

TRENDS IN MEDICALLY ATTENDED INJURIES IN CZECH ADOLESCENTS

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SUMMARY

Objective: Due to the importance of surveillance of injuries and accidents in the Czech Republic, the purpose of this study was to report the temporal trends of injuries of Czech adolescents between 2002 and 2014.

Methods: Adolescents (N = 20,038) from the Czech Republic, that took part in the 2002, 2006, 2010 and 2014 HBSC study, reported the frequency of medically attended injuries in the past 12 months. Repeated binary logistic regressions with different years as reference categories were performed.

Results: Less than half (44.7%) of all Czech adolescents reported they had experienced at least one medically attended injuries in the past 12 months, with boys experiencing more injuries than girls ($p < 0.001$), and the injuries were more common in older adolescents. Fewer boys reported injury in 2014 when compared to 2002 (OR, CI: 0.81, 0.72–0.90), there was also a significant decrease in injuries among girls between 2014 and 2006 (OR, CI: 0.77, 0.69–0.86).

Conclusions: The trend was not linear amongst boys. Along with improved safety promotion education, the rate of injuries decreased among adolescents between the years 2002 and 2014.

Key words: safety promotion, injury prevention, HBSC, trend

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INTRODUCTION

Injury is a serious public health concern. The World Health Organization (WHO) estimates that the cause of death in 36% of young adolescents were injuries (1). Non-life threatening injuries may have short or long-term effects on health, which may also lead to disabilities. Reduced life expectancies and lower number of school days are commonly associated with injuries that require medical attention (2). National records solely on injuries have not been available in the European Commission Injury Database, making comparisons to other EU countries difficult. Recent reports in European countries have indicated that 41% of children report at least one medically attended injury in the past 12 months (3).

However, according to the national register, the number of hospitalisations as a result of injuries of children aged between 10–14 years old decreased from 5,761 in 2008 to 3,228 in 2012 (4, 5). These figures demonstrate the burden on national health systems with 32.7% of hospitalisations for injuries requiring operations (4).

From the main public health perspectives, effective strategies towards injuries are based on prevention (6). To prevent injuries, it is important to carry out surveillance of injuries before identifying risk factors. Only then can the development and evaluation of interventions take place before the implementation of public health injury prevention. Behavioural risk factors for injury

include: alcohol consumption, fighting, sports participation, and other multiple risk behaviours (7–9). Czech adolescents have one of the highest rates of reporting one medically attended injury when compared to other European and North American countries (8), however, fewer adolescents report more than one injury in the past year, bringing the overall injury rates in the Czech Republic to below the median.

As proposed by Valent and colleagues (6), surveillance is important to see how injury prevention programmes are working. Therefore, the purpose of this study was to report the temporal trends of injuries of Czech adolescents between 2002 and 2014.

MATERIALS AND METHODS

Participants

In the spring of 2002, 2006, 2010 and 2014, randomised selection of schools from all 14 regions of the Czech Republic was chosen to create a representative sample. The school response rates were 93.5%, 95.6%, 94.5% and 99.5% in the respective years. Using the international Health Behaviour in School-aged Children (HBSC) study protocol, only one class from one grade per school was selected randomly to fulfil the necessary quota for a national representative sample. Pupils in that selected class used

up one class period, lasting 45 minutes, and completed the HBSC survey with teacher or trained researcher present (when teacher was absent). Pupils that were absent during that period did not complete the survey, therefore, the overall pupil response rates were 88.8%, 88.5%, 87% and 89.2% in the respective years. The final sample consisted of 20,038 adolescents (Table 1). The study was performed according to the ethical requirements formulated by the Convention on Human Rights and Biomedicine and under the principles of the Helsinki Declaration. The study in the Czech Republic was approved by the Ministry of Health and the National Institute of Public Health in each year of survey data collection.

Medically Attended Injuries

Measures of medically attended injuries included the question: "How many times during the past 12 months have you been injured so that you have been treated by a doctor or a nurse?" Responses included: I have not been injured over the last 12 months; once; twice; three times; four or more times. The responses were dichotomised between the following: have not been injured (none) and at least one medically attended injury (once, twice, three, four or more) for multiple binominal logistic regression analysis.

Statistical Analyses

Descriptive statistics were performed to identify an overview of incidences of injuries. Differences of injury rates by age were conducted using one way ANOVA with post-hoc tests. Repeated binary logistic regression with different years as reference categories were also performed. In other words, the reference category was 2002 when all years were included. When 2006 was the reference category, data from 2002 was omitted. Finally, when 2010 was the reference, data from 2002 and 2006 was omitted. Analyses were controlled for gender and age. SPSS 22.0 was used for statistical analysis.

