

# TRENDS IN CHILDREN'S TOOTHBRUSHING IN THE CZECH REPUBLIC FROM 1994 TO 2014: RESULTS OF THE HBSC STUDY

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## SUMMARY

**Objective:** Brushing one's teeth twice a day is the main self-care method to prevent the most prevalent non-communicable diseases. The aim of the study is to describe the trends in brushing teeth in 11-, 13-, and 15-year-old Czech children between 1994 and 2014.

**Methods:** One question about oral health from the HBSC study protocol was used in the six surveys (1994, 1998, 2002, 2006, 2010, and 2014). Altogether, 21,170 answers from boys and girls were analyzed using statistical description and binominal logistic regression.

**Results:** The findings showed that the prevalence of brushing their teeth more than once a day increased throughout the twenty years, more so in boys, but a preventive programme is still needed to educate the 21–38% of those who brush their teeth less than twice a day.

**Conclusion:** Although the recommended frequency of brushing their teeth has increased among Czech school-aged children, it still lags far behind the recommended twice-a-day regularity, especially among boys.

**Key words:** habits, brushing teeth, oral health, dental care, schoolchildren

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## INTRODUCTION

Dental hygiene and oral health are a key element of general health and well-being (1). Oral diseases are very common throughout the world, causing pain and discomfort and reducing the quality of life. In addition, their treatment costs considerable amounts of money every year (2). The most common oral diseases, caries and periodontal diseases could be prevented by the adoption of healthy behaviours (3).

Such healthy behaviours are commonly adopted during childhood and adolescence and the main influence comes from the family. In particular, dental care should begin and become regular when a child's first tooth appears. A child has to get used to touching and cleaning the mouth as soon as possible. During the learning of this self-care method with an appropriate brush, the mother is the most important authority until the child is able to use a toothbrush effectively himself or herself. If the teeth are brushed irregularly, it can cause tooth decay and periodontal disease. Moreover, irregular brushing is associated with high levels of cardiovascular diseases, diabetes mellitus, hypertension, and metabolic syndrome (4, 5).

The assessment of oral health in children is vital for planning effective interventions in schools because at that age children are willing to learn new things from a teacher or specialist much more easily than from their parents. Dental health care and related habits in children have not been at the centre of researchers' attention in the Czech Republic. However, oral hygiene has a significant impact on adults and seniors and many measurement instruments

are used for the assessment of health-related quality of life (6, 7), but none of them is suitable for children.

The aim of this study was to describe trends in the prevalence of the habit of brushing their teeth more than once a day in six consecutive HBSC surveys between 1994 and 2014 among school-aged children. We hypothesized that a higher proportion of the girls and boys had adopted a habit of brushing their teeth more than once a day in 2014 compared to 1994 and that the trend has an increasing tendency.

## MATERIALS AND METHODS

Data from the survey was obtained in six years – 1994, 1998, 2002, 2006, 2010, and 2014 as a part of the Health Behaviour in School-aged Children (HBSC) study in the Czech Republic. The Health Behaviour in School-aged Children study is a collaborative cross-national survey coordinated by the World Health Organization (8). The HBSC protocol was followed in each year in the 11-, 13-, and 15-year-old age groups (8–10). After adjustment of the data according to the age categories, 21,170 questionnaires were entered into the statistical analysis, which was calculated with the IBM SPSS version 22 (11).

The children's oral health was assessed using a mandatory question about the frequency of brushing their teeth validated in the HBSC study (12): "How often do you brush your teeth?" with the possible answers: more than once a day; once a day; at least once a week but not daily; less than once a week; never. For

logistic regression (Enter method) we dichotomized the responses to these questions into two categories: more than once a day (reference); children brush their teeth once a day or less than once a day. The independent variable was set to 1994, the first year of the data collection in the Czech Republic. The dependent variables were the following: the years 1998, 2002, 2006, 2010, and 2014.

