

# Oral Hygiene Habits and Complaints of Gum Bleeding Among Schoolchildren in Lithuania

*Aiste Zaborskyte, Egle Bendoraitiene*

## SUMMARY

The study was carried out in the framework of the International Health Behavior among School-aged Children (HBSC) Study, conducted by the World Health Organization. A representative group of 5645 schoolchildren aged 11, 13 and 15 years was drawn from overall Lithuania and was surveyed including specific questions on oral hygiene and gum bleeding. The findings of the present survey showed that the oral hygiene was not a priority for Lithuanian schoolchildren. Only 39.7 percent of schoolchildren brushed their teeth twice or more a day (32.0 percent of boys, 47.6 percent of girls,  $p < 0.001$ ; 49.1 percent of schoolchildren from urban areas, 32.3 percent of schoolchildren from rural areas,  $p < 0.001$ ). Over 60 percent of schoolchildren reported that they had never used a dental floss or a mouthwash. The gum bleeding was indicated by more than a half of them (52.3 percent of boys, 59.5 percent of girls,  $p < 0.001$ ; 50.6 percent of schoolchildren from urban areas, 59.8 percent of schoolchildren from rural areas,  $p < 0.001$ ). The further analysis demonstrated a relationship between gum bleeding and poor oral hygiene among schoolchildren.

**Key words:** children, schoolchildren, health behavior, oral hygiene, gum bleeding.

Periodontal diseases are the ones of the most prevalent oral diseases that get its roots early in childhood [1, 2, 3]. The prevalence of periodontal diseases in Lithuania is 98.0 %. A great part (3.6 %) of children and young adults (18 - 25 years old) have severe periodontitis with periodontal pockets deeper than 5 mm [19]. A survey of 1035 12 - year - old Lithuanian children showed that 51.2 % of boys and 44.2 % of girls had periodontal lesions. As a consequence of these diseases, if they are not treated on time, the destructive processes are progress in both solid and soft tissues together with losing teeth [5]. The relevance of dentistry lies in the relationship between the effective oral hygiene and the prevalence of periodontal diseases [23].

Many studies on oral health have concentrated on clinically diagnosing plaque and measuring gum bleeding as indicators of oral health. Gum bleeding caused by tooth brushing or by a touch of dental instrument is considered to be a first sign of gingivitis. Adequate daily removal of dental plaque prevents periodontal diseases and dental caries [4, 5].

The most common and effective way to promote oral hygiene is tooth-brushing; therefore brushing is recommended to be adopted as a habit, which is repeated every morning and evening, at least twice a day. In addition to improved oral hygiene, which prevents periodontal diseases, frequent brushing with fluoride toothpaste increases the resistance of dentition

to dental caries [4, 6]. Unfortunately, tooth brushing cannot clean the proximal surfaces of the teeth, and therefore the use of dental floss and mouth rinses have been recommended [3, 4].

Generally, oral hygiene care and the factors that influence it are essential for the development of effective education programs for oral health and practice targeted at young people. Tooth brushing and other behaviors that comprise young people's lifestyles may directly or indirectly impinge on their health in the short or long term. Most of behavioral patterns were established in early childhood. Oral health behavior may constitute an integral part of an individual's lifestyle. Therefore these habits should be studied more extensively and be affected in the context of broader behavioral patterns, so as to provide a better empirical basis for preventive action.

The number of researchers worldwide has recognized the perspective of studies on child and adolescent's health behavior. For this purpose, a special WHO research program, the international survey among school - aged children was developed, which also included oral health habits. The Health Behavior of School - aged Children (HBSC) is a unique international research study conducted in collaboration with the WHO Regional Office for Europe. It is a research project that aims to gain new insight into and increase the understanding of health behavior, lifestyles and their context in young people. The study also aims to inform and influence health promotion and health education policy, programs and practice aimed at school - aged children at the national and international level [9, 15, 22].

One of specific objectives of this study was to collect data on oral hygiene habits and related variables from various countries in the European region and

---

*Aiste Zaborskyte, D.D.S., resident of general stomatology at outpatient Dainava clinic in Kaunas city.*

*Egle Bendoraitiene, D.D.S., Assist. at the Clinic of Preventive and Pediatric Dentistry, Kaunas University of Medicine  
Address for correspondence: 6 Luksos-Daumanto str., Kaunas, LT-3007, Lithuania.*

North America, and to compare its trends over time and between countries. Dental health habits were investigated together with other health habits [14, 20].