RESULTS

Less than half (44.7%) of all Czech adolescents surveyed between 2002, 2006, 2010 and 2014 (total number 20,038) reported they had experienced at least one medically attended injuries in the past 12 months of completing the survey (Table 1). More boys (48.2%) reported at least one injury than girls (41.2%) ($t=9.943, p<0.001$). In addition, there was a general pattern that the prevalence of at least one injury increased with age categories ($F=15.6, p<0.001$). Post hoc tests reveal statistically significant differences between 11- and 13- as well as 11- and 15-year olds. However, the differences between 13 and 15 year olds were not statistically significant.

More adolescents in 2006 (48.2%) reported medically attended injuries than the other data collection periods. Fewer adolescents in 2010 (47.5%) reported at least one medically attended injury, although it was not statistically significant from the prevalence in 2006. The least amount of adolescents that reported medically attended injuries were in 2002 (43.4%) and in 2014 (40.7%). Despite this, the overall rate of medically attended injuries has reduced from 2002 (Fig. 1).

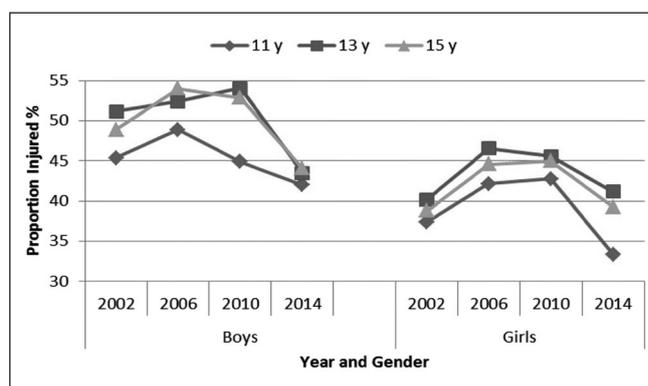


Fig. 1. Frequencies of medically attended injuries by gender and age categories.

Table 1. Study characteristics (N=20,038)

	Survey year									
	2002		2006		2010		2014		Trend	Total
	n	%	n	%	n	%	n	%		
Gender	5,012		4,782		4,425		5,819		20,038	
Boy	2,412	48.1	2,416	50.5	2,145	48.5	2,843	48.9	9,816	49.0
Girl	2,600	51.9	2,366	49.5	2,280	51.5	2,976	51.1	10,222	51.0
Age category										
11	1,691	33.7	1,509	31.6	1,426	32.4	1,790	30.9	6,416	32.1
13	1,661	33.1	1,601	33.5	1,456	33.1	1,985	34.3	6,703	33.6
15	1,660	33.1	1,665	34.9	1,522	34.6	2,013	34.8	6,860	34.3
Times injured										
Not last 12 months	2,825	56.6	2,454	51.8	2,275	52.5	3,443	59.3	10,997	55.3
1 time	1,392	27.9	1,385	29.2	1,220	28.2	1,351	23.3	5,348	26.9
2 times	417	8.4	516	10.9	463	10.7	568	9.8	1,964	9.9
3 times	196	3.9	209	4.4	218	5.0	227	3.9	850	4.3
4 times or more	162	3.2	177	3.7	155	3.6	216	3.7	710	3.6

Between 2002 and 2006, there was an increase in reported injuries, in particularly in girls with two or more injuries (age category, 2002 vs. 2006; 11-years: 11.8% vs. 15.0%; 13-years 12.4% vs. 18.7%; 15-years 13.9% vs. 17.6%). In the periods after that, between 2006 and 2014, the most significant increase was in the groups of adolescents (boys and girls, and across the three age groups), who reported no medically attended injuries (2006 vs. 2014; 51.8% vs. 59.3%).

Table 2 presents the adjusted odds ratios with different years as reference points. In 2014, less boys reported one more injury when compared to 2002 (OR, CI: 0.81, 0.72–0.90), with 2006 (OR, CI: 0.74, 0.66–0.83) and with 2010 (OR, CI: 0.74, 0.66–0.83). With girls, the odds, for at least one medically attended injury, was not significantly different in 2014 and 2002 (OR, CI: 0.97, 0.87–1.08), although there was a decrease between 2006 and 2002 (OR, CI: 0.77, 0.69–0.86), as well as 2010 and 2002 (OR, CI: 0.77, 0.69–0.86). In each model, more 13- and 15-year olds reported injuries than 11-year olds.

DISCUSSION

This study examined the trends of medically attended injuries among adolescents in the Czech Republic between 2002 and 2014. The main results reveal that between 2002 and 2014 there is a reduction in the number of adolescent boys that reported medically attended injuries and among girls, a decrease in reported injuries occurred between 2006 and 2014. However, the pattern was not linear. More specifically, in 2006 there was an increase compared to 2002, but since then there has been a decline.

