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School physical activity policies and active transport to school among pupils in the Czech Republic

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ABSTRACT

Background: Previous studies indicate that the level of physical activity (PA) significantly affects children's health. Active transport to school is PA on a daily basis that may contribute substantially to the overall volume of moderate to vigorous physical activity (MVPA). Aim of our study was to explore whether schools' health promotion and PA-related policies are associated with active commuting in 15-years-old girls and boys actively commuting to and from school and whether gender differences on active commuting exist.

Methods: Students in 9th grades (N = 1522; mean age 15 years; 47.7% boys) from the Czech Republic were enrolled. The active transport of adolescents was self-reported within the Health Behavior in School-aged Children survey in the year 2010. Data about school polices were obtained from the school-level questionnaire which was responded to by school principals. Associations between active transport and school health or PA policies were calculated by logistic regression.

Results: We found that adolescents actively commuted more often (OR/95%-CI: 3.43/1.87–6.27 [girls]; 2,87/1.46–5.642 [boys]) in schools which promote students' walking and cycling to or from school. Adolescents from schools that are planning an implementation of health promotion reported even higher levels of use of active transport (OR/95%-CI: 5.32/2.38–11.92 [girls]; 4.54/2.01–10.24 [boys]). The association was stronger in boys compared to girls.

Conclusion: School policies and programs promoting active transport to and from schools in the Czech Republic contribute to the use of active transport and should be widely implemented. Gender-sensitive approaches should also be taken into account.

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1. Introduction

The level of physical activity (PA) significantly affects the health of young people, improves the cardiovascular metabolic risk, and contributes to an optimal physical and cognitive development (Andersen et al., 2006, 2011a, 2011b). According to the recommendations for health-enhancing PA levels, adolescents should reach at least a minimum of a daily 60 min of moderate vigorous physical activity (MVPA) (World Health Organization, 2010).

Meeting the MVPA recommendation can be achieved by different types of PA in different contexts (e.g. organized leisure time, active play with friends). However, a large proportion of children are physically active for less than 60 min a day (Kalman et al., 2015). Active transport is a promising approach that can significantly help to achieve the recommended level of 60 min of MVPA a day (Carver et al., 2011) and it is easy to integrate into daily life. Active transport is most often defined as walking, cycling, or other human-powered modes of transport used for practical purposes of getting from one place to another in everyday life (Sallis et al., 2004). Active transport (walking or cycling) to or from school may contribute to the overall volume of MVPA by 33% in both boys and girls (Southward et al., 2012). Active transport also improves the development of motor skills in children (Davis and Jones, 1996), as well as cognitive performance in adolescent girls (Martínez-Gómez et al., 2011). Active transport is also associated with better cardiovascular health and lower body weight (Larouche et al., 2014; Xu et al., 2013). Active commuters are also more physically active in non-curricular physical activity than non-active commuters (Faulkner et al., 2009). Social benefits of active transport were also frequently reported in children because it provides a good opportunity to meet and spend time with friends; there is the chance to talk to them or even to make new friends (Kirby and Inchley, 2013).

If differences between countries are taken into account, the prevalence of active transport between countries varies considerably. For example, in the Netherlands almost 50% of adolescents reported active commuting to school on most school days because there is a widespread active commuting on bicycle and this way of transport is also part of the culture in the Netherlands (Bere et al., 2008). A high prevalence of active transport to school is present in Switzerland (78%), because schools are easily accessible from homes by walking or cycling (Bringolf-Isler et al., 2008). Almost two-thirds of adolescents actively commuted to school in Estonia and Sweden (Chillón et al., 2010). However, less than 20% of the 15-year-old adolescents in Australia did so (Booth et al., 2007). Reasons are bigger distances between schools and their homes. Almost 65% of Czech school-aged children aged 11 to 15 commute to school on foot or by bicycle (Pavelka et al., 2012).

Some studies showed that PA in various forms, such as active transport, as well as the lessons of physical education and organized leisure-time sport, has decreased (Hallal et al., 2012; Patel et al., 2010). The reasons for the decreasing level of PA can generally be noticed in higher urbanization-related car-dependent town planning (Katzmarzyk and Mason, 2009). Lower levels of safety (traffic, few pedestrians and bicycle paths) and/or greater environmental pollution also contribute to the decreasing level of PA (De Vet et al., 2011; Durand et al., 2011). Strategies to promote active transport should take the determinants of active transport from different socio-ecological levels (individual and physical environmental factors) into account to support more children in walking or cycling to school. Within the environmental level of influence PA-related school policies might be important to promote active commuting to and from school but this determinant was rarely examined (Panter et al., 2008). Schools have direct contact with students for approximately six hours each day and for up to 13 critical years of their social, psychological, physical, and intellectual development (Miller et al., 2009). However, only a minority of elementary schools have integrated PA as a health policy theme in all grades (Cardon et al., 2012).