Lithuania joined this international study in 1992. According to the international study project three countrywide surveys of school-aged children have already been carried out in Lithuania (in 1994, 1998 and 2002) [7, 8]. With a large scope of studied health behavior patterns in the last survey, in 2002, the focus was directed on oral hygiene habits and precursors of oral diseases. Gum bleeding was considered a very significant precursor of periodontitis.

The aim of this study was to describe the oral hygiene habits (tooth brushing, flossing and rinsing) and complains of gum bleeding among 11 - 15 - year old schoolchildren in Lithuania. The further aim was to identify the associations between gum bleeding and oral hygiene habits.

The data of the HBSC survey in Lithuania in 2002 was used in the study. The authors of this paper developed a package of items on oral hygiene and gum bleeding, the questionnaire, and participated in collecting the data, and carried out the analysis of the gathered information.

## MATERIALS AND METHODS

This study is part of an extensive international, comparative survey of schoolchildren's health and life-styles (Health Behavior in School-aged Children – A WHO Cross-National Survey, the HBSC Study). The philosophy and methods of the project have been described in more detail elsewhere [8, 9, 22]. In Lithuania this was the third survey carried out in accordance with the international project.

The guidelines for the survey state that approximately 1500 respondents in each of three age groups – 11, 13 and 15 year – should be targeted. As the survey was planned in spring of 2002, the appropriate grade levels corresponding to the desired age ranges were 5, 7 and 9. A stratified cluster sampling design was used to draw a representative sample of schoolchildren from the whole of Lithuania. There were five strata by regions of the country including cities (Vilnius, Kaunas, Klaipeda, Siauliai and Panevezys) and three strata by language (Lithuanian, Russian and Polish) used for education at school. In first level of sampling the schools were randomly selected from each stratum. The number of selected schools was proportional to the size of stratum. Then the 5<sup>th</sup>, 7<sup>th</sup> and 9<sup>th</sup> grades were included into the sample. If two or more classes of desired grade level occurred in the selected school only one class was randomly selected. Altogether 105 schools were selected. They delegated 297 classes of the 5<sup>th</sup>, 7<sup>th</sup> and 9<sup>th</sup> grades. It was expected that approximately 6000 pupils might participate in the survey.

The data were collected by means of standardized anonymous questionnaire. It included 101 structured questions (followed by alternative answers). Questionnaire topics were discussed among various research teams and finally approved by protocol of the study.

In this survey child's oral hygiene habits and complains of gum bleeding were accessed by four questions:

1. "How often do you brush your teeth?" Five alternative answers were given: twice or more a day, once a day, at least once a week but not daily, less than once a week, never. In the analyses, the answers were recorded into two categories: "regular brushing" = twice or more a day, and "irregular brushing" = the remaining answers.

2. "How often do you use dental floss?" Three alternative answers were given: almost daily, sometimes, never. In the analyses, the answers were recorded into two categories: "teeth flossing" = used a floss almost daily and sometimes, and "never teeth flossing" = never used a floss.

3. "How often do you rinse your oral mouth with special rinse?" Alternatives of answers and recording corresponded to these used for the previous questions.

4. "Does your gum bleed when you brush teeth?" Two alternative answers were given: yes, no.

The first of these questions was included on the list of core items that have been used by all participating countries. The remaining questions were selected in addition to specific national interest and were optional items for other countries that were taking part in the research.

The survey was completed in March and April 2002. It was coordinated by Laboratory for Social Pediatrics of Institute for Biomedical Research at Kaunas University of Medicine. The ethical clearance for the study and the support with relevant information were obtained from the Ministry of Education and Science as well as from the regional departments of education and the administrations of the selected schools. The teachers were asked to administrate the questioning and to follow agreed guidelines. The survey was conducted in school classes with a teacher overseeing the process. Pupils responded anonymously. It was striven for self-dependent work of pupils and confidentiality of their answers. The completed questionnaires were enclosed into envelopes and returned to the research institution on completion. Altogether 5700? questionnaires were returned. The response rate was 96 %.

