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DENTAL EDUCATION IN THE PROMOTION OF ORAL HEALTH AMONG TWELVE-YEAR-OLDS

СТОМАТОЛОШКАТА ЕДУКАЦИЈА ВО ПРОМОЦИЈА НА ОРАЛНОТО ЗДРАВЈЕ КАЈ ДВАНАЕСЕТГОДИШНИ ДЕЦА

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Abstract

Dental education is a special discipline whose planning, programming and performing covers all professional health persons and services as well as educational and pedagogical persons, orienting all their activities towards the individual and the community in order to motivate and transform them in the role of active participants in keeping and improving their own personal health. The aim of our study is to enhance the positive forms of health behavior and promote oral health as an undivided segment of health as a whole to children at the age of twelve; to develop motivation for protecting oral health with timely recognition of risk factors for development of oral diseases and correction of bad habits and attitudes of children at the age of twelve. For realizing the given aim we followed 80 respondents from both genders, at the age of twelve, with different hygiene-dietetic regimes, all pupils in the primary school “Nikola Vapcarov” – Skopje. Respondents had good general and oral health, with exclusion of dental caries. The study was realized in three phases, whereof, the first phase was realized during the conducted dental education of all respondents, the second phase one month after the dental education, and the third one three months after the conducted dental education. The condition of dental health in all respondents in our study is shown through DMF index values whose average was 7.05. There was a significant differences between oral hygiene index values in all pupils between the first and the second phase, between the second and the third phase of the research, as well as in values of the OHI index during the implementation of education and three months after that. **Key words:** Promotion of oral health, dental education, twelve-year old children, dental status.

Апстракт

Стоматолошката едукација претставува посебна дисциплина во чие планирање, програмирање, и изведување учествуваат сите здравствени стручни лица и служби, наставни и педагошки лица, насочувајќи ги сите активности кон поединецот и заедницата да ги мотивираат и да ги трансформираат во улогата на активни учесници во зачувувањето и унапредувањето на сопственото здравје. Цел на нашата студија е да постигнеме унапредување на позитивните форми на здравствено однесување и промоција на оралното здравје како неделив сегмент на здравјето во целина кај деца на дванаесетгодишна возраст; развој на мо¬ти¬ва¬ци¬ја¬та за заштитата на оралното здравје со благовремено препознавање на факторите на ризик за развој на оралните заболувања и корекција на лошите навики и ставови кај деца на дванаесетгодишна возраст. За реализација на поставената цел беа проследени 80 испитаници од обата пола, на возраст од 12 години, со различен хигиено-диететски режим, ученици во основното училиште “Никола Вапцаров” - Скопје. Испитаниците се со зачувано општо и орално здравје, со исклучок на денталниот кариес. Студијата се реализираше во три фази, при што, првата фаза беше реализирана пред спроведената стоматолошка едукација на сите испитаници, втората фаза еден месец по стоматолошката едукација, и третата фаза беше реализирана три месеци по спроведената стоматолошка едукација, при што беа детерминирани вредностите на pH на плунката, ОХИ индексот, индексот на гингивална инфламација и индексот на гингиворагија и беше регистриран КЕП индексот. Состојбата на денталното здравје кај сите испитаници во нашата студија е прикажана преку вредностите на КЕП индексот чија средна вредност изнесува 7,05. Сигнификантна е разликата меѓу вредностите на ОХИ индексот кај сите ученици меѓу првата и втората фаза, меѓу втората и третата фаза на истражувањето, како и на вредностите на ОХИ индексот пред одржувањето на едукацијата и три месеци после тоа. **Клучни зборови:** Промоција на оралното здравје, стоматолошка едукација, дванаесетгодишни деца, дентален статус.

Introduction

It is a fact that health has been a case of interest and interpretation of experts in different scientific disciplines for many years, giving its universal value, it is still, as a whole and in very respectful level can be discussed only from a medical and biological point of view. Nourishing health has always been a significant duty of each individual and society. In the past, health was seen only from the diseases aspect, and questions regarding maintaining health were reviewed only in the sphere of health protection. Promotion of health represents a concept in which health is created through political and social processes to reach social, mental and physical well-being of all people.