Taking the current body of literature into account, we identified programs that encourage active transport worldwide by applying strategies such as a walking school bus, the Safe Routes to School program, or the Gold Medal Schools program (Chillon et al., 2011). Government of the Czech Republic supports the National Strategy Health 2020 which is part of European health policy framework Health 2020 in 2014. This should implement a mechanism to improve health and healthy behavior of the Czech population. Since 1994 the Czech Republic is part of Healthy Cities 21st Century project. Goal of this project is to improve and support quality of life in municipalities. The Czech Republic is one of the 43 members of the European network Schools for Health in Europe since 1993 also. The program helps schools to apply the above-mentioned strategy and to create conditions to promote health. In contrast, evidence for PA-related policies which takes into account such factors as personal, social and environmental is low (Heath et al., 2012). Aim of our study is to explore whether schools' health promotion and PA-related policies (rule and support for active commuting) are associated or related with active commuting in 15-years-old girls and boys actively commuting to and from school and also whether gender differences on active commuting exist.

2. Material and methods

For 30 years, the Health Behavior in School-aged Children (HBSC) study has been a pioneer cross-national study gaining insight into young people's well-being, health behaviors and their social context. This research collaboration with the WHO Regional Office for Europe is conducted every four years in 45 countries and regions across Europe and North America. With adolescents making about one sixth of the world's population, the HBSC-study uses its findings to inform policy and practice to improve the lives of millions of young people. The data used in the present study are based on the 2009/2010 Czech national HBSC survey. HBSC focuses on a wide range of health, education, social, and family measures affecting young people's health and well-being in students aged 11, 13, and 15 years old. For the purpose of the survey HBSC uses an internationally accepted questionnaire. HBSC has been conducted under the auspices of the WHO every four years since 1983 Schools that support or promote children's walking and cycling were assessed by the School Level Questionnaire (SLQ), which was also used and validated in the 2010 HBSC survey. The SLQ asked questions to the teacher and was used in all the schools participating in the data collection related to the children's questionnaire on

transportation.

2.1. Sample

The sample was based on a random sampling procedure of schools in the Czech Republic, 86 schools from all 14 regions of the Czech Republic were randomly chosen as being representative in accordance with the international HBSC protocol (Currie et al., 2012). We registered 6553 students, of whom 5709 took part (none of them refused to participate in the study); 844 pupils were absent. After a visual screening of the questionnaires we excluded 23 of them because of a lack of credibility. The total data set contained 5284 questionnaires. For the purpose of this study only adolescents aged 15 years (n = 1522) were analyzed. Children in younger age are mainly transported or accompanied to the school by parents. The study sample was fairly evenly divided by gender (47.7% boys, 52.3% girls).

For this study, we used two HBSC sources. First, the HBSC survey used questionnaires for adolescents which were collected by a trained researcher and research assistants in June 2010. The set of questionnaires was administered during a regular 45-minute lesson on a voluntary and anonymous basis and in the absence of the teacher. 86 elementary schools participated in the study. The overall response rate was 87%. Non-response was due to illness or other types of absence from school. The total data set contained 5284 questionnaires.

The second source was based on the SLQ, which was collected in February and March 2012 and completed by the school principal. The overall response rate for the SLQ was 92.4%. All of the questions used in the HBSC have shown evidence of reliability and validity (Roberts et al., 2009). Since items were used in multiple countries all the questionnaires used in this study also underwent the process of forward and backward translation to ensure that the language versions used in this study measured the same construct as the original language version (Currie et al., 2012).

2.2. Measures

2.2.1. Individual level

Children's transport was assessed using questions validated in the HBSC survey in 2010: ‘On a typical day is the main part of your journey to school made by…?’ and ‘On a typical day is the main part of your journey from school made by…?’ with the possible answers (1) Walking; (2) Bicycle; (3) Bus, train, tram, underground, or boat; (4) Car, motorcycle, or moped; (5) Other means. We dichotomized the responses by categorizing children walking and cycling to and from school vs. children not using active transport. The latter was used as the reference category in the logistic regression analyses.

2.2.2. School level

The school policies related to active transport were assessed by the following items: ‘Does your school support or promote students’ walking or cycling?’; ‘Does your school mission statement explicitly contain the topics health and health promotion?’; ‘Do you have a plan for the implementation of the aims for health promotion at your school?’; ‘Does your school focus on fostering a positive attitude towards physical activity?’, with the possible response categories (1) Yes or (0) No. Further items were: ‘Is your school a member of a health-promoting school network?’, with the response categories (1) Yes, currently; (2) Yes, previously; (3) No. We dichotomized this question for the binary regression into two categories, 1 = Yes, currently or previously; 0 = No. ‘Does your school inform parents about the importance of regular physical activity for their health and the health of their child?’, with the answering categories (1) Yes, regularly; (2) Yes, from time to time; (3) No. We also dichotomized this question into two possible answers, 1 = Yes, our school informs parents; 0 = No. (Table 1).