The national data was cleaned at the coordinating center in the University of Bergen (Norway) and was included into the international databank of 36 countries that had taken part in the research. The final population of the cleaned data consisted of 5645 schoolchildren.

The studied population was representative to the population of school-aged children from the whole of Lithuania in respect of demographic and social values. Gender groups distributed these respondents fairly evenly: 2887 (51.1 %) boys and 2758 (48.9 %) girls. The groups were also well balanced by age and corresponded to its proportions in the population as follows: 11 years – 1867 (33.1 %) children, 13 years – 1873 (33.2 %) children, and 15 years – 1905 (33.7 %). According to the living environment the respondents were distributed into two groups: urban area (cities and towns) – 2402 (42.6 %) and rural area (villages and countryside) – 3243 (57.4 %).

Statistical analysis was made by Statistical Package for the Social Sciences, version 11.5. The variations in the distributions of the variables studied in this study were analyzed by cross-tabulations according to gender, age groups and living environment. Statistical significance was measured by the chi-square ( $\chi^2$ ) test.

The level of significance was 0.05. In tables 2x2, the odd ratios (OR) for gum bleeding according to irregular teeth brushing, never flossing, and never rinsing were estimated. The 95 % confidence limits (CI) of estimations were calculated where appropriate.

**RESULTS**

Table 1 shows the percentage of pupils' answers to the question on their tooth brushing. Twice or more a day tooth brushing was especially uncommon among schoolchildren of Lithuania: such habit was reported only by 39.7 % of respondents. A quite big proportion 16.6% of respondents reported that they brush teeth not daily, less than once a week or never.

32.0 % of boys and 47.6 % of girls (p <0.001) reported a regular tooth brushing. The less frequent tooth-brushing among boys than among girls was detected in all age groups. With age the proportion of girls who reported a regular tooth brushing increased from 41.3 % in 11 years to 54.3 % in 15 years (p<0.001) while among boys these proportions have a tendency to decrease (Fig. 1).

The variations in the distributions of children's answers on their tooth brushing correlated with their living environment. Children from urban areas reported a regular tooth brushing more often than children from rural areas (correspondingly 49.1 % and 32.6 %, p<0.001). These differences had the same values both among boys and girls (Fig. 2).

The use of dental floss among schoolchildren was rare. Only 4.5 % of respondents reported on regular, almost daily flossing of their teeth. A large proportion (over 60 %) of children avowed having never used a dental floss. Girls were more likely to have an inclination for flossing of teeth (Table 2). Neither among boys

**Table 1.** Tooth-brushing habits among schoolchildren in Lithuania, 2002 (%)

How often do you brush your teeth?	Boys (n=2881)	Girls (n=2755)	Total (n=5636)
Twice or more a day	32.0 (31.3 – 33.7) <sup>a</sup>	47.6 (45.7 – 49.5)	39.7 (38.4 – 41.0)
Once a day	45.4	41.9	43.6
At least once a week but not daily	14.2	8.0	11.1
Less than once a week	6.4	2.3	4.3
Never	2.2	0.2	1.2
$\chi^2=235$ ; df=4; p<0.001			

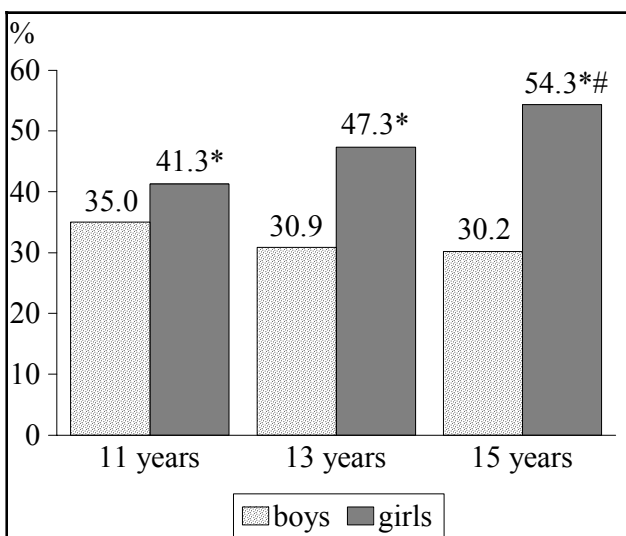
<sup>a</sup> 95% confidence interval.