Teeth diseases and other tissues in the oral medium, such as: dental caries, parandotopathy, orthodontia anomalies, malign and hereditary diseases belong to the group of chronic diseases, representing a great health problem with expressed social aspects. Widespread dental caries, parandotopathy and orthodontia anomalies give the characteristics of pandemic diseases. Of those, dental caries represents a special health problem, because it is shown very early, but spreads very quickly, covering more and more new people, new teeth, causing heavy complications, which leads to complete or incomplete loss of teeth with all present consequences from that loss.[1]

The World Health Organization (WHO) defines health education as an active process of learning and empowerment of individuals and the public in applying the acquired knowledge for health.[2,3] Dental health education represents special a discipline in which planning, programming, organizing and performing are covered by all professional health persons and services, educational and pedagogical persons, orienting all the activities towards the individual and the community in order to motivate and transform them in the role of active participants in keeping and improving their oral health .

In Scandinavian countries, the postulates of the World Health Organization (WHO) are reached and achieve the values of the average caries index of 1.5 in children of twelve years of age.[4,5] Also, in Denmark the value of this index is 0.8, in Norway 1.6, while in twelve-year old children in Portugal it is 1.5.[6]

Prevention programs which also involve the educational staff in teaching the importance and improvement of oral health in Poland, during a period of five years, resulted in decreasing the average caries index from 4.2 to 3.8. Wierzbicka M. et al.[7]

National research made in Italy by Campus G. et al.[4] during the period between 2004 and 2005, in twelve-year-old children showed values of average caries index of 1.09, with statistical siginifcant differences among children of different genders, and that in girls it was 1.20 while in boys 0.99.

Well organized prevention programs realized through regular and correct brushing of teeth with a toothpaste for everyday maintenance of oral hygiene which contain fluorides, implementing oral education, and conducting organized watering fissures and yolks of lateral teeth, in Slovenia,[3] contributed to decreased values of average caries index from 5.1 in 1987 to 1.8 in 1998 in twelve-year-old children and from 10.2 to 4.3 in fifteen-year old children.

The last data are from 2009 by the Clinic for child's and preventive dentistry and the Faculty of Dentistry in Belgrade, with the intention to be used in designing a dental preventive program in the Republic of Serbia.[8,9] The results showed that in twelve-year old children, the average caries index was 2.8 while in fifteen-year old children it was 5.6.

The study of Knezevic R. et al.[10] indicates the successfulness of the preventive program conducted within three years, reaching an improvement of oral health in children. The preventive program started 2005, when the structure of the parandotosis index in respondents for healthy teeth was 75%, teeth with caries 18% and sealed teeth 7%, the average OHI index was 1.60%. Three years later, = in the same pupils the structure of the KEP index for healthy teeth was 81%, teeth with caries 10%, sealed teeth 8%, and the average OHI index was 0,95%.

Sheiham A.[11] indicates significantly lower indices of gingival inflammation and gingival virus, as well as an OHI index, in all respondents who brushed with fluoride toothpaste under supervision in relation to respondents who brushed under supervision, but with non-fluoride toothpaste; compared to respondents who brushed without supervision with fluoride toothpaste.

The aim of our study is to improve positive forms of health behavior and to promote oral health as an undivided segment of health as a whole in children at the age of twelve; to develop their motivation for protecting oral health with timely recognition of risk factors for development of oral diseases and correction of bad habits and attitudes in twelve-year-old children.

To realize the given aims, the study followed and determined: the values of the KEP index in all respondents; the structure of the KEP index; the values of KIO – general caries frequency; the values of the OHI index, before implementing dental education in the first phase; one month (II phase) and three months after the realized education (III phase) and its comparison and to the implemented questionnaire.

