health Organisation (WHO, 2010).

Bad eating habits meant everyday (during 5 school days) lack of eating breakfast, fruit and vegetables and everyday eating of sweets, drinking soft drinks and having a diet. Sedentary behaviour meant sitting for at least two hours a day (during 5 school days), during watching TV, using a computer or playing video games. Abuse of psychoactive substances and stimulants meant smoking or drinking alcoholic drinks at least once a week or smoking marihuana or hashish at least 1–2 times during last 30 days.

The study was conducted on the sample of 609 students aged 15–19. As 38 respondents refused to participate in the study, the percentage of the questionnaires return was 93.8%. The authors followed the IPAQ Research Committee guidelines on data cleaning and processing (IPAQ, 2005). In the cases of "don't know"/"refused" (n=36) or data missing (n=59), the subjects were removed from further analysis. Outliers were excluded in all the cases where cumulative total time of walking, and the overall MVPA was greater than 960 min. (16 hrs/day) (n=4). Table 1 presents the characteristics of the participants (n=472).

[1] The Education Office in Warsaw, as of 01/09/2015.

Table 1. Characteristics of the sample (n=472)

Type of school, class (age)	Girls (n=230)		Boys (n=242)		Total (n=472)	
	n	%	n	%	n	%
Middle school (n=58)						
II (15)	6	33.3	23	57.5	29	50.0
III (16)	12	66.7	17	42.5	29	50.0
Secondary technical school (n=137)						
I (17)	37	49.3	13	21.0	50	36.5
II (18)	15	20.0	12	19.4	27	19.7
III (19)	23	30.7	37	59.7	60	43.8
High school (n=277)						
I (17)	20	14.6	9	6.4	29	10.5
II (18)	82	59.9	72	51.4	154	55.6
III (19)	35	45.5	59	42.1	94	33.9

Source: own study.

The statistical analyses were run in IBM® SPSS® Statistics, version 21. In order to investigate the differences between the types and duration of physical activities undertaken by Polish adolescents, the Chi^2 test was used ($p<0.05$). Multi-variable logistic regression analysis was performed to find the relationship between positive and negative indicators of health and the amount of exercise (daily MVPA and walking at least 60 min) recommended by WHO (2010). The relationship between physical activity undertaken by Polish youth and the amount of exercise recommended by the WHO was assessed using the log-linear analysis. Strength of the relationship was expressed by the odds ratio (OR) with the 95% confidence interval.

Research Results

Sedentary lifestyle is the greatest problem among the analysed behaviours. As many as 75.2% of the boys and 66.1% of the girls spend time sitting at least 2 hours a day ($Chi^2=4.7$; $p<0.05$), watching TV (63.6 and 60.4%, respectively; NS) and playing video games (52.5 and 18.7%; $Chi^2=58.4$; $p<0.001$).

Bad eating habits, i.e., daily lack of eating breakfast (during 5 school days) was observed among 25.0% of the boys and 23.9% of the girls (NS), fruit – 41.7 and 36.2%, respectively, (Chi^2=3.4; $p<0.05$) and vegetables – 43.2 and 34.5% (Chi^2=12.3; $p<0.001$). On the other hand, 8.3% of the boys and 9.7% of the girls (NS) eat sweets every day, while 9.5 and 8.9%, respectively (NS) drink soft drinks. 14.8% of the respondents follow a diet – more often (Chi^2=13.0; $p<0.0001$) the girls (10.2%), than the boys (4.7%).

Regular smoking, i.e., at least once a week or every day, is observed among 21.9% of the boys and 22.2% of the girls – there is no significant difference between them as far as this issue is concerned (NS). A similar observation concerns smoking marihuana and hashish, at least 1–2 times within last 30 days (10.3 and 13.0%, respectively; NS). Alcohol is drunk at least once a week by 30.2% of the boys and 20.0% of the girls (Chi^2=6.5; $p<0.05$).

The WHO recommendations concerning pro-health physical activity level (60 min/day MVPA) are met only by 24.2% of the surveyed teenagers. However, we have to note that more often (Chi^2=3.3; $p<0.05$) these are girls (27.8%), than boys (20.7%). There are no significant differences in results for various education levels (recommendations are met by 24.1% of the middle school students, 21.9% in the case of technical schools and 25.3% of high schools).

Among the middle school students who meet the WHO recommendations, 20.7% walk, MPA is undertaken by 22.4% and VPA by 22.4%. In the case of secondary technical schools, the results are 19.0; 19.7 and 19.0%, respectively, and for high schools: 24.9; 22.7 and 20.6%, respectively.

An analysis of the odds ratio of meeting PA recommendations (being an active person) depending on the analysed variables (Table 2) revealed significant differences but only in the case of some types of schools and some variables (i.e., the type of activity, sedentary behaviour and eating habits). Active high school students (in comparison to inactive ones) walk more often (nearly 15 times), undertake MPA (nearly 3 times) and VPA (over 2 times).

