ECONOMIC IMPORTANCE OF THE PREVENTIVE MEASURES IN DENTISTRY

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ABSTRACT

Introduction: Previous studies have shown that the state of oral health in the area of Podrinje Canton is really poor. Taking into account that in the last five years are implemented two projects in the municipality it is necessary to examine the impact of preventive measures in dentistry on the oral health. The research goals are: a) To evaluate the impact of continuing education and local fluoridation on the state of oral health; b) To analyze the economic importance of preventive measures. The examinees and methods: For the purpose of the research on activities of continuing education on the importance of oral health and local fluoridation of teeth and to determine the economic aspects of the application of preventive measures is tested and reviewed 900 students from fourth to ninth grade. The children were divided into three groups of 300 students in each group: a) In the first group of children is carried out continuous education about proper tooth brushing and the importance of oral hygiene and local fluoridation twice a year during the last three years, b) In the second group children carried out local fluoridation twice a year during the last three years while in the third group, there were no continuous prevention measures; c) Used is a single questionnaire for all respondents. Data obtained in this study were analyzed by descriptive and inferential statistical methods.

The results and conclusions: The importance of continuing education and local fluoridation is clearly reflected in the different values DMF-index, which was the subject of research. In the first group, in which is carried out continuous education about proper tooth brushing and the importance of oral hygiene and local fluoridation twice a year during the last three years, b) In the second group children carried out local fluoridation twice a year during the last three years while in the third group, there were no continuous prevention measures; c) Used is a single questionnaire for all respondents. Data obtained in this study were analyzed by descriptive and inferential statistical methods.

Key words: oral health, local fluoridation, economic importance of preventive measures in dentistry, education.

1. INTRODUCTION

Caries is today, regardless of the good knowledge about its multiclausal etiology and the possibilities for its effective prevention still the most widespread disease of our civilization, which affects about 95% of our population (1). It affects all populations and age groups (2), this is a disease that is very difficult to completely eradicate due to a complex interaction of biological factors, dietary habits, social status, etc. (3).

Because of its high incidence and socio-economic importance, the World Health Organization in 1982 defined the objectives, which should be achieved in the field of dentistry until 2000. These are:

• That 50% of children aged 5-6 years is free of cavities.
• That the DMF index in twelve year olds is less than 3.
• That 85% of the population in the age of 18 years is without a lost tooth.
• That in the age group 35-45 years is reduced by 50% the number of extracted teeth (4).

Over 70% of countries in the world have managed to achieve this goal, as well as most European countries. The reasons for the improvement of oral health are numerous and complex, but is most often attributed to: the implementation of systematic school prevention programs and health education, then the massive and continuous application of fluoride, improved oral hygiene, more sensitive approach to the consumption of sugar, as well as changes in lifestyle and living conditions (5). The lowest DMF value is registered in Switzerland 0.84, followed by the Netherlands and Sweden 0.9 (6). A similar decrease in caries prevalence was recorded in Finland, Denmark, Sweden, UK, Germany and Iceland, where the DMF was below 1.5 and 23-49% of twelve years old were without caries. DMF-index in 1999 was 1.8 in Slovenia, 3.0 in Macedonia, 3.5 in Croatia, while the average DMF-index of twelve years old in Federation of Bosnia and Herzegovina according to WHO data for 1997 amounted to
The prevention of oral diseases should be a priority in relation to the treatment of the consequences of oral diseases. In countries where the DMF-index is low emphasis is placed on individual prevention, as opposed to countries with high DMF-index which recommended and implemented the preventive measures for the general population. Since the state of oral health in the Bosnia-Podrinje Canton is really poor, the prevention program was made, which has been implemented for more than five years in urban primary schools of the municipality of Gorazde, and in the focus of preventive programs are:

- Education of children, and the parents about oral health;
- Regular fluoridation of teeth (twice a year);
- Advices related to oral hygiene, nutrition and the importance of timely protection of permanent teeth.
- This research aimed to provide answers to the following questions:
  - Whether there are differences in the prevalence of the caries between different groups of respondents?
  - Whether there are differences in values of DMF-index between different groups of respondents?
  - How much “decay” exist in different groups of subjects?
  - Whether prevention programs, which are implemented in Bosnia-Podrinje Canton, are positive from an economic point of view?

2. THE PURPOSE OF THE RESEARCH

To evaluate the impact of continuing education and local fluoridation at the state of oral health.

Analyze the economic importance of preventive measures.