Material and methods

For realizing the given aim we followed 80 respondents from both genders, at the age of twelve, with different hygiene-dietetic regimes, all pupils from the primary school "Nikola Vapcarov" – Skopje. Respondents had a good general and oral health, with exclusion of dental caries. The study was realized in three phases, whereof, the first phase was realized during the conducted dental education of all respondents, the second phase one month after the dental education, and the third phase three months after the conducted dental education, when we determined the values of the DMF index (*Klein-Palmer-system*), the Structure of the DMF index, the values of KIO – General caries frequency, the values of the OHI index (*method of Greene –Vermillion*), implemented questionnaire.

For statistical processing of the obtained data we applied software EXCEL 2007, SPSS version 12 and STATISTIKA version 7.

Results

Dental education in our study was conducted in the first phase of the research, after dental examination of each child, with the help of a power point presentation and an individual demonstration. Dental education was realized in order to provide the students with the necessary information for maintaining oral hygiene, applying fluoride and establishing a proper dietary regime, as well as motivating them to take an active part in preventing the onset of diseases in the oral medium. The state of dental health is shown through the values of the DMF index, in all respondents, of both genders (Table 1.). The average value of the DMF index is $\bar{x} = 7.05$, with minimum values of 0.00 and a maximum of 14.0. Regarding the gender, the values of the DMF Index amounted to 6.9 in male and 7.2 in female respondents.

Table 1. Mean values of the DMF index in all respondents

Number of respondents	$\bar{\chi} \pm \sigma$ (total)	$\bar{\chi} \pm \sigma$ M / F	min	max
8o	7.05	6.9 / 7.2	0.00	14.o

In the twelve year old students, of the total DMF (7.05), the biggest percentage, 75.8%, were cariogenic, unwashed teeth, and much more in males (81.9%) than in females (69%). Extracted teeth were represented by 3.9%, i.e. 3.19% in males and 4.6% in females, while compared to restored teeth; they were represented with 20.2%, 14.8% in males and 25.5% in females (Table 2./Graph 1.).

The prevalence of dental caries in permanent teeth among our respondents expressed through the CIP index or the general caries frequency is 98.75%, as shown in Chart 2.

The median values of the Oral Hygiene Index (OHI) among all our respondents in all phases of the research are shown in Table 3. It can be noted that in the first phase of the research it is the highest at 1.72 ± 0.58, with registered minimum values of 0.66 and maximum of 3.00. After the conducted dental education, in the second phase of the survey, the mean value of the OHI index decreased to 1.36 ± 0.46, with minimum values of 0.33 and maximum of 2.33 and a similar value in the period of three months after the conducted dental education at 0.94 ± 0.62, with a minimum value of 0.0 and a maximum value of 2.0 (Table 3.)

Table 2. Structure of the DMF Index

Structure of DMF	M	F	TOTAL
D - decay	81.9 %	69.8 %	75.8 %
E - extraction	3.19 %	4.6 %	3.9 %
F - filling	14.8 %	25.5%	20.2 %
Total	100%	100%	100%