## RESULTS

The whole study sample was collected between 1994 and 2014 and there were 21,170 children involved. Of these 10,276 (48.5%) were boys and 10,894 (51.5%) were girls. Table 1 presents the results from the logistic regression analyses which were performed between the associations of brushing teeth more than once a day in 1994 (reference group) and the other years.

According to the last HBSC world report (13), a significant increasing trend in tooth brushing habits was observed in association with family affluence in all the countries surveyed. In the Czech Republic, we found out that brushing one's teeth more than once a day became more common in both genders, regardless of family socioeconomic status. We observed a greater improvement among the boys. Differences existed between the age groups. The probability of the boys aged 11 years brushing their teeth more than once a day was 1.95 times higher in 2014 than in 1994. This improvement also happened in the 13-year-old boys (1.88) and 15-year-old boys (1.39 times higher).

The girls also showed an improving trend between 1994 and 2014. This increase was observed only in two age groups; the 11-year-old girls were 1.63 times more likely to brush their teeth more than once a day in 2014 than in 1994, and the 13-year-old girls 1.37 times more likely. Only the 15-year-old year girls demonstrated a decline in the prevalence of brushing their teeth regularly (4.6%).

In the older children, we observed a deterioration among the 15-year-old boys (61.4%) in terms of brushing their teeth compared to the 13-year-old boys (68.2%) and to the 11-year-old boys (67.4%) in 2014 (Fig. 1). It means that compared to other participating countries we dropped from 10th place (for 13-year old boys) to 18th place for 15-year-old boys (13).

In the girls, the percentage of those who brushed their teeth more than once a day was increasing in the oldest age group (Fig. 1). However, it is still alarming that more than 20% of the girls and more than 30% of the boys do not follow this common healthy habit and brush their teeth only once a day or less often.

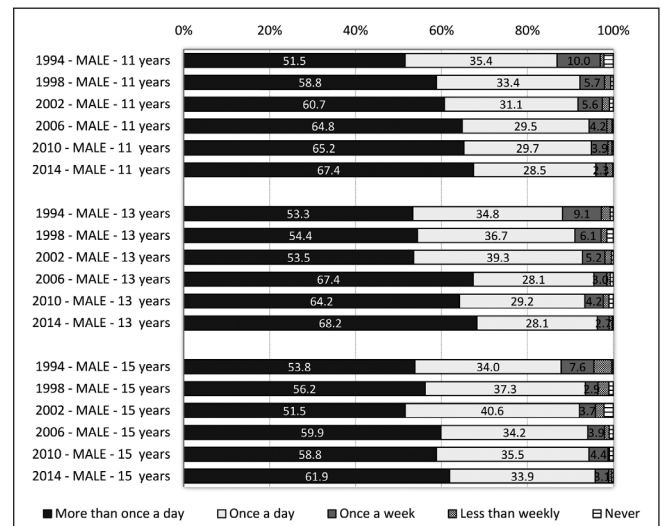
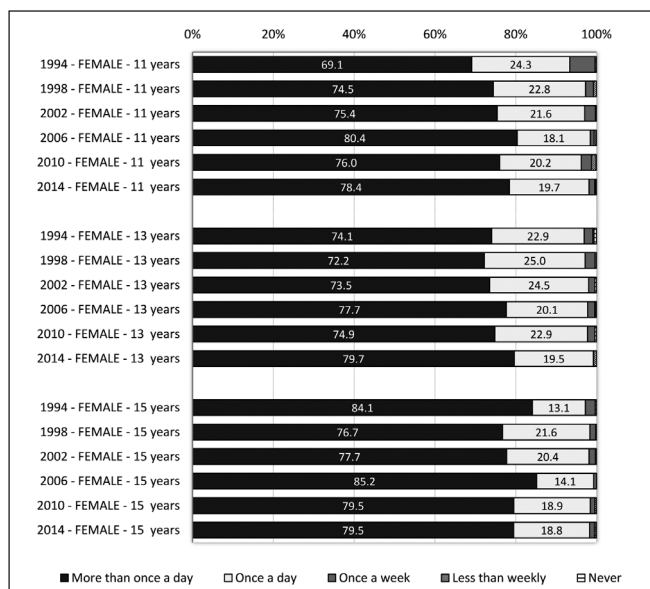


Fig. 1. Percentage of 11-, 13-, and 15-year-old boys who brushed their teeth more than once a day in six consecutive HBSC surveys, from the 1994 survey to the 2014 survey (20 years).