3. THE EXAMINEES AND METHODS

In the school year 2014/2015 is conducted an extensive research, which is aimed at the identification of oral disease and the results of the application of dental preventive measures. This research was carried out with the consent of the parents, the ethics committee of Dental Medicine Faculty in Sarajevo, the Cantonal Ministry of Health of Bosnia-Podrinje
Canton, as well as the consent of the Cantonal Ministry of Education of Bosnia-Podrinje Canton.

Subjects were divided into three groups depending on the application of preventive measures. In each group there were 300 respondents from fourth to ninth grade.

A single questionnaire was used, which is recommended by the WHO.

The total number of respondents was 900, as shown in Table 1.

Registration of oral health is carried out in the classrooms according to WHO recommendations. Testing was carried out with one on the adjacent tooth starting from the most distal teeth in the upper right quadrant to the most distal tooth in the lower right quadrant.

To label the teeth were used letters for baby teeth and numbers of permanent teeth, according to the codes listed in Table 2.

The main criterion for the presence of teeth is to have at least one visible surface of the test teeth.

Based on the determined results there is a chance to really determine how much it cost to repair and how much money should be invested in order to repair the oral problems in each subject.

The values of each service are defined in the code book provided by the Federal Health Insurance and Reinsurance Fund.

To obtain more precise data, which are essential for determining the economic aspect of the preventive measures codes 2 and 3 will be divided into:

- F1–Single surface filling
- F2–Double surface filling
- F3–Multifaceted filling
- F4–Repair of the dental crown.

Also, in determining the need for treatment will be considered only permanent teeth and will use the specified values from Table 3.

Use of resources will be calculated on the basis of adding value to every filled or extracted tooth in the oral cavity.

The necessary funds for reconstruction of oral cavity will be calculated so that gather the value of individual teeth, which is in need of treatment with the addition of the cost of treatment of periodontal disease if the same is present.

As in the study the radiography is not used, in case of dual facets, multiple facets filling and upgrade of the tooth crown, and in the deeper carious lesions will be used the service of indirect pulp capping with application of proper anesthesia.

To the extraction of permanent teeth also is added the value of appropriate anesthesia.

In determining the existence of gingival bleeding will use code for treatment of gingivitis with the application of the drug lump sum once per respondent. In determining the existence of deposits is used the code removal of subgingival lime per port, this is the code can be used up to two times per respondent, because the value of the account codes per arch.

4. RESULTS

In the first group of subjects, where was conducted continuous education about the importance of oral health and regular local fluoridation has spent 12,336 KM per price list of the Federal Institute for Health Insurance and Reinsurance (average per child 41.12 KM).

In the second group of children where the properly local fluoridation was carried out, but without continuous education was spent 13,731 KM (average per child 45.77KM).

In the third group of subjects, which did not have any preventive measures the group spent 17,513 KM (average per child 58.38 KM).

Mann-Whitney test revealed a significant difference in the value of consumed resources of group G1, in which was conducted continuing education with regular dental fluo-

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\begin{array}{|c|c|c|}
\hline
G1 & G2 & G3 \\
\hline
\text{Respondents with education and fluoridation of teeth} & 390 & 300 & 300 \\
\text{Respondents with local fluoridation, without continuing education} & 170 & 260 & 108.926 \\
\text{Respondents without education and local fluoridation} & 128.1428 & 118.079 & 137.000 \\
\text{Total} & 900 & 300 & 300 \\
\hline
\end{array}
\]

Table 3. Classification of services of the Federal Health Insurance and Reinsurance Institute

Table 4. Total funding for oral health
Economic Importance of the Preventive Measures in Dentistry

In the first group of subjects, where continuous education about the importance of oral health and regular local fluoridation was carried out, it is necessary to spend 7006 KM according to the price list of the Federal Institute for Health Insurance and Reinsurance (average per child 23.35 KM) for the rehabilitation of the oral cavity.

In the second group of children, where local fluoridation was carried out, but without continuing education, it is necessary to spend 13,882 KM (average per child 46.27 KM). In the third group of subjects, in which was not carried out any preventive measures, it is necessary to spend 35,649 KM (average per child 111.88 KM).

Mann-Whitney test revealed a significant difference in the values of the necessary funds for reconstruction between patients group G1, in which was conducted continuing education with regular dental fluoridation and group G2 of respondents with local fluoridation, but without continuing education. The rehabilitation costs for patients group G1, in which was conducted continuing education with regular dental fluoridation and group G2 of respondents with local fluoridation, but without continuing education U = 35 472.50, z = 4.977, p <0.0001.

