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Oral Health Awareness in Croatian and Italian Urban Adolescents

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ABSTRACT

Purpose of this study was to investigate and compare differences in oral health awareness between Croatian and Italian urban adolescents. The sample consisted of primary school last grade students aged between 13 and 15 years, 300 children from Zagreb (Croatia) and 298 children from Bari (Italy). Oral health awareness was evaluated using a self-administered standardized questionnaire. Self-perception of oral health proved to be different between the two groups ($p < 0.001$). The Croatians reported that their oral health was »excellent« or »very-good« more often than the Italians (68.6% vs. 50.2%). The reasons given for visiting a dentist were different ($p < 0.001$). The Italians cleaned their teeth more often than the Croatians (»two or more times a day«, 83.1% vs. 72.2%, $p < 0.003$). Wooden toothpicks were preferred by the Croatians ($p < 0.001$), while floss was preferred by the Italians ($p = 0.03$). The awareness regarding the use of fluoridated toothpaste was higher in the Italian group (95.6% vs. 72.5%, $p < 0.001$). The Croatians were consuming sweetened foods more often than the Italians ($p < 0.001$). Croatian adolescents reported more indicators of a lower level of oral health awareness than the Italians, while on the contrary Croatians had higher esteem of their oral health. Defining national preventive strategies is essential for improving adolescents' attitudes toward oral health in both countries, particularly in Croatia.

Key words: oral health, awareness, adolescents, Croatia, Italy

Introduction

The World Health Organization (WHO) has worked hard over the last few years to increase the awareness of oral health as an important component of general health and quality of life. In 2003, the WHO Global Oral Health Program formulated a set of policies and necessary actions for continuous improvement of oral health¹. However, oral diseases are still a major public health problem in many countries². Adolescents are a challenging group as they are choosing their lifestyle while in the process of becoming young independent adults. Oral health education in different settings (family environment, primary and secondary schools, health care system) and using several approaches would play an important role in modifying behaviors that affect the oral health of children and adolescents^{3–6}.

Croatia and Italy are two neighboring European countries that differ in their historical backgrounds and the current economic and political statuses, as well as in oral health care systems. Croatia's economic development was strongly affected by long-lasting consequences of the Croatian War of Independence from 1991 to 1995. Croatia is soon expected to join the European Union and, according to the World Bank, ranks among the upper middle income countries⁷. Italy is a highly developed country, a member state of the European Union and ranks among the high income countries⁷. In Croatia, the Bismarck model of health care has been adopted. A public oral health care system provides free treatment for all children under 18. Until the late 1980s, annual check-ups and fluoridation were mandatory for Croatian schoolchil-

dren, but since the War of Independence, only few short-term preventive programs have been conducted. Italy has the world's »second overall best« health care system⁸, based on the Beveridge model. Many health institutions are public but the private sector has the principal role in dentistry.

The aim of this study was to investigate and compare the differences in oral health awareness between Croatian (Zagreb) and Italian (Bari) urban adolescents. We hypothesized that the level of oral health awareness was lower in Croatian group.

Subjects and Methods

Student recruitment

The study was based on a cross-sectional survey conducted from January to February 2009. The participants were the last grade students (13–14 years old) from ten randomly selected public primary schools: five located in Zagreb, Croatia, and five in Bari, Italy.

A total of 600 adolescents were invited to participate in this study, and 598 returned the completed questionnaires for a response rate of 99.7%. The final sample included 300 Croatians (170 females (56.7%) and 130 males (43.3%)) and 298 Italians (155 females (52.1%) and 143 males (47.9%)).

A letter explaining the purpose of the study and the procedures was sent to the principals of the selected schools. The principals informed the students about the study and set the day for completing the questionnaires. Participation was voluntary and anonymous, and informed consent was obtained from all the participants. The study was approved as a part of a research project by the Ethics Committee of the Croatian Ministry of Science, Education, and Sports in the year 2007.

Questionnaire

All participants completed a standardized questionnaire developed by WHO for health awareness in children⁹. The questionnaire was translated from English to Croatian and Italian then back translated by the same bilingual dentist. It included twelve items designed to evaluate the individual views of children about their own oral health, dental care, oral health practices, dietary habits and parental education. The questions were presented in a forced choice format, in which participants had to choose one or more responses from a provided list of options. The participants received a full explanation of how to score their responses and were made aware that there was more than one response format for some items. Furthermore, one of the investigators was always available during the completion of the questionnaire, and the participants were encouraged to approach the investigator whenever they needed clarification of any point.

Statistical analysis

Descriptive statistics were calculated for all variables. Frequency distributions are shown for categorical vari-

ables, and mean and standard deviations are shown for ordinal variables. The difference in frequency distributions between Croatian and Italian adolescents was tested using a χ^2 -test or Fischer's exact test for variables with infrequent values. The difference between the ranks of the two groups was tested using the Wilcoxon rank sum test (Mann-Whitney U-test). Statistical analysis was performed using Statistical Analysis Software (SAS), version 5.1, for Windows, with a p-value lower than 0.05 considered significant.

