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Oral hygiene in secondary technical school pupils devoid of regular dental care

The main etiopathogenetic factor of both dental caries and periodontal disease is bacterial plaque (11). Elimination of the plaque due to proper oral hygiene, appropriate diet taking into account harmful influence of sweets on dentition, application of fluoride compounds and frequent dental check-ups, may contribute to a large extent to a decrease of prevalence of dental caries and periodontal disease in the Polish population (4, 13, 14). Therefore it was purposeful to conduct a survey allowing for evaluation how 18-year-old pupils of a secondary technical school devoid of dental care are able to eliminate dental plaque. Moreover there were analyzed differences between two groups of pupils – educated in profession of baker (more prone to dental caries) and educated in other professions.

MATERIAL AND METHODS

One hundred and twenty-two 18-year old pupils attending secondary technical school in Lublin, devoid of dental care were included in the survey. The examined pupils were divided into two groups. In the first one, including 95 persons, there were pupils educated in professions other than baker, while in the second one -27 pupils training in the profession of baker presenting a group of the increased risk of caries.

The study questionnaire consisted of 19 questions concerning basic oral hygienc habits, used fluorine prophylaxis, alimentary habits as well as dental treatment. The condition of the dentition was also evaluated clinically basing on the DMF index. The obtained data were subject of statistical analysis using Statistica for Windows 6.0 software.

RESULTS

On the basis of the carried out study, it was stated that in both surveyed groups the level of knowledge on dental hygiene and prohealthy behaviours was very low. The detailed results were presented in Tables 1–14. Statistically significant differences between two groups of pupils according to educational profile were found in the following matters: dental treatment in childhood (Table 2), DMF index and frequency of eating sweets (Table 4), frequency of tooth brushing (Table 5), time devoted to tooth brushing (Table 6) as well as frequency of change of a tooth brush (Table 9).

Frequency of visits for check-ups		Total	(Group I	C	iroup II	11 Statistics		
and dental treatment	No.	%	No.	%	No.	%	UStatistics		
Every 3 months	18	14.8	15	15.8	3	11.1	U = 0.63 p = 0.2640		
Every 6 months	18	14.8	16	16.8	2	7.4	U = 1,35 p = 0.0885		
Every 12 months	9	7.4	8	8.4	1	3.7	U = 0.92 p = 0.1777		
Only when necessary (pain)	71	58.2	52	54.7	19	70.4	U = -1.49 p = 0.0682		
Other	6	4.9	4	4.2	2	7.4	U = -0,63 p = 0.2635		
Total	122	100.0	95	100.0	27	100.0			
Chi ² statistics	$\chi^2 = 3.53$ p = 0.4727 (df=4)								

 Table 1. Frequency of visits for check-ups and dental treatment in the studied group of 18-year-olds taking into account the profile of education (in %)

 Table 2. Dental treatment in the childhood according to the group of 18-year-olds taking into account the profile of education (in %)

Dental treatment in the		Total		Group I	(Group II	LI Statistics	
childhood	No.	%	No.	%	No.	%	- O Statistics	
Regular treatment of deciduous teeth	47	38.5	37	38.9	10	37.0	U =0.18 p = 0.4284	
Treatment only in case of pain	67	54.9	50	52.6	17	63.0	U = -0.96 p = 0.1683	
None	8	6.6	8	8.4	0	0.0	U = 2.70 p = 0.0035	
Total	122	100.0	95	100.0	27	100.0		
Chi ² statistics	$\chi^2 = 2.70$ p = 0.2590 (df=2)							

Table 3. Frequency of eating sweets in the examined group taking into account the profile of education (in %)

Frequency of eating		Total		Group I	(Group II	LI Statistics			
sweets	No.	%	No.	%	No.	%				
Once a day	67	54.9	55	57.9	12	44.4	U = 1.24 p = 0.1079			
Twice a day	14	11.5	9	9.5	5	18.5	U = -1.21 p = 0.1131			
Several times a day	41	33.6	31	32.6	10	37.0	U = -0.42 p = 0.3357			
Total	122	100.0	95	100.0	27	100.0				
Chi ² statistics		$\chi^2 = 2.31$ p = 0.3146 (df=2)								

Frequency of			DMF i	ndex (C	Group I)		DMF index (Group II)						
daily	0	1-4	5-10	11-15	>15	Total	%	0	1-4	5-10	11-15	>15	Total	%
Once a day		1	21	22	8	52	54.7		1	3	5	4	13	48.1
Twice a day	1	1	1	7	3	13	13.7			[4	1	5	18.5
Several Times a day			12	9	9	30	31.6			3	5	1	9	33.3
Total	1	2	34	38	20	95	100	0	1	6	14	6	27	100
%	1.1	2.1	35.8	40.0	21.1	100		0.0	3.7	22.2	51.9	22.2	100	
Chi ² statistics			χ p = 0.0	$2^{2} = 15$.60 (df=8)					χ p = 0.0	² = 14)295	.01 (df=6)		