The adolescents from secondary technical schools who meet the WHO recommendations over twice less often spend over 2 hours watching TV, and physically active teenagers from high schools (over 2 times) and middle schools (nearly 5 times) spend less time using computer.

High physical activity of middle school students decreases their risk of everyday not eating vegetables (over 11 times) and fruit (over 8 times). On the other hand, high PA of high school students decreases the risk of not eating breakfast (nearly twice). Physically active students from secondary technical schools over 3 times less fail to eat fruit.

Table 2. Odds ratio of undertaking pro-health dose of physical activity * (with the 95% confidence interval) vs. analysed variables

Factors	Odds ratio of undertaking pro-health dose of PA* (with the 95% confidence interval) OR (95% CI)		
	Middle school	Secondary technical school	High school
Males	0.5 [0.14–1.74]	0.53 [0.22–1.24]	0.77 [0.45–1.33]
Physical activity			
Walking	0.77 [0.13–4.48]	0.98 [0.29–3.23]	14.61 [1.96–108.69]**
Moderate physical activity	4.33 [0.51–37.0]	1.14 [0.29–4.32]	2.86 [1.23–6.66]**
Vigorous physical activity	3.34 [0.38–29.0]	1.24 [0.38–4.01]	2.45 [1.23–4.85]**
Sedentary behaviour (≥2h/day)			
TV	0.64 [0.16–2.53]	0.41 [0.18–0.93]**	1.1 [0.64–1.92]
Computer	0.21 [0.06–0.77]**	0.62 [0.24–1.6]	0.48 [0.26–0.89]**
Video games	0.75 [0.21–2.69]	0.37 [0.16–0.86]	1.24 [0.66–2.32]
Bad eating habits			
Daily lack of eating breakfast	1.64 [0.47–5.7]	1.04 [0.46–2.33]	0.56 [0.32–0.98]**
Daily lack of eating fruit	0.12 [0.03–0.46]**	0.32 [0.12–0.95]**	1.54 [0.77–3.09]
Daily lack of eating vegetables	0.09 [0.02–0.35]**	0.52 [0.21–1.26]	0.69 [0.37–1.31]
Daily eating sweets	0.94 [0.25–3.56]	0.53 [0.19–1.47]	0.98 [0.48–2.02]
Daily drinking soft drinks	0.83 [0.22–3.2]	1.4 [0.44–4.49]	0.92 [0.46–1.86]
Abuse of psychoactive substances and stimulants			
Smoking cigarettes (≥1 time a week)	1.23 [0.28–5.44]	0.77 [0.27–2.25]	0.83 [0.43–1.6]
Drinking alcohol (≥1 time a week)	0.17 [0.0–3.22]	0.51 [0.18–1.47]	1.16 [0.64–2.09]
Smoking marihuana and hashish (≥1–2 times within last 30 days)	0.49 [0.05–4.44]	0.49 [0.06–4.17]	1.32 [0.63–2.78]

*By persons with a particular factor calculated in relation to other participants; ** Statistically significant $p<0.05$
Source: own study.

Discussion

Potential risks for health of adolescents resulting from their risk behaviour result in the necessity of finding a solution for this difficult situation. The presented study shows that it is a quite serious problem in Warsaw schools. Nearly 70% of the adolescents spend time sitting over 2 hours a day. Nearly ¼ do not eat breakfast and almost 40% do not eat fruit or vegetables. On the other hand, over 20% smoke cigarettes and drink alcohol and over 10% take drugs. What is more, 9% eat sweets and drink soft drinks every day. Some types of behaviour are often characteristic of the boys, e.g., sitting for a long time (using computer, playing video games), not eating fruit or vegetables and using alcohol, and some of the girls, e.g., following diets. There are also some in which there are no differences between the sexes, like watching TV, eating sweets and drinking soft drinks, and smoking cigarettes.

However, it must be noted that the described phenomenon is not different in Warsaw in comparison to other regions of Poland. The nationwide HBSC study shows similar percentage of children aged 15 who smoke cigarettes (15.1%), marihuana (10.9%) and drink alcohol (10.8%) (Mazur, 2014). It presents a comparable fraction of adolescents spending at least 2 hours a day sitting - watching TV (63%), using computer (70.3%) and playing video games (32.5%). Among younger students aged 15–16 (in Poland, third grade of middle school) taking part in "European School Survey Project on Alcohol and Other Drugs" (Sierosławski, 2011), 30% smoke cigarettes, and among older students aged 17–18 (second grade of secondary schools) – nearly 42%. Alcohol is the most popular psychoactive substance among adolescents – the number of teenagers who drink alcohol is twice higher than the number of those who smoke. There are three times fewer users of marihuana than those who drink alcohol. According to HBSC studies, as many as 36.1% of teenagers do not eat breakfast (including 18.4% never eating breakfast) (Mazur, 2014). Over 15% of persons aged 15–18 eat sweets and over 10% drink soft drinks (Mazur, 2014). This problem does not concern only Poland. It is present in the case of adolescents from other European countries (Carli et al., 2013; Kess et al., 2014), America (Grunbaum et al., 2004) and Africa (The South African National Department of Health, 2003).