Results

The difference in the gender structure between the two investigated groups was not significant ($p=0.28$ for χ^2 -test).

The comparison of self-perception of oral health (teeth and gums) between the two groups showed a significant difference ($p<0.001$, Table 1). The Croatians presumed that their oral health was »excellent« or »very-good« more often than the Italians did (68.6% Croatians and 50.2% Italians).

The comparison of the reported frequency of toothache or discomfort experienced during the past 12 months between both groups showed no significant difference (Table 2).

Although the Italians visited the dentist more often than the Croatians (»more than four times« 36.9% Italians *vs.* 26.7% Croatians), the difference in the frequency of dental visits during the last 12 months was not significant. Comparing the reasons for the last visit to the dentist showed a significant difference between both groups ($p<0.001$, Table 2). Among the Croatians, the visit was more frequently initiated by a dentist (11.5% Croatians *vs.* 5.6% Italians) or because of pain caused by teeth or gums (9.6% Croatians *vs.* 2.6% Italians). For 55.5% of the Croatian children, the visit was part of ongoing treatment, compared to 39.0% for the Italians. For the Italians, the appointments were made more often by their parents (22.5% Italians *vs.* Croatians 18.3%) or even by the children themselves (30.3% Italians *vs.* Croatians 5.0%). The Italians reportedly cleaned their teeth more often than the Croatians (»two or more times a

TABLE 1
SELF-PERCEPTION OF ORAL HEALTH

	Croatian children		Italian children		p-value*
	N	%	N	%	
Excellent	62	21.4	25	8.4	<0.001
Very-good	137	47.2	124	41.8	
Good	62	21.4	105	35.4	
Average	19	6.6	40	13.5	
Poor	6	2.1	3	1.0	
Very-poor	4	1.4	0	0.0	
Do not know	10		1		

* Wilcoxon rank sum test

TABLE 2
EXPERIENCE OF TOOTHACHE; FREQUENCY AND REASONS FOR THE VISIT TO THE DENTIST; ORAL HYGIENE HABITS

	Croatian children		Italian children		p-value
	N	%	N	%	
Toothache or discomfort during past 12 months					
Often	10	3.6	6	2.1	0.85*
Occasionaly	17	6.1	25	8.6	
Rarely	108	38.8	89	30.5	
Never	143	51.4	172	58.9	
Do not know	22		6		
Visit to the dentist during last 12 months					
No visit	37	14.1	49	17.6	0.36*
Once	45	17.2	35	12.5	
Twice	48	18.3	45	16.1	
Three times	35	13.4	29	10.4	
Four times	27	10.3	18	6.5	
More than four times	70	26.7	103	36.9	
Do not know/remember	38		19		
Reasons of the last visit to the dentist					
Parents had made an appointment	40	18.3	52	22.5	<0.001**
The appointment was initiated by the dentist	25	11.5	13	5.6	
The appointment was a part of following-up treatment	121	55.5	90	39.0	
Pain/trouble with teeth or gums	21	9.6	6	2.6	
Appointment made by patient himself	11	5.0	70	30.3	
Do not remember	45		18		
Frequency of teeth cleaning					
Never	3	1.0	0	0.0	0.002*
2–3 times a month	1	0.3	2	0.7	
Once a week	1	0.3	1	0.3	
2–6 times a week	10	3.3	7	2.4	
Once a day	68	22.7	40	13.5	
Two or more times a day	216	72.2	246	83.1	
Use of flouridated toothpaste					
Yes	103	72.5	215	95.6	<0.001**
No	39	27.5	10	4.4	
Do not use tooth paste	6		0		
Do not know	151		71		
Methods used for teeth cleaning					
Toothbrush	290	97.0	296	99.3	0.063***
Wooden tooth picks	117	39.0	69	23.2	<0.001**
Plastic tooth picks	10	3.3	5	1.7	0.2**
Dental floss	106	35.3	131	44.0	0.03**
Others	38	12.7	57	19.1	0.03**

* Wilcoxon rank sum test, ** χ^2 -test, *** Fischer's exact test

TABLE 3
DIETARY HABITS AND TOBACCO USE

	Croatian children		Italian children		p-value*
	Mean**	SD	Mean**	SD	
Dietary habits					
Fresh fruit	4.6	1.1	4.6	1.2	0.18
Biscuits, cakes, pies, buns etc,	4.0	1.2	3.8	1.3	0.29
Soft drinks, lemonade	3.4	1.4	3.3	1.3	0.24
Jam, honey	3.0	1.4	2.1	1.3	<0.001
Chewing gum (containing sugar)	3.7	1.7	3.5	1.7	0.25
Sweets, candies	3.7	1.4	3.3	1.4	<0.001
Milk with sugar	1.7	1.3	3.1	1.9	<0.001
Tea with sugar	2.7	1.5	2.0	1.3	<0.001