Table 1. Trends in the prevalence of toothbrushing more than once a day: HBSC study, 1994 to 2014

Variable		1994	1998	2002	2006	2010	2014	2014 vs. 1994		
								OR	CI	
									Lower	Upper
Boys										
11–11.99 years	%	51.5	58.8	60.7	64.8	65.2	67.4	1.95***	1.43	2.65
	n	229	488	656	671	644	639			
13–13.99 years	%	53.3	54.4	53.5	67.4	64.2	68.2	1.88***	1.42	2.49
	n	287	526	613	708	589	702			
15–5.99 years	%	53.8	56.2	51.5	59.9	58.8	61.9	1.39*	1.06	1.83
	n	288	475	646	725	653	737			
Girls										
11–11.99 years	%	69.1	74.5	75.4	80.4	76.0	78.4	1.63**	1.19	2.23
	n	272	517	716	657	634	696			
13–13.99 years	%	74.1	72.2	73.5	77.7	74.9	79.7	1.37*	1.01	1.86
	n	328	533	722	686	720	758			
15–15.99 years	%	84.1	76.7	77.7	85.2	79.5	79.5	0.73	0.51	1.05
	n	290	486	701	709	713	756			

Results from logistic regression; % percentage of participants who are brushing teeth more than once a day; n: total number of participants according to gender, age and year of survey; OR: odds ratio (cohorts from the year 1994 are reference groups); CI: 95% confidence interval; \*p≤0.05; \*\*p≤0.01; \*\*\*p≤0.001



**Fig. 2.** Percentage of 11-, 13-, and 15-year-old girls who brushed their teeth more than once a day in six consecutive HBSC surveys, from the 1994 survey to the 2014 survey (20 years).

## DISCUSSION

Proper oral hygiene is not the only factor that is necessary to prevent oral disease but there are also other risk factors that must be taken into account, such as unhealthy diet, tobacco use, harmful alcohol use, and social determinants. Most oral diseases are also dependent on a lack of clean water, adequate sanitation, proper oral hygiene, and appropriate exposure to fluorides (14). Worldwide, 60–90% of schoolchildren have dental cavities that could be prevented by maintaining an appropriate low level of fluoride in their oral cavities (15).

Many improvements can be made in families (e.g. educating parents) and also at schools, where teachers may include oral health issue as a specific project or as a part of general health promotion (16). Such school-based oral health promotion interventions have been shown to be effective and can improve children's oral health (17). There are several projects and programmes for prevention that are mainly focused on the prevention of tooth decay in children and young people, on spreading information among their parents, and on the improvement of oral health and acquiring practical and correct oral hygiene habits. The Czech Dental Chamber does not have enough financial means to realize its own preventive projects; however, it supports many programmes and bestows a stamp of quality. Unfortunately, there are no official results from those preventive campaigns. The only information that the Ministry of Health has published was obtained through the HBSC study.

## CONCLUSIONS

The improvement of the recommended frequency of brushing one's teeth within the twenty-year period is evident in the boys in all the age groups studied and among the younger girls. A decrease in the frequency of brushing their teeth more than once a day was only observed in the 15-year-old girls between 1994 and 2014.

Prevention by an appropriate frequency of brushing teeth warrants parents' and doctors' attention because nowadays 32–38% of boys and 21% of girls do not brush their teeth more than once a day.

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## Conflict of Interests

None declared

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