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Reduction trend of the DMFT Index among children at age 12 in the Republic of Macedonia

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Abstract

Introduction: Oral diseases are public health problem, especially because they are at the same time risk factors for many chronic diseases.

Objectives: The vision of the National Strategy is an educated, highly motivated population with preserved oral health.

Material and methods: In Republic of Macedonia the values of DMFT index among children at age 12 in 2001y. was 6.88 which required the creation of a National Strategy for Prevention of Oral Diseases in Children. The Strategy started with implementation from 01-01-2008 and children at age 0-14 were covered with provided preventive measures.

Results: In 2018, the evaluation showed decrease trend in the values of the DMFT index among 12 year old children, from 6.88 to 2.12 for the first generation of children covered by the Strategy, 1.91 for the second, 1.97 for the third and 1.89 for the fourth generation of children.

Conclusion: The evaluation of the implementation of the Strategy in period from 2008 to 2018 has shown and a few inconsistencies. The new Strategy (2018-2028) will improve oral and an even greater trend of decline in the values of the DMFT index in 12-year-olds. Our goal is to achieve the DMFT values among 12 year old children under 1 and increase the percentage of 6 year old children without caries to 60%.

Key words: national strategy, oral health, caries prevention.

I. INTRODUCTION

Oral diseases are major public health problem in the world because at the same time they are also risk factors for many chronic diseases. *The global burden of diseases study* showed that 3.9 billion people through worldwide are affected by oral cavity disorders. The experience of pain, problems with eating, chewing, smiling and communication due to missing, discoloured or damaged teeth have a major impact on people's daily lives and well-being. Furthermore, oral diseases restrict activities at school, at work and at home causing millions of school and work hours to be lost each year throughout the world.(1)

Dental caries and periodontal disease have historically been considered the most important global oral health burdens. Dental caries is still a major health problem in most industrialized countries as it affects 60-90% of school-aged children and the vast majority of adults. In 2004, WHO updated the epidemiological information available in the databanks.(2,3)

In most developing countries, the levels of dental caries were low until recent years but prevalence rates of dental caries and dental caries experience are now tending to increase. This is largely due to the increasing consumption of sugars and inadequate exposure to fluorides. In contrast, a decline in caries has been observed in most industrialized countries over the past 20 years or so. This pattern was the result of a number of public health measures, including effective use of fluorides, together with changing living conditions, lifestyles and improved self-care practices. However, it must be emphasized that dental caries as a disease of children has not been eradicated, but only controlled to a certain degree.(1)

More than a decade ago, the World Health Organization (WHO) published a document aimed at continuously improving oral health in the 21st century.

The document emphasizes that oral health is an integral part of general health, that it has a significant impact on quality of life and is essential to the general well-being.



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In the same document, oral health of children and adolescents was emphasized as a priority area for activities, so countries were encouraged to develop primarily preventive approaches through health education in schools and through partnerships between families, schools, health workers and the community, as well as the improvement and modernization of the approach for curative treatments.

But despite the numerous efforts, the improvement of oral health remains a challenge in both developed and developing countries.(4)

Traditional treatment of oral disease is extremely costly; it is the fourth most expensive disease to treat in most industrialized countries. Traditional curative dental care is a significant economic burden for many industrialized countries where 5-10% of public health expenditure relates to oral health. (5,6)

Over the past years, savings in dental expenditures have been noted in industrialized countries which have invested in preventive oral care and where positive trends have been observed in terms of reduction in the prevalence of oral disease.(7,8)

Given the extent of the problem, oral diseases are major public health problems in all regions of the world. Their impact on individuals and communities as a result of the pain and suffering, impairment of function and reduced quality of life they cause, is considerable. In several industrialized countries there have been positive trends in the reduction of dental caries in children and reduction of tooth loss among adults, but dental caries has not been eradicated in children although it has been brought under control in some countries. Thus, global strengthening of public health programmes through implementation of effective oral disease prevention measures and health promotion is urgently needed, and common risk