Table 4. Relationship between DMF indexes and frequency of eating sweets in the examined groups taking into account the profile of education

Table 5. Frequency of daily tooth brushing (in %)

Frequency of	T	otal	Gr	oup I	Gro	oup II	LI Statistics			
brushing	No.	%	No.	%	No.	%	U Statistics			
Once a day	39	32.0	27	28.4	12	44.4	U = -1.54 p = 0.0623			
Twice a day	68	55.7	57	60.0	11	40.7	U = 1.78 p = 0.0378			
Three times a day	15	12.3	11	11.6	4	14.8	U = -0.44 p = 0.3303			
Total	122	100.0	95	100.0	27	100.0				
Chi ² statistics		$\chi^2 = 3.27$ p = 0.1953 (df=2)								

Table 6. Time devoted to tooth brushing in the studied groups taking into account the profile of education (in %)

Time devoted to	Т	otal	Gr	oup I	Gr	oup II	U Statistics	
tooth brushing	No.	%	No.	%	No.	%	UStatistics	
1 minute	18	14.8	10	10.5	8	29.6	U = -2.25 p = 0.0123	
3 minutes	49	40.2	43	45.3	6	22.2	U = 2.27 p = 0.0117	
More than 3 minutes	7	5.7	5	5.3	2	7.4	U = -0.41 p = 0.3427	
Don't know	48	39.3	37	38.9	11	40.7	U = -0.17 p = 0.4333	
Total	122	100.0	95	100.0	27	100.0		
Chi ² statistics	$\chi^2 = 8.17$ p = 0.0427 (df=3)							

Duration of			DMF i	ndex (C	iroup I)				DMF ir	ndex (G	roup II)	
brushing	0	1-4	5-10	11-15	>15	Total	%	0	1-4	5-10	11-15	>15	Total	%
1 minute			4	5	1	10	10.5			2	4	2	8	29.6
3 minutes	1	3	15	14	9	42	44.2		1	2	2	1	6	22.2
More than 3 minutes			1	3	2	6	6.3				2		2	7.4
Don't know			13	14	10	37	38.9			2	6	3	11	40.7
Total	1	3	33	36	22	95	100	0	1	6	14	6	27	100
%	1.1	3.2	34.7	37.9	23.2	100		0.0	3.7	22.2	51.9	22.2	100	
Chi ² statistics	$\chi^2 = 7.86$ p = 0.7957 (df=12)							$\chi^2 = 6.38$ n = 0.7014 (df=9)						

Table 7. Relationships between DMF indices and time devoted to tooth brushing in the studied groups taking into account the profile of education (in %)

Table 8. Types of used tooth brushes in the studied g	group
taking into account the profile of education	

Type of used tooth	Te	otal	Gr	oup I	Gro	up II	LI Statistics			
brush	No.	%	No.	%	No.	%				
Hard	14	11.5	12	12.6	2	7.4	U = 0.80 p = 0.2106			
Medium	77	63.1	60	63.2	17	63.0	U = 0.02 p = 0.4926			
Soft	22	18.0	17	17.9	5	18.5	U = -0.07 p = 0.4705			
Electric	9	7.4	6	6.3	3	11.1	U = -0.79 p = 0.2157			
Total	122	100.0	95	100.0	27	100.0				
Chi ² statistics		$\chi^2 = 1.16$ p = 0.7626 (df=3)								

Table 9. Answers to the question: "How often do you change your tooth brush?"

How often do	Тс	otal	Gro	oup I	Gro	oup II	U Statistics		
tooth brush?	No.	%	No.	%	No.	%	U Statistics		
Every 3 months	53	43.4	44	46.3	9	33.3	U = 1.22 p = 0.1112		
Every 6 months	53	43.4	43	45.3	10	37.0	U = 0.77 p = 0.2214		
Once a year	14	11.5	7	7.4	7	25.9	U = -2.38 p = 0.0087		
Less than once a year	2	1.6	1	1.1	1	3.7	U = -0.83 p = 0.2023		
Total	122	100.0	95	100.0	27	100.0			
Chi ² statistics	$\chi^2 = 8.35$ p = 0.0392 (df=3)								