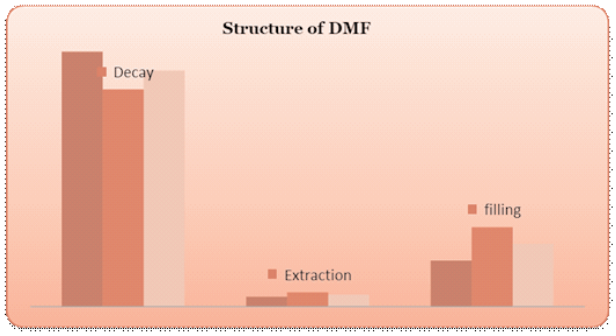

Chart 1. Structure of the DMF

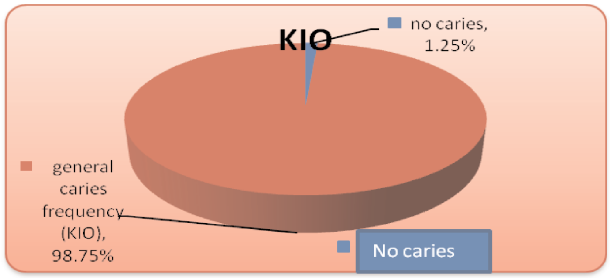

Chart 2. Values of the KIO index

Table 3. Average values of the OHI index in all phases of the research

OHI values	No. of respondets	$\bar{\chi} \pm \sigma$	Min	Max
OHI 1	80	1.72 ± 0.58	0.66	3.0
OHI 2	80	1.36 ± 0.46	0.33	2.33
OHI 3	80	0.94 ± 0.62	0.0	2.0

The relationships between the average values of the Oral Hygiene Index among all respondents in the three phases of the study, shown through the Student's "t" test for dependent samples, indicate a significant difference between the values of the OHI index among all students between the first and second stages, between the second

Table 4. Correlation between the OHI values in the three phases of the ANOVA test

ANOVA test about OHI								
Variable	SS Effect	df Effect	MS Effect	SS Error	df Error	MS Error	F	P
OHI 123	24.40396	2	12.20198	74.39049	237	0.313884	38.87418	0.000000

Table 5. Correlation between the values of the OHI index for all respondents in the three phases of the research

OHI	$\bar{\chi} \pm \sigma$	Σ	"t"	P
OHI 1 - OHI 2	0.36	0.34	9.37	<0.01
OHI 1 - OHI 3	0.78	0.59	11.7	<0.01
OHI 2 - OHI 3	0.41	0.56	6.61	<0.01

and third stages of the research, as well as the values of the OHI index before the education and three months after, there is a significant difference ($p < 0.01$) (Table 4. and 5.). These results speak for the improvement of oral hygiene among our respondents after the dental education. With the ANOVA test for OXI, the index shows a statistical significance of improved oral hygiene in children who followed the educational hour ($f = 38.87$, $p \leq 0.01$).

From the total number of questionnaires or 8 in number, we could statistically process only 5, which we compared statistically in respct of the gender of students. The highest percentage of children in our study, for the first time, visited a dentist at the age of six, 57%, then 28% visited the dentist for the first time at the age of five, while for the first time 15% of the examinees visited the dentist at the age of seven years (Table 6.).

In the three examined groups, the respondents visit their dentist more than once annually - 58.8%, 50% of the male and 67.5% of the girls. Once a year responded25%, twice a year a total of 12.5% and never visited a dentist, a total of 3.8% of the respondents (Table 7.). The statistical analysis of values with the Mann-Whitney test ($Z = 0.5$ $p > 0.05$), as well as with the test of Kolmogorov-Smirnov (0.44) does not show the existence of a statistic significance.

Table 6. Distribution of respondents by age from the first visit to the dentist

First visit	No. of respondets	M	F	Total
5 year old	80	21.9	35.8	28 %
6 year old	80	60.9	51.2	57 %
7 year old	80	17	12.8	15 %

Table 7. Distribution of respondents from the three groups according to the frequency of visiting a dentist

Visits to the dentist	Gender		Total
	M / %	F / %	
Once a year	30	20	25
Twice a year	12.5	12.5	12.5
More times	50	67.5	58.8
Never	7.5	0	3.8
Total	40 / 100	40 / 100	80 / 100

In the three groups of examinees, pupils performed teeth brushing twice a day (62.5%, with the same percentages in both sexes), followed by after each meal (28.8%, 22.5% of the boys and 35% of the girls), while brushing teeth once a day was practiced by 8.8%, 15% of boys and 2.5% of girls (Table 8.).

The statistical analysis of the values of the teeth brushing frequency with the Mann-Whitney test showed 90% significance ($Z = -1.8$ $p \leq 0.10$), and the Kolmogorov-Smirnov test (0.55) did not show the existence of a static significance.