The findings from this study reflect the changes in the reported injuries over time and are similar to other studies that produce surveillance data on injuries. For example, the National Action Plan of Child Accident Prevention 2007–2017 reported an increase in accidents between 2002–2005, of which a quarter were fractures, approximately 30% from sports injuries, 19% from incidents from schools, and 5% from traffic accidents (11). In the International HBSC reports, the average number of adolescents who reported to have been injured at least once or more, ranged from 50.8% (15-years) to 52.9% (13-years) and 51.7% (11-years) in 2001/02 (10), whereas in the 2014 report, overall percentage fell to 42% (15-years), 45% (13-years), and 44% (11-years) (12). When comparing with other countries between 2002 and 2014, adolescents in the Czech Republic were ranked in the lower half in 2001/02 for all three age groups. A change occurred in 2005/6 for 11-year olds (ranked 16/41), 13-year olds (ranked 10/41), and 15-year olds (ranked 5/41) as the rate of injuries increased in the Czech Republic and in the majority of other countries declined (13). According to the 2014 International report (12), the Czech Republic fell in the ranking for 11-year olds (30/42), 13-year olds (25/42), and 15-year olds (15/42), based on the number of adolescents with reported at least one medically attended injury.

In the Czech Republic, the passing of a law in 2001 in which, all minors under the age of 15, and from 2006, for minors under the age of 18, who ride on bicycles, either on their own, or with an adult, are required to wear a safety helmet. Although, this may not have been the direct cause for the reduction in reported injuries between 2006 and 2014, there may have been greater awareness of safety measures to prevent childhood injuries. There is a need

Table 2. Adjusted odds ratio and 95% confidence intervals for trends between 2002 and 2014 on adolescents with at least one medically attended injury in the last 12 months

	Boys						Girls					
	OR	LCI	UCI	OR	LCI	UCI	OR	LCI	UCI	OR	LCI	UCI
2002	Ref.						Ref.					
2006	1.14	1.02	1.28	Ref.			1.27	1.13	1.42	Ref.		
2010	1.09	0.97	1.23	1.05	0.93	1.18	1.26	1.13	1.42	1.00	0.89	1.12
2014	0.81	0.72	0.90	0.74	0.66	0.83	0.97	0.87	1.08	0.77	0.69	0.86
11 years old	Ref.			Ref.			Ref.			Ref.		
13 years old	1.21	1.10	1.34	1.19	1.06	1.34	1.21	1.10	1.34	1.25	1.11	1.40
15 years old	1.20	1.09	1.32	1.21	1.08	1.36	1.14	1.03	1.26	1.17	1.04	1.31

OR – odds ratio; LCI – lower bound 95% confidence interval; UCI – upper bound 95% confidence interval; Ref. – reference group

for a more comprehensive examination of the safety promotion activities to explain the temporal changes in time. In addition, data before 2002 may shed light on the changes in Czech society towards adolescent injuries. In some ways, injury prevention and safety promotion act as synonymous terms, however, there are some slight differences and this has a bearing on the way policy makers respond to the surveillance data.

On the 22nd August 2007, the Czech Government approved the National Action Plan on Child Injury Prevention 2007–2017 as a systematic solution for injury prevention for children aged between 0–19 years. In this action plan, various stakeholders including international organisations in operation within the Czech Republic, as well as major ministries, such as transport, health, education, and labour, all reported their contributions towards better child safety. Furthermore, a strength, weakness, opportunities, and threat analysis was conducted to make Czech a safer place for children (11). Immediate results were visible with a decline in the number of hospitalisations due to injuries and accidents, and the results of this study confirm these reports. In 2012, the availability and affordability of safety promoting equipment such as car seats, floatation devices and smoke alarms were still behind countries in the European Union, however, bike helmets in the Czech Republic were 100% available (14).

Injury prevention is a well known term in health policy, however, a salutogenic approach may suggest the need to use safety promotion methods such as education (15). Even though the changes in the law such as the use of bike helmets have been praised, the challenges of addressing educational means for reducing accidents by falls, drownings and scalds is still a pertinent area for improvement in the Czech Republic (14). In addition, since sports related injuries can range from 30–50% of the medically attended injuries (8, 16), safety promotion in sports training needs to be also covered. This could range from training programs that aim to improve physical conditioning to an array of studies that explore rule modifications to enhance the safety aspects of the game (17).

CONCLUSION

The rate of medically attended injuries among adolescents in the Czech Republic was lower among boys in 2014 than in 2002, and among girls between 2014 and 2006. Among boys, the trend was not linear. During these years, a national level action plan has been devised to reinforce the multi-level stakeholders to act on and improve safety among Czech adolescents.

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Conflict of Interests

None declared

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