2.3. Statistical analyses

Descriptive analyses for boys and girls separately were performed as the first step. Second, binary regression with the Enter method was used to explore the association between schools which promote or support forms of active transport and children's active transport for boys and girls separately. The dependent variable was active transport to and from school, i.e. a journey to and from school on foot or by bicycle (1 = yes, 0 = active transport not used). The independent variables were as follows – schools which support or promote students’ walking or cycling to and from school; the school mission statement explicitly contains the topics health and health promotion; a plan for the implementation of the aims for health promotion at the school exists; the school focuses on fostering a positive attitude towards physical activity; the school is a member of a health-promoting school network; the school informs parents about the importance of PA for their health and the health of their child; the school has a policy of creating a supportive school environment and new opportunities for PA. We tested co-linearity of independent variable before regression analysis. Statistical analyses were performed using the Statistica software, v. 10 and IBM SPSS v. 21. Comparing the percentages was performed in Statistica CZ. Further analyses were performed using IBM SPSS version 21. Statistical significance was set at 0.05.

3. Results

Table 2 shows the descriptive statistics of the study sample. The boys walked to and from school more often compared to the girls. The girls used public transport to and from school significantly more often compared to the boys. The frequency of traveling to school is higher than that from school for both genders.

Table 1
Descriptive statistics of the study sample on students' active transportation behavior by gender (%).

	Boys n = 726	Girls n = 796	p-value
N	47.7	52.3	ns
School in same place			
Yes	72.3	76.3	ns
No	27.7	23.7	ns
How long does it take to travel to school			
less than 5 min	24.6	18.9	ns
6–15 min	49.0	46.0	ns
16–30 min	20.7	24.5	ns
31 min to 1 h	4.7	9.6	ns
More than 1 h	1.1	1.0	ns
Journey to school			
Walking	59.4	50.8	*
Bicycle	1.1	2.6	ns
Bus, train, underground	27.4	35.7	*
Car, motorcycle	11.4	10.3	*
Other means	0.7	0.5	*
Journey from school			
Walking	60.7	56.0	*
Bicycle	3.1	1.3	ns
Bus, train, underground	30.8	33.0	*
Car, motorcycle	4.7	9.2	*
Other means	0.7	0.4	*

Notes: * $p < 0.05$; ns – not significant.

Table 2
Association between school-related policies and active travel to and from school by gender.

Variable	Boys		Girls	
	OR	CI	OR	CI
School promotes students' walking or cycling				
No	1	Ref.	1	Ref.
Yes	2.87*	1.46–5.642	3.43**	1.87–6.27
School mission statement contains health topics				
No	1	Ref.	1	Ref.
Yes	0.16	0.04–0.61	0.83	0.36–1.93
Plan for implementation of the aims for health promotion				
No	1	Ref.	1	Ref.
Yes	4.54**	2.01–10.24	5.32**	2.38–11.92
Promoting a positive attitude towards PA				
No	1	Ref.	1	Ref.
Yes	0.94	0.17–5.05	2.55	0.34–18.74
Member of a health-promoting school network				
No	1	Ref.	1	Ref.
Yes	0.93	0.52–1.65	2.66*	1.44–4.93
Informing parents about the importance of PA				
No	1	Ref.	1	Ref.
Yes	4.84*	1.18–19.7	1.20	0.26–5.49

Notes: respondents who indicated using active transport to school or from school in the selected category OR – odds ratio; (CI 95%) – confidence interval; * $p < 0.05$, ** $p < 0.01$; Nagelkerke $R^2 = 0.184$ Boys; $R^2 = 0.198$ Girls.

Table 3 presents the results from the logistic regression analyses. We found that the likelihood of active transport to and from school at schools which promote students' walking and cycling (like pedestrian crossings with supervision, illuminated sidewalks, sheltered bicycle storage areas) is significantly higher for boys (OR/CI: 2.87/1.46–5.64) and for girls (OR/CI: 3.43/1.87–6.27); 63.7% of the schools supported students' walking and cycling to school or from school. The likelihood of active transport was significantly higher in schools which have a plan for the implementation of the aims for health promotion (either written or oral rules or recommendations) both in boys (OR/CI: 4.54/2.01–10.24) and girls (OR/CI: 5.32/2.38–11.92). In schools that are members of a health-promoting network girls had a higher probability of using active transport. In schools that inform parents about the importance of PA boys had a significantly higher likelihood of using active transport. We checked co-linearity also. The correlation coefficient between variables plan for implementation of the aims for health promotion and informing parents about the importance of PA was 0.114.