The largest percentage of respondents in our study are changing their toothbrush every three months (81.3%, 87.5% males and 75% females), 7.5% every six months (10% of boys and 5% of girls), while 10 % of respondents change the toothbrush once a year (2.5% boys and 17.5% girls). It is interesting to point out that 1.3% of all respon-

Table 8. Distribution of respondents by sex of the three groups according to the frequency of teeth brushing by gender

Tooth brushing	Gender		Total
	M / %	F / %	
Once a day	15	2.5	8.8
Twice a day	62.5	62.5	62.5
After each meal	22.5	35	28.8
Total	40 / 100	40 / 100	80 / 100

Table 9. Distribution of respondents by gender according to changing toothbrushes

Changing the brush	Gender		Total
	M / %	F / %	
Every 3 months	87.5	75	81.3
Every 6 months	10	5	7.5
Once a year	2.5	17.5	10
Never	0	2.5	1.3
Total	40 / 100	40 / 100	80 / 100

Table 10. Distribution of examinees from the three groups according to the use of dental hygiene means

Dental devices	Gender		Total
	M / %	F / %	
Dental floss	10	17.5	13.8
Refreshing liquid	30	42.5	36.3
Interdental brush	0	5	2.5
None of the listed	60	35	47.5
Total	40 / 100	40 / 100	80 / 100

dents reported that they do not change the toothbrush at all (Table 9).

Educating how to brush your teeth (Tab.8) and tips regarding more frequent changes of the toothbrushes (Tab.9) have proved statistically nonexistent with Kolmogorov-Smirnov (0.78), but with Mann-Whitney showed a significance of 90% ($Z = -1.6$, $p \leq 0.10$).

In the largest proportion of the three examined groups, the respondents do not use any of the additional means of maintaining teeth hygiene (47.5%, 60% boys and 35% girls), followed by a rinse water 36.3%, of which 30% boys and 42.5% girls. Dental floss is used by 13.8% of the respondents, 10% by boys and 17.5% by girls. Interdental brush is used by 2.5% of the examinees (Table 10).The percentage difference registered between the modalities of the use of additional means of teeth hygiene among the examinees of both sexes, with the Mann - Whitney test, the significance of the education was statistically significant for 95% ($Z = -2.01$, $p \leq 0.05$).

Discussion

Health education, as part of the promotion of oral health, contributes to a better understanding of the importance of oral health and helps develop specific skills, enabling the application of behavior from risk to health-improving. Its application is of particular importance to schoolchildren because of the early development of behavior that has a long-term impact on oral health and is difficult to change later in life.

The state of dental health among all respondents in our study is shown through the values of the CEP index with an average value of 7.05, with minimum values of 0.00 and a maximum of 14.0. Of the total CEP (7.05), the largest percentage, 75.8%, were caries, unwashed teeth, and much more in males (81.9%) than females (69%). Extracted teeth were represented by 3.9%, 3.19% in males and 4.6% in females, while compared to restored teeth, they were represented with 20.2%, 14.8% for males and 25.5% for females - children.

Davidovic, V. et al.[1] examined the state of dental health in twelve children from Foca, Cainice and Kalinovich, and found that only 4% of children had healthy teeth, the lowest value of KEP was 1, and was observed in 2.2% of children, while the highest value of the CEP index was 21 and was registered in 0.2% of children. In 16.4% of children, the most frequent value of the CEP index was 4. The overall prevalence of dental caries was 50.3%, while in girls the values of the CEP index were higher than for boys ($p < 0.05$).

Rajic Z. et al.[12] in their epidemiological study provide data on the values of the CEP index in twelve year olds over a longer period of time (1968, 1973, 1980, 1990/1 and 1999), starting in 1968, when the PEP index was 7.0 and in 1991 it fell to a value of 2.6. However, in 1999, the value of the CEP Index rose to 3.5 as a result of the war in Croatia and the reorganization of the health care system in this period, considered as an authority in this study.

Results on the oral status of 12-year-old children in Cambodia, obtained in the research by Teng O. et al.[13]