What brands of tooth	Te	otal	Gr	oup I	Gi	roup II	LI Statistics	
paste do you use?	No.	%	No.	%	No.	%		
Always the same	51	41.8	39	41.1	12	44.4	U = -0.31 p = 0.3766	
Any	25	20.5	19	20.0	6	22.2	U = -0.25 p = 0.4014	
Recommended by the dentist	2	1.6	1	1.1	1	3.7	U = -0.83 p = 0.2023	
Various. I keep serching for a favourite brand	44	36.1	36	37.9	8	29.6	U = 0.80 p = 0.2111	
Total	122	100.0	95	100.0	27	100.0		
Chi ² statistics	$\chi^2 = 1.41$ p = 0.7036 (df=3)							

Table 10. Answers to the question: "What brands of tooth paste do you use?"

Table 11. The main factors responsible for choosing of a certain brand of a tooth paste in the examined groups taking into account the profile of education

Factors	То	otal	Gr	oup I	Gro	up II	L1 Statistics	
ractors	No.	%	No.	%	No.	%	O Statistics	
Fluoride content	20	16.4	15	15.8	5	18.5	U = -0.33 p = 0.3699	
Whitening and cleaning properties	93	76.2	73	76.8	20	74.1	U = 0.30 p = 0.3840	
Flavour	5	4.1	4	4.2	1	3.7	U = 0.12 p = 0.4525	
Price	4	3.3	3	3.2	1	3.7	U = -0.14 p = 0.4453	
Total	122	100.0	95	100.0	27	100.0		
Chi ² statistics	$\chi^2 = 0.15$ p = 0.9854 (df=3)							

 Table 12. Additional means of oral hygiene applied in the examined group taking into account the profile of education

Means of		Total		Group I	(Group II	U Statistics		
oral hygiene	No.	%	No.	%	No.	%			
Dental floss	25	20.5	19	20.0	6	22.2	U = -0.25 p = 0.4014		
Tooth pick	38	31.1	31	32.6 7		25.9	U = 0.68 p = 0.2493		
Mount rinse	15	12.3	12	12.6	3	11.1	U = 0.22 p = 0.4146		
None	44	36.1	33	34.7	11	40.7	U = -0.57 p = 0.2849		
Total	122	100.0	95	100.0	27	100.0			
Chi ² statistic:	$\chi^2 = 0.60$ p = 0.8955 (df=3)								

Did your dentist		Total		Group I	(Group II	LI Statistica	
brush your teeth?	No.	%	No.	%	No.	%	U Statistics	
Yes	41	33.6	32	33.7	9	33.3	U = 0.03	
No	81	66.4	63	66.3	18	66.7	p = 0.4864	
Total	122	100.0	95	100.0	27	100.0		
Chi ² statistics	$\chi^2 = 0.001$ p = 0.9728 (df=1)							

Table 13. Answers to the question: "Did your dentist teach you how to brush your teeth?"

Table	14	Answers to	h the	question.	"Do	von	nav	snecial	attention	to k	mishing	of mol	ar teeth?"
rabic	14.	ruisweis u) uiç	question.	D_{0}	you	pay	special	attention	iu i	Justing		ar teem.

Do you pay special	T	otal	Gr	oup I	Gro	oup II	LI Statistics		
of molar teeth?	No.	%	No.	%	No.	%	U Statistics		
Yes	82	67.2	66	69.5	16	59.3	U = 0.98		
No	40	32.8	29	30.5	11	40.7	p = 0.1635		
Total	122	100.0	95	100.0	27	100.0			
Chi ² statistics	$\chi^2 = 0.995$ p = 0.3184 (df=1)								

DISCUSSION

The survey testifies to the fact that the knowledge of oral hygiene and prohealthy behaviours in the studied pupils is poor as well as that motivation to treatment is low. Almost 60% of the adolescents said that they were visiting a dentist only in case of dental pain, while in the group of bakers this percentage was as high as 70.4%. No statistically significant differences were found between these two groups of pupils in frequency of dental check-ups and treatment.

Alimentary habits and oral hygiene play an important role in the development of dental caries. The basic and the most accessible component of the diet are carbohydrates. They are cariogenic, especially when are ingested in excessive quantities. Carbohydrates eaten between main meals in solid or adhesive forms are responsible for large activity of caries; as such carbohydrates remain for a longer time on the surface of the teeth (1, 7, 8, 17).