**Table 2.** Teeth flossing habits among schoolchildren in Lithuania, 2002 (%)

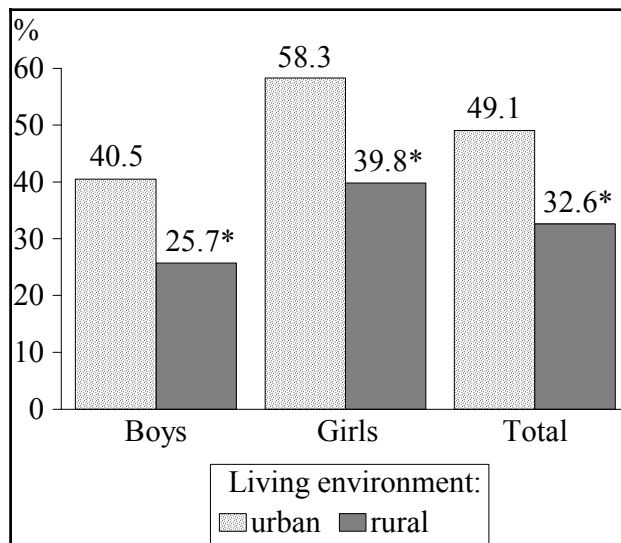
How often do you use dental floss?	Boys (n=2881)	Girls (n=2755)	Total (n=5636)
Almost daily	4.4	4.6	4.5
Sometimes	32.4	37.1	34.7
Never	63.2	58.3	60.8
$\chi^2=14.61$ ; df=2; p=0.001			

nor among girls any statistically significant association between this oral hygiene habit and age was identified. Therefore teeth flossing of schoolchildren was significantly related to their living environment. Respondents from urban areas more often reported teeth flossing than respondents from rural areas (correspondingly 44.4 % and 35.3 %, p<0.001).

Oral mouth rinsing with special rinse was also rare among schoolchildren in Lithuania. A few (6.4 %) respondents reported on almost daily rinsing. Just a little more of pupils (27.9 %) used this hygiene measure sometimes. Two of three children (65.7 %) never used an oral mouth rinse (Table 3). A very low association between variation of this habit and gender (boys likely more often than girls used rinsing almost daily) was identified. Similarly to teeth flossing, no association between rinsing and age group was identified neither among boys nor girls. Schoolchildren from urban areas



**Figure 1.** Percentage of boys and girls who brush their teeth regularly by age.  
\* p<0.05 between boys and girls; # p<0.05 between age groups.



**Figure 2.** Percentage of children who brush their teeth regularly by living environment.  
\* p<0.05 between urban and rural groups of children.

used oral mouth rinse more often than these from rural areas (accordingly 37.6 % and 31.9 %,  $p<0.001$ ).

The analysis of schoolchildren's answers to the final question of oral health package "Does your gum bleed when you brush teeth?" discovered that more than half (55.9 %) of respondents reported gum bleeding. Girls indicated on that complaint more often than boys (correspondingly 59.5 % and 52.3 %,  $p<0.001$ ); schoolchildren from rural areas more often than schoolchildren from urban areas (correspondingly 59.8 % and 50.6 %,  $p<0.001$ ) (Fig. 3). There were no significant differences according to age groups of respondents.