Among the respondents from group G1, or the children from fourth to ninth grade of elementary school “Husein ef. Djozo”, which had a continuous education about the importance of oral health and regular local fluoridation required is less funds according to the price list of the Federal Institute for Health Insurance and Reinsurance (average per child 23.35 KM) for the rehabilitation of the oral cavity, as opposed to respondents from group G2, in which was implemented local fluoridation, but without continuous education about the importance of oral health (an average per onechild 46.27 KM).

Mann-Whitney test revealed a significant difference in necessary funds between respondents from group G1, where was conducted continuing education with regular dental fluoridation and patients group G3 without applied preventive measures U = 19 382.00, z = 12.616, p <0.0001.

Among the respondents from group G1, or for children from fourth to ninth grade of elementary school “Husein ef. Djozo”, which had a continuous education about the importance of oral health and regular local fluoridation, should be used less funds according to the price list of the Federal Institute for Health Insurance and Reinsurance (average per child 23.35 KM) for the rehabilitation of the oral cavity, as opposed to respondents from group G3, which was without education and local fluoridation (average per child 111.88 KM).

Mann-Whitney test revealed a significant difference in necessary funds between patients groups G1, where was conducted continuing education with regular dental fluoridation and patients groups G3 without applied preventive measures U = 27 082.00, z = 8.617, p <0.001.

For subjects group G2, in which was implemented local fluoridation Was needed less funds according to the price list of the Federal Institute for Health Insurance and Reinsurance (average per child 46.27 KM), as opposed to the respondents from group G3, which did not have preventive measures (average per child 111.88 KM).

5. DISCUSSION

This study, which followed the connection of caries and implementation of preventive measures in Bosnia-Podrinje Canton, verified the importance of preventive measures on the incidence and prevalence of dental caries. The importance of continuing education and local fluoridation is clearly reflected in the different values of DMF-index, which was the subject of this research. The first group of subjects, in which was carried out continuous education and local fluoridation value of DMF-index was 2.7, in the second group of subjects, in which was carried out local fluoridation, this value is 3.56, while in the third group of respondents, where preventive measures was not carried out continuously the...

|   | G1- Respondents with education and fluoridation of teeth | G2-Respondents with local fluoridation, without continuing education | G3- Respondents without education and local fluoridation | Total |
|---|---|---|---|---|
| N | 300 | 300 | 300 | 900 |
| Mean | 23.353 | 46.273 | 111.883 | 62.819 |
| SD | 48.412 | 76.878 | 117.119 | |
| 95% CI | 0.000-0.000 | 0.000-21.000 | 64.000-92.460 | |
| 25-75 P | 0.000-30.000 | 0.000-62.000 | 15.000-155.500 | |
| Total | 7006 KM | 13882 KM | 35649 KM | 56537 KM |

Table 5. The necessary funds for reconstruction in relation to oral health.
value DMF index was 5.93.

Share of carious tooth in DMF-index, as well as the need for treatment is much lower in children where preventive measures were implemented.

In extensive research on 800 respondents, where respondents were children from first to eighth grade, which was carried out on the territory of Bosnia-Podrinje Canton in 2009 was examined the effects of short-term continuing education for a period of three months on oral health in children as follows:

Score of repaired: non repaired teeth are changed in favor of restored teeth in children, where they conducted continuing education in most of the class (in the second and third there was no significant change) by about 20%.

There was no significant change in values of DMF-index, or with respect to the take a short follow-up period (six months) could not even expect to reach significant changes

Oral hygiene improved by about 40% in children, when continuing education was conducted in all grades except first grade (13).

Research for a period of three years from the application of preventive measures in terms of local fluoridation and continuing education is done in Banja Luka in children grades I-IV, where there was an improvement of oral health (DMF-index in fourth grade in 2005 amounted to 4.39 the value of oral hygiene index was 1.60. In 2008, DMF-index in fourth grade was 2.91 and the value of oral hygiene index 0.95 (14).

Similar research for a period of six months was carried out in Pancevo on a sample of 112 respondents of the second and seventh grade, where also after continuing education was reduced the frequency of children with gingivitis, as well as improved oral hygiene (15).

In Iran, the influence of continuing education on school-age subjects for a period of three months, which are also oral hygiene habits improved in the group of respondents with education (16).

The results of this research are very difficult to compare with other studies, because Bosnia and Herzegovina does not have data for similar research. In other countries have done the economic analysis but cannot be compared because of differences in health care systems, different financing and presentation of dental services. Thus, in Japan also available from: http://www.whocollab.od.mah.se/euro.html

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