In the studies carried out by Boguszewska-Gutenbaum (4) on 18-year-olds in Warsaw it was proved that over one-half of the examined adolescents eat sweets once or several times a day. Also 32.4% of a secondary school in Białystok declared daily consumption of sugar, candies, chocolate, carbonated drinks including sugar and compound carbohydrates (12). Examining healthy behaviours of 18-year-olds from secondary schools in Łódź, Urbaniak (19) proved that sweets are eaten between meals by 54.6% of the pupils and directly before sleeping 19.8% and such habits are very devastating for dental prophylaxis. Constant eating of sweets between main meals should be avoided, because this limits the time of remineralisation and creates more possibilities of demineralization leading to appearance of a carietic lesion (7, 15). Also in the own material it was found that the adolescents were frequently eating sweets and over one-half declares cating sweets once daily, while one-third consume sweets several times a day.

Oral hygiene including appropriate teeth brushing after every meal with a toothbrush and toothpaste containing fluoride plays a crucial role in maintaining healthy dentition and periodontium. Tooth brushing twice a day, especially after meals, should be an obligatory minimum (16).

Dental caries results from metabolic processes occurring in bacterial plaque present on the surface of teeth. It was found that bacterial plaque must be at least 2 days old before the attack of carbohydrates would decrease oral pH to the level causing dissolving of hard tissues of a tooth. According to that dental plaque must be regularly eliminated by means of appropriate tooth brushing. Therefore the old maxim "A clean tooth is never decayed" is still valid (13, 14). It was proved that frequent but not accurate removal of plaque is not as effective as proper tooth brushing performed at least once a day. Moreover application of a tooth brushing (14). Therefore the effectiveness of removal of dental plaque depends on repeated and appropriate brushing, the applied method of brushing as well as the use of a suitable tooth brush (20).

In the own material 55.7% of the examined pupils brushed their teeth twice a day, once a day -32% and three times a day only 12.3%. Comparable examination on 18-year-olds in China proved that a higher percentage of pupils brushed their teeth with lower frequency as 50.3% did this only once a day (22).

Gibson et al. (9) proved the relationship between frequency of teeth brushing and prevalence of caries. In the group of people frequently brushing their teeth only 21% had caries, while caries prevalence in people brushing the teeth less frequently equalled 24%. Strycharz (18) studied health behaviours of third class graduate students from a secondary general school in Lublin and found that 44% pupils brushed the teeth twice daily. In comparison, over two-thirds of adolescents from secondary schools in Warsaw reported brushing the teeth twice daily and only 12.7% – once a day. Also pupils of secondary schools attending dental care in Szczecin report higher frequency of tooth brushing during the day – twice daily in 72.7% of cases (4).

An important factor in maintenance of healthy dentition and periodontium is the time dedicated to teeth brushing (19). In the own studies only 40.2% of the pupils brushed their teeth during 3 minutes, 14.8% – only one minute and 39.3% were not aware of the time dedicated to this activity. The study carried out by Urbaniak (19) on secondary school pupils from Łódź revealed that proper time dedicated to teeth brushing was reported by 52.6% of the examined (50.3% – 2–3 minutes and 2.3% over 3 minutes). Almost one-half of the surveyed adolescents brushed the teeth only during one minute that is insufficiently.

Inadequate habits connected with teeth brushing in the own material may result from the statement of 66.4% of the surveyed pupils that their dentist did not give them information on proper techniques of teeth brushing. In comparison the whole studied population of 18-year-olds from a secondary technical school in Katowice, devoid of dental care, did not know what an appropriate tooth brush should be like and did not know the methods of proper application of a tooth brush (2). These results testify to the practical need of health promotion in the field of oral care. No correlation between the knowledge on healthy behaviours and practical application of the knowledge was observed as in the majority of pupils there was found considerable negligence in the field of oral care and high prevalence of caries.

Epidemiological studies carried out by the WHO proved that about 80% of carietic lesions appear on occlusal surface of molar teeth. This is related not only to abundant dental plaque in these areas, but also to specific histochemical structure of fissures as well as incomplete mineralisation of enamel and dentine characteristic of the developmental age (1, 6, 10). Deep fissures covered with a thin layer of enamel or even devoid of it are z zone, where tooth brush would not penetrate (6).

The ability to use hygienic accessories as well as suitable motivation to apply them allowing more effective cleaning of poorly accessible zones is crucial (5). Many products are available on the market such as tooth pastes, dental floss, mouth-rinses, medical chewing gums containing xylitol or fluorides. They play an important role in remineralisation therapy as they accelerate it due to the content of ions such as fluorides, calcium and phosphates (21).