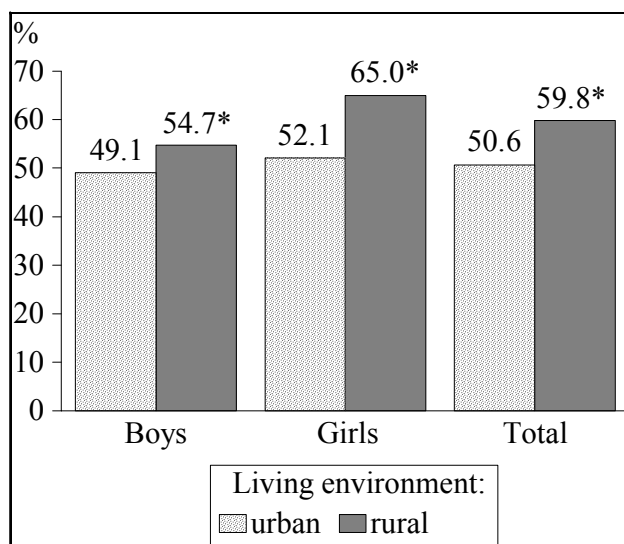
Table 3 presents three tables 2x2 designed for the bivariate analysis of complaints of gum bleeding by oral hygiene habits. The analysis indicates to statistically significant relationships between gum bleeding and oral hygiene habits. Generally, the poor, inadequate oral hygiene was a significant predictor of complaints of gum bleeding among children. The highest risk for complaints of gum bleeding was related to irregular teeth brushing (OR=1.45). Never teeth flossing and never oral mouth rinsing arose a little bit less, however, significant risk for complaints of gum bleeding (OR for these factors were 1.28 and 1.30, respectively).

**DISCUSSION**

All questioning methods for collecting data on oral hygiene have limitations. From the behavioral standpoint, the most important aspect of brushing is its frequency. However, its efforts might not be an adequate technique and not an adequate duration of brushing. Flossing does not seem to be a well-known habit as well. Thus, the following question might arise: how reliable is the information about oral hygiene gathered by the questions used in this study? The effect of tooth-brushing frequency and the duration of brushing have been studied as correlates of plaque status and gingivitis [17, 20, 21]. In most studies among children the duration of habitual tooth brushing was emphasized more than tooth-brushing frequency in dental health education.

Earlier studies in Lithuania demonstrated high correlation between tooth-brushing frequency reported by children and their OHI-S (by Green-Vermillion) index. According to the mean values of that index it was concluded that oral hygiene of Lithuanian 12-year-old schoolchildren was satisfactory (OHI-S = 1.44±0.69 among boys and OHI-S = 1.27±0.69 among girls) [17].

The results of this study supported earlier findings that Lithuanian schoolchildren pay insufficient attention to the oral hygiene. The HBSC survey in 1994 showed that regular teeth brushing were reported by 23.1 % of boys and 36.6 % of girls, in 1998, – by 32.2 % of boys and 48,8 % of girls [7, 8]. According to our results, in 2002 there were 32.0 % of boys and 47.6 % of girls who reported on regular brushing of their teeth. It seems that the



**Figure 3.** Percentage of boys and girls who complained of gum bleeding by living environment. \*  $p<0.05$  between urban and rural groups of children.

percentage of regular teeth brushing increased significantly in 1994-1998 while in 1998-2002 there were no significant trends, nevertheless, the national children's oral health program is being implemented.

The comparison of the results with those of other countries participating in the HBSC study showed that Lithuanian boys and girls took the last places by ranking the percentages of children who brushed their teeth twice a day [7, 8, 9, 14, 15]. Among Lithuanian children these indices were twice smaller than among children of the same age in Northern Europe and some other countries.

In comparison with other countries Lithuanian schoolchildren used flossing of teeth very rarely [14, 15]. No positive trends for these habits have been found since 1994. It should be notified that in 1994 over 70 % of respondents avowed that they did not know what

**Table 3.** Oral mouth rinsing habits among schoolchildren in Lithuania, 2002 (%)

Haw often do you rinse your oral mouth with special rinse?	Boys (n=2885)	Girls (n=2755)	Total (n=5640)
Almost daily	7.4	5.4	6.4
Sometimes	27.8	27.9	27.9
Never	64.8	66.6	65.7

$\chi^2=8.92$ ;  $df=2$ ;  $p=0.012$

**Table 4.** Complaints of gum bleeding by oral hygiene habits among schoolchildren in Lithuania, 2002 (%)

Oral hygiene habits	Complained of gum bleeding	Not complained of gum bleeding
Regular tooth-brushing (n=2236)	50.3	49.7
Not regular tooth-brushing (n=3402)	59.5	40.5
OR=1.45 (95 % CI: 1.30 – 1.61); $p<0.001$		
Teeth flossing (n=2211)	52.2	47.8
Never teeth flossing (n=3427)	58.3	41.7
OR=1.28 (95% CI: 1.15 – 1.42); $p<0.001$		
Oral mouth rinsing (n=1934)	51.7	48.3
Never oral mouth rinsing (n=3704)	58.0	42.0
OR=1.30 (95% CI: 1.16 – 1.45); $p<0.001$		

flossing was [8]. Unfortunately, we have not found any published data to compare our findings on the prevalence of oral mouth rinsing in children.