On the other hand, the WHO recommendations concerning pro-health PA level (60 min/day MVPA) is met only by 24.2% of the surveyed teenagers. Scientists all over the world point to the fact that many young people do not have the minimum dose of PA (Youth risk behaviour surveillance system, 2006). The recommendation is not met by almost a half of young Europeans (EU Physical Activity Guidelines,

2008), e.g., 3 in 10 boys and 4 in 10 girls (aged 5–18) in the United Kingdom (Department of Health, 2003).

However, in the case of the youth from Warsaw, the percentage of those insufficiently active is significantly higher – nearly 80%, regardless of the type of school – middle school, high school or secondary technical school. Thus, such a phenomenon is noted at each education level. Considering the above, what do students do during physical education (PE) classes? Do not they have other extracurricular classes? All of that indicates a significant lack in the educational system and parent care. School education is expected to exert a definitely larger influence on the physical education of the youth (in qualitative and quantitative aspects, during classes as well as in leisure time). Parents should be aware that PA of their children cannot be limited to 3 hours of PE classes per week and that it is a too small dose to provide good health (no to mention proper development) and that a lack of PA is also a risk behaviour.

However, the subject of our study is whether undertaking of PA (at the recommended level) can be supportive in limiting risk behaviour of adolescents living in Warsaw. Existing research shows that it is possible in many cases, however, the results are not always unequivocal (Lisha, & Sussman, 2010; Farb, & Matjasko, 2012). Physically active youth rarely uses psychoactive substances and is more often engaged in various pro-health behaviour (Pate et al., 2000; Ali et al., 2015; Szczerbiński et al., 2010). Our research studies show that such a relationship is observed only in the case of long sitting watching TV and using computer and in the case of bad eating habits. In the case of physically active high school students, the risk of not eating breakfast is nearly twice smaller and long-lasting sitting using computer (over 2 hours a day) is over twice lower. Active adolescents from middle school, in comparison to their inactive schoolmates, sit using computer 5 times less often, as well as more rarely do not eat vegetables (over 11 times) and fruit (over 8 times). In the case of active teenagers from secondary technical schools, there is a lesser risk of long-lasting sitting watching TV (over twice) and not eating fruit (over 3 times).

However, there was no stated relationship between meeting pro-health recommendations on PA and using psychoactive substances and stimulants. Different conclusions were presented by other authors (Farb, & Matjasko, 2012; Lorente et al., 2004). Dunn (2014) proves that participation in sport activities might be a factor attenuating the risk of alcohol consumption. Tabak et al. (2015) made an attempt to show that PA is a factor protecting Polish adolescents against smoking cigarettes and marihuana, but in general only among boys. In the case of alcohol, similarly as in our group, no significant correlation was revealed. However, according to Mazur

et al. (2014), relations between a favourable pro-health behaviour (such as PA) and a risk behaviour (like using psychoactive substances) can also depend on cultural factors. This leads to a statement that achieving a straight correlation between PA and using psychoactive substances may be difficult. This fact seems to explain differences in various research results (Delisle et al., 2010).

Thus, future analyses should take more factors modifying this relation into account. It may be also worth considerind motives for risk behaviour and perception of resulting threats (Kuntsche et al., 2006).

Conclusions

Frequent risk behaviour and a lack of PA among Warsaw adolescents clearly indicate an urgent necessity of a system approach to popularisation of health, including an active lifestyle. It seems unavoidable to combine the lesson content of biology, anatomy and hygiene with physical education. And within this framework, the knowledge about the functioning of the human body and maintaining its functions through prevention activity should be provided. The previous Polish research shows that despite the implemention of the reform program, extracurricular and after-school PA is not at a satisfactory level, and youth represents a very low level of knowledge about healthy behaviors and prevention actvities (Jurczak & Jaworski, 2005). Physical activity is a factor protecting teenagers against sitting for over 2 hours a day and bad eating habits. This means that prophylaxis programs aimed at limitation of a sedentary lifestyle and a change of eating habits should consider promotion of PA. It is also essential to focus more PE lessons at schools and development of interesting sport and recreation offers, encouraging young people to engage in active forms of spending free time. It is also necessary to raise the awareness of adolscents by transferring the knowledge on healthy eating and the consequences of risk behavior for the functioning of the body during obligatory classes for students.

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