The efficiency of cleaning of teeth depends also on the degree of wearing out of a tooth brush (19). Knowledge on this subject in the own material is insufficient. The pupils of the technical

secondary school change a toothbrush infrequently (43.4% every 3 months and 43.4% every 6 months, while 11.5% only once a year). In comparison over one-half of graduate students of a secondary general school in Lublin usually change a tooth brush every 3 months and only 6.29% less frequently than every 6 months (18). Similar results were obtained by Urbaniak (19) in the survey study of the population of secondary school pupils in Lódź - 50.1% – every 3 months, 38.5%, every 6 months and once a year or less frequently – 9.3%. However, according to that author in clinical practice no one changed a tooth brush once a month, every 3 months only 10.1% and the majority seldom: 58.6% every 6 months and annually as many as 31.3% of the pupils.

The most willingly used type of a tooth brush in the own material was medium hard – almost two-thirds of the surveyed children. Also pupils of secondary schools in Warsaw mainly use the same type of a tooth brush – 73.89% (4). On the basis of the own observations it can be concluded that 41.8% of the examined adolescents use their favourite tooth paste. The motives of the pupils to choose a certain type of a tooth paste are at the first place whitening and cleaning properties (76.2% of the studied), while fluoride content is less important (16.4%). According to the results acquired by Boguszewska-Gutenbaum (4) in a study of 18-year-olds in Warsaw, the most frequently applied tooth paste was Colgate, followed by Blend-a-Med. For this group of adolescents the factor encouraging to use a certain tooth paste brand was good flavour and smell, while fluoride content was not as essential. In the author's opinion this related to the fact that currently most of tooth pastes available on the market contain fluoride and the differences can be found in taste only.

The results of the own survey showed that over one-half of the examined possess average knowledge and infrequently applies in practice additional means of oral care, such as dental floss or mouth rinses. Comparable results were obtained by Borysewicz-Lewicka et al. (5) in a study on 18-year-olds in Poznań. In a survey of 15-year-olds from Grybów it was found that 76% of the examined adolescents were not using any additional means of oral hygiene (3).

CONCLUSIONS

1. The results show unfavourable state of the oral cavity of pupils attending a technical secondary school devoid of regular dental care.

2. The survey testifies to the fact that the knowledge on oral hygiene and prohealthy behaviours in the studied pupils is poor as well as that motivation to treatment is low.

3. Apart from frequent check-ups and planned treatment it is necessary to increase the level of health consciousness in the examined school children devoid of regular scholar dental care.

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SUMMARY

The purpose of the study was a survey allowing for evaluation how 122 18-year-old pupils of a secondary technical school devoid of dental care are able to eliminate dental plaque. Moreover, there were analyzed differences between two groups of pupils – educated in profession of baker (more prone to dental caries) and educated in other professions. The study questionnaire consisted of 19 questions concerning basic oral hygiene habits, used fluorine prophylaxis, alimentary habits as well as dental treatment. The condition of the dentition was also evaluated clinically basing on the DMF index. The obtained data were the subject of statistical analysis using Statistica for Windows 6.0 software. The results show unfavourable state of the oral cavity of pupils attending a technical secondary school devoid of regular dental care. The survey testifies to the fact that the knowledge of oral hygiene and prohealthy behaviours in the studied pupils is poor as well as that

motivation to treatment is low. Apart from frequent check-ups and planned treatment it is necessary to increase the level of health consciousness in the examined school children devoid of regular scholar dental care.

Higiena jamy ustnej u uczniów technikum pozbawionych szkolnej opieki stomatologicznej

Celem pracy była ocena umiejętności usuwania płytki nazębnej przez 122 osiemnastoletnich uczniów szkoły zawodowej, pozbawionych szkolnej opieki stomatologicznej. Ponadto zbadano różnice pomiędzy dwiema grupami uczniów – kształconych w zawodzie ciastkarza (wyższe ryzyko rozwoju próchnicy) i kształconych w innych zawodach. Kwestionariusz ankiety składał się z 19 pytań dotyczących podstawowych nawyków higienicznych w zakresie jamy ustnej, stosowanej profilaktyki fluorkowej, nawyków żywieniowych, jak też leczenia stomatologicznego. Stan uzębienia oceniono klinicznie na podstawie liczb PUW. Dane analizowano statystycznie za pomocą oprogramowania Statistica for Windows 6.0. Wyniki wskazują na niekorzystny stan zdrowia jamy ustnej uczniów uczęszczających do technikum, pozbawionych szkolnej opieki stomatologicznej. Badanie wykazuje, że poziom wiedzy na temat higieny jamy ustnej oraz zachowań prozdrowotnych u badanych uczniów jest niski, podobnie jak motywacja do leczenia. Oprócz częstych wizyt kontrolnych i leczenia stomatologicznego należy podwyższyć poziom świadomości zdrowotnej uczniów pozbawionych szkolnej opieki stomatologicznej.