** Description of the scale: 1 – Never, 2 – Several times per month, 3 – Once per week, 4 – Several times per week, 5 – Every day, 6 – Several times per day

day«, 83.1% vs. 72.2%, respectively, $p=0.002$, Table 2). The awareness regarding the use of fluoridated toothpaste was higher in the Italian group (95.6%) than in the Croatian group (72.5%) ($p<0.001$, Table 2). The two groups were similar in their preference of tooth brushing as the most commonly used method of teeth cleaning (Table 2). However, there was a significant difference in the use of wooden toothpicks ($p<0.001$), which were preferred by the Croatians, and floss, which was used more often by the Italians ($p=0.03$, Table 2).

An analysis of dietary habits showed that jam, honey, sweets, candies and sweetened tea were consumed more often by the Croatians, while sweetened milk was more often consumed by the Italians ($p<0.001$, Table 3).

TABLE 4
FATHER'S EDUCATION LEVEL

	Croatian children		Italian children		p-value*
	N	%	N	%	
Primary school	9	3.6	28	13.5	<0.001
Secondary	93	37.3	29	14.0	
High school	12	4.8	10	4.8	
Academy	28	11.2	27	13.0	
University	91	36.5	74	35.7	
MS/PhD	16	6.4	39	18.8	
No male adult in household	7		63		
Do not know	44		28		

* χ^2 -test

The comparison of the father's education level between the two groups revealed a significant difference ($p<0.001$). The most frequently reported levels of education for Croatian fathers were secondary school (37.3%) and university (36.5%), while among the Italians they were university (35.7%) and MS/PhD (18.8%) (Table 4). The frequency of no male adult in the household was much higher among the Italians than among the Croatians (21.1% Italians vs. 2.3% Croatians, Table 4).

Discussion

This study has compared the oral health awareness of adolescents in Croatia and Italy. Zagreb (the capital of Croatia) and Bari (the capital of the Puglia region) are roughly equal in population numbers, which is close to 700,000, and this was the reason these two cities were chosen for the survey^{10,11}. Croatia has a total population of 4 290 612¹², which is comparable to the population of the Puglia region of Italy 4 091 259¹³.

The findings confirmed our hypothesis revealing more indicators of a lower level of oral health awareness in the Croatian group than in the Italian group. Although pain or trouble with teeth or gums was reported almost four times more frequently as the reason for dental visits by the Croatians than by the Italians, the Croatians had a significantly higher self-esteem of their oral health. Possibly, the Croatian adolescents were comparing themselves to their parents or older family members with poor oral health. According to the WHO oral health country/area profile, the DMFT (decayed, missing, filled teeth) index, an objective indicator of oral health, was found to be 3.5 for Croatian 12-year-olds in 1999¹⁴ and it was 1.1 for the Italians in 2004¹⁵. This could indicate that the Croatians have lower criteria for oral health self-estimation.

The Italians brushed and flossed their teeth more often than the Croatians did and were more aware of the reasons for using fluoridated toothpaste. The Croatians preferred wooden toothpicks, which is a traditional way of cleaning inter-dental spaces. Half of the Croatian and a quarter of Italian adolescents were not aware that they use fluoridated toothpastes, probably because only toothpastes containing fluoride are available on their markets. Besides, community water fluoridation is implemented in the Puglia region, whereas water is not fluoridated anywhere in Croatia, and fluoride is usually only applied topically.

Both study groups equally consumed half of the eight categories of sweetened foods. Of the remaining four categories, Croatians ate three of them more frequently, while Italians consumed more often only one, sweetened milk. This could indicate that the Croatians are less aware of the cariogenic potential of their diet. However, statistical data revealed that Croatia's annual sugar consumption per capita is estimated to be lower (30 kg per year) than Italy's (43.6 kg per year)^{16,17}. It seems that both groups expressed a very similar pattern of dietary

habits, probably as an effect of improving their socioeconomic status and modern urban lifestyle.

Very few regional studies have investigated the incidence and trends of dental caries in Croatia^{18,19}, and there are no studies about adolescents' awareness in relation to oral health. The DMFT index of 12-year-old Croatians decreased from 7.0 in 1968 to 2.6 in 1991 and increased to 3.5 in 1999¹⁸. There is only one recent investigation on caries prevalence in adolescents from 2008, conducted in a restricted area severely destroyed during the War of Independence, which revealed a very high DMFT value of 6.7¹⁹. These data show that Croatia is very far from achieving the goals set by the WHO concerning oral health improvement.