4. Discussion

The aim of our study was to verify whether the health promotion or PA-related policies of schools are reflected in 15-year-old girls and boys actively commuting to and from school. Almost half of the adolescents in our study reported that traveling to school takes between six to fifteen minutes. The boys walked to and from school significantly more often compared to the girls. The girls used public transport to and from school significantly more often compared to the boys. Active transport was significantly higher in schools which have a plan for the implementation of the aims for health promotion for boys and girls. In schools that were members of a health-promoting network the girls had a higher probability of using active transport. In schools that informed parents about the importance of PA the boys had a significantly higher likelihood of using active transport.

We found that the boys walked to and from school more often compared to the girls. However, when related to school PA-related policies the girls were more active commuters than the boys. Boys were more likely to be physically active than girls in previous studies (Baquet et al., 2014; Spencer et al., 2015). McDonald (2012) suggested that in general boys are more likely to walk to and from school than girls. They also found that boys cycle to and from school two to three times more frequently than girls. McDonald (2012) predicted that the reasons for the greater level of participation of boys in active transport depends on the increased likelihood of their parents granting permission for independent walking and cycling compared to girls of the same age. However, there are several factors that affect active transport and the overall level of PA. The most important are travel time, distance, the degree of urbanization (Kemperman and Timmermans, 2014), personal safety, weather conditions (Kirby and Inchley, 2013), and also walkability (Christiansen et al., 2014). Kirby and Inchley (2013) also mentioned physical discomfort, particularly feelings of tiredness and having to carry heavy school bags, or just the laziness of secondary students as being deterrents to active travel.

We found that a school's membership of a health promotion network is associated with active transport among girls; they use active transport almost three times more in schools that are members of such a network. Boys seem to be more active in general (Baquet et al., 2014; Spencer et al., 2015). However, our results show that girls are more susceptible to policy interventions and physical activity. Our results are consistent with the study of Tjomsland et al. (2014), who stated that membership of a school health promotion network helps schools to implement health and physical activity policies. School health policies are also widely connected with other interventions, such as physical education, classroom activities, and after-school sports. These activities, together with active transport, will increase the level of adolescents' MVPA (Heath et al., 2012). Policies and interventions such as the Walk to School program in the USA (Vaughn et al., 2009), children walking to school in Italy (World Health Organization, 2002), or Living Streets in the United Kingdom (Adams et al., 2012) seem to be effective programs to increase the level of active commuting to school. The Living Streets program also reports on the health outcomes of active commuting (Sinnett and Powell, 2012). The Walk to School program had a positive impact on policy changes and improvements to the physical environment (Vaughn et al., 2009). Two other programs, Safe Routes to School (DiMaggio et al., 2016) and the Walking School Bus (Mendoza et al., 2012), have limited evaluations, but these activities are viewed positively by parents and schools and also have a positive effect on the level of children's active commuting (Davison et al., 2008).

4.1. Strengths and limitations

Our study has several strengths. The most important are the large national sample which was included in the study and its high response rate. We used data from a standardized questionnaire used for the national data collection of the HBSC study. Our survey has some limitations as well. One is the reliance on only child's self-reporting about their journey to and from school and the level of confidence in correct answers from the school-level questionnaire. Potential confounders may be the size a of village where schools are located, economic factors and social desirability. A third limitation is the cross-sectional design of the HBSC study, which does not allow us to draw firm conclusions about the causal pathway. The study focuses only on a national sample from the Czech Republic; results in other countries could be different; however, we can expect similar results in other Central European countries thanks to the similar political and economic background.

4.2. Recommendations

We found that school policies were positively associated with active transport. Theoretically, school policies have a positive effect on a healthy lifestyle and should be widely implemented. Also, ensuring the safety of active transport to school is crucial although the issue of supporting physical activity and a healthy lifestyle is more complicated. Further studies should focus on the pathway between physical activity and health, and within the framework also on barriers in schools and reasons why policies are not extended to all schools.

5. Conclusion

We found that school policies are an effective tool to support PA and active transport to or from school (Dobbins et al., 2013; Morton et al., 2016). School policies stimulated PA and increased children's active behavior, especially walking and cycling to school in both boys and girls. PA policies had a positive impact on both genders, although more on boys (Biddle et al., 2014; Martínez-Vizcaíno et al., 2014). Every school should promote walking or cycling to and from school and they should also create and implement plans for health promotion like some European schools are doing already (Leurs et al., 2005; Mura et al., 2015). Children have a greater chance to use active transport in elementary schools that have written policies for promoting PA (Brown et al., 2013;

Drenowatz et al., 2013; Kriemler et al., 2011). We recommend to every school to have an official policy in place that promotes health and physical activity through active commuting.

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