The factor most consistently associated with teeth brushing and other oral hygiene habits frequency seemed to be the gender. Girls are more concerned about their personal hygiene than boys. It might also be more difficult to change the behavior of boys than of girls, because girls tend to have more health - directed behavior than boys [15]. Consequently, boys require more targeted health education programs than girls.

The second common factor associated with oral hygiene habits, especially with teeth brushing, was living environment. Children from rural areas reported higher percentage of inadequate oral hygiene than children from urban areas. This result indicates on improvement of health education efforts at schools located in rural areas. Several other epidemiological surveys have also shown the importance of social - economic background for determining children's tooth-brushing behavior [14, 16].

During the last years, a number of epidemiological studies have been carried out in Lithuania, which demonstrated a high prevalence of periodontal diseases among the young population [17, 18, 19]. Gum bleeding is considered a very significant precursor for periodontitis. Our study was the first study in Lithuania aimed to identify the prevalence of complaints of gum bleeding among school-aged children. The results of this survey were surprising. More than a half of 11-15-years-old schoolchildren complained of gum bleeding. Therefore our earlier clinical study of a group of 12-year-old Lithuanian children showed that 51.2 % of boys and 44.2 % of girls had periodontal lesions [17].

Girls indicated the gum bleeding more often than boys did. It may be caused by several reasons. Girls have sexual pubescence earlier and hormonal changes can be a cause of gum bleeding. Girls are more observant and they brush their teeth more intensively.

According to the findings of the study, regular and correct teeth cleaning significantly decreases symptoms of gum's inflammation. Educational program on oral and dental health was executed in Lampedusa, a small Italian island. A group of 6 - 13 year old children have been taught to understand the meaning of plaque and it's role in causing caries and gingivitis, the importance of tooth-brushing to prevent plaque accumulation, the possibility of controlling and

rationalizing sugar consumption. In the five - year period the percentage of healthy six-year-old children has increased from 20.9 to 53.7 percent, twelve-year-old children - from 0.9 to 4.0 percent. The percentage of twelve-year-old children, who had a calculus, has decreased from 55.6 to 38.8 percent [12]. Horowitz at all has been observing decreasing symptoms significantly of gum's inflammation among the children, who took part in daily tooth-brushing educational program. The mean gingivitis scores have been reduced by 40 percent among girls and by 17 percent among boys during a three - year period [11].

Prevention and treatment of early stages of periodontal diseases are relatively simple and very effective. In many cases it is enough to have the social education and instructions for correct and regular oral hygiene. The preventive component of lifestyle should be induced and accepted at a young age.

Epidemiological investigations of periodontal status and oral hygiene are an important part of preventive program. Such programs at national and local government level are realized more and more often in Lithuania.

## CONCLUSIONS AND RECOMMENDATIONS

Oral hygiene for Lithuanian schoolchildren is not a priority. Only 39.7 percent of schoolchildren brushed their teeth twice or more a day.

Tooth-brushing frequency was consistently lower among boys than among girls and lower among schoolchildren from rural areas than among schoolchildren from urban areas. These differences should be considered when oral health education is being implemented.

The use of dental floss and oral mouth rinse should be emphasized more in oral health education campaigns for improving the oral hygiene of schoolchildren.

Over a half (55.9 %) of all schoolchildren complained of gum bleeding. That complaint was more often among girls than among boys, and it was more often among schoolchildren from rural areas than among schoolchildren from urban areas.

The risk of gum bleeding among schoolchildren was associated with their poor oral hygiene habits. Extensive efforts are needed to reduce the prevalence of this precursor of periodontal diseases by means of oral hygiene education.