The level of oral health in the Italian population is much better represented in literature, although the data are analyzed primarily on a regional basis. An epidemiological survey among 12-year-olds called »National Pathfinder among Children's Oral Health in Italy«, published in 2007, showed that over the past two decades the mean DMFT fell from over 5 to the present level of 1.09, similar to that in other Western European countries²⁰.

Very few studies have investigated adolescents' awareness in relation to oral health. The studies have used different methods, and their results primarily showed a relatively low level of awareness^{21–26}. A study completed in India, using the same questionnaire as in our study, compared Indian and non-resident American children studying in India²⁷. The Indian group showed a low level of oral health awareness and practice, although both groups showed similar modern eating habits as an effect of urbanization. On the other hand, the oral health awareness and habits of American children were similar to our study groups. Saudi Arabian study, based on similar self-administered questionnaire covering indicators of oral health awareness, showed that sweet consumption, smoking, tooth brushing, dental flossing, dental visiting pattern and self-rated oral health were significantly associated with tooth loss²⁸.

We used a sample of convenience in one geographical area and thus the results may not be generalisable to all Croatian and Italian adolescents in general. It would be desirable to conduct a follow-up study with a larger sample of adolescents of both countries. As Zagreb is the capital of Croatia and Bari the capital of the Puglia region, it is possible that these urban adolescents have access to more sources of information related to oral health, hence the better oral health awareness, than the adolescents in the rest of the country/region. Recent Korean study

showed that urban type of residential area positively influenced the frequency of visits to dentist and the likelihood of receiving preventive dental treatment²⁹. However, national Chinese study from 2002 showed negative influence of urban residential area where adolescents had higher caries levels than rural adolescents³⁰.

We used a self-reported questionnaire, which is vulnerable to self-report bias, including the possibility of false responses, usually desirable ones. Nevertheless, self-reported data are commonly relied upon to draw inferences about health³¹, in order to inform public health services and to define strategies for oral health promotion.

Conclusion

The present findings indicated that adolescents' oral health awareness needs to be improved in both countries. In Croatia, adolescents reported more indicators of a lower level of oral health awareness than the Italians did, while they had a higher self-esteem. It could be explained by lower criteria and a lack of oral health care tradition in Croatian families.

Attainment of good oral health depends on the awareness of appropriate dietary and oral hygiene practices. Basic oral health education should start in the kindergarten; continue through school education and be a basic component of the oral health care system of every country. Nevertheless, of equal importance or of even more importance is the family environment, which has a critical influence on the development of oral hygiene and dietary habits from early childhood onwards. Thus, the development of preventive programs should be taking into account in both the family and the public environments.

In Croatia as well as in Italy, there is no general caries preventive program for children at the state level, although there were some regional short-term oral health campaigns. Systematic community-oriented oral health promotion programs, including fluoride promotion, are needed to target lifestyles and the oral health needs of adolescents in both countries, particularly in Croatia.

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SVIJEST O ORALNOM ZDRAVLJU U HRVATSKIH I TALIJANSKIH ADOLESCENATA

SAŽETAK

Cilj ovog istraživanja bio je istražiti i usporediti razlike u svijesti o oralnom zdravlju između hrvatskih i talijanskih urbanih adolescenata. Uzorak se sastojao od učenika zadnjeg razreda osnovnih škola u dobi od 13 do 15 godina, 300 djece iz Zagreba (Hrvatska) i 298 djece iz Barija (Italija). Svijest o oralnom zdravlju procjenjivala se pomoću standardiziranog upitnika koji su ispunjavali sami ispitanici. Doživljaj oralnog zdravlja od strane samih ispitanika pokazao se različit između obje grupe ispitanika ($p < 0,001$). Hrvati su svoje oralno zdravlje doživljavali kao »izvršno« ili »vrlo dobro« mnogo češće nego Talijani (68,6% vs. 50,2%). Razlozi koje su naveli za posjetu stomatologu bili su različiti ($p < 0,001$). Talijani su prali svoje zube znatno češće nego Hrvati (»dva ili više puta dnevno«, 83,1% vs. 72,2%, $p < 0,003$). Hrvati su češće rabili drvene čačkalice za zube ($p < 0,001$), dok su Talijani češće rabili zubni konac ($p = 0,03$). Skupina Talijana pokazala je veću osviještenost o korištenju zubne paste koja sadrži fluor (95,6% vs. 72,5%, $p < 0,001$). Hrvati su konzumirali slatkiše znatno češće od Talijana ($p < 0,001$). Hrvatski adolescenti imali su više pokazatelja niske razine svijesti o oralnom zdravlju od Talijana, međutim imali su više mišljenje o svojem oralnom zdravlju. Definiranje nacionalnih preventivnih strategija neophodno je za poboljšanje stavova prema oralnom zdravlju adolescenata obje zemlje, a osobito Hrvatske.