## REFERENCES

- Pilot T, Miyazaki H. Global results: 15 years of CPITN Epidemiology. *Intern Dent J*. 1994; 44: 553- 60.
- Oh T-J, Eber R, Wang H-L. Periodontal diseases in the child and adolescent. *J Clin Periodontol*. 2002; 29: 400-10
- Hoag P.M., Pawlak E.A. *Essentials of Periodontics*. The C. V. Mosby Company; 1990. 248 p.
- Milčiuvienė S., Jasulaitytė L. *Stomatologinių ligų profilaktika*. Kaunas; 1999. 184 p.
- Axelsson P. *An Introduction to Risk Prediction and Preventive Dentistry*. Quintessence Publishing Co Inc; 1999. 159 p.
- Murray JJ. *Prevention of Oral Disease*. Oxford University press; 1996. 280 p.
- Zaborskis A., Makari J. Lietuvos moksleivių gyvenimo: raida 1994-1998 metais ir vertinimas tarptautiniu požiūriu. *Panevėžys: E.Vaičekausko leidykla*; 2001. 136 p.
- Zaborskis A., Žemaitienė N., Šumskas L., Diržytė A. *Moksleivių gyvenimo būdas ir sveikata*. Vilnius: Leidybos centras; 1996. 124 p.
- Currie C, Hurrelmann K, Settertobulte W, et al, editors. *Health and Health Behavior among Young People. Health Behavior in School-aged Children. A WHO Cross-National Study (HBSC)*. International report. Copenhagen: World Health Organization Regional Office for Europe; 2000. 132 p.
- Čekanaivičius V., Murauskas G. *Statistika ir jos taikymai*. Vilnius: TEV; 2000. 240 p.
- McDonald RE, Avrry DR. *Dentistry for the Child and Adolescent*. Mosby; 2000
- Pilot T, Purdell-Lewis D. *Guidelines for Community Periodontal Care*. FDI World Dental Press Ltd; 1992. 94 p.
- Milčiuvienė S., Vaitkevičienė V, Bendoraitienė E. Burnos ertmės būklė tarp Kauno miesto 12-mečių moksleivių (1983-1998 m). *Medicina*. 1999; 35 ( 4 priedas): 8 -12.
- Kuusela S, Honkala E, Kanas L, et al. Oral Hygiene Habits of 11-year-old Schoolchildren in 22 European Countries and Canada in 1993/1994. *J Dent Res*. 1997; 76 (9): 1602-9.

15. King A, Wold B, Tudor-Smith C, Harel Y. The Health of Youth. A Cross-national Survey. A report of the 1993-94 survey results of the Health Behavior in School-Aged Children: A WHO Cross-National Study. Canada: WHO Regional Publications; 1996. 222 p. European Series No. 69
16. Addy M, Hunter M L., Kingdon A, Dummer PM, Shaw WC. An 8-year study of changes in oral hygiene and periodontal health during adolescence. *Int J Paediatr Dent.* 1994; 4 (2): 75-80.
17. Bendoraitiene E, Milciuviene S. Periodontal status and oral hygiene among Lithuanian 12 years old schoolchildren. *Stomatologija.* 2001; 3 (2): 10-13.
18. Milciuviene S. Prevalence and severity of dental caries among 12-year-old schoolchildren in Lithuania. *Stomatologija.* 2001; 3 (3): 9-12.
19. Mackeviciene G, Puriene A, Balciuniene I. The necessities for complex treatment of periodontitis in Lithuania. 78 Annual meeting of NOF Programme and abstracts; 1995 August 25-27. p. 41.
20. Honkala E, Nyysönen V, Knuuttila M, Markkanen H. Effectiveness of children's habitual toothbrushing. *J Clin Periodontol.* 1986; 13: 81- 5.
21. Nyysönen V, Honkala E. Oral hygiene status and habitual tooth brushing in children. *ASDC J Dent Child.* 1984; 51 (4): 285-8.
22. WHO. Health Behavior in School-Aged Children: A World Health Organization Cross-National Study. Research protocol for the 2001/02 survey. Edinburgh: The University of Edinburgh; 2002. 362 p.
23. Honkala E, Kannas L, Rise J. Oral health habits of schoolchildren in 11 European countries. *Int Dent J.* 1990; 40: 211- 7.

Received: 01 03 2003

Accepted for publishing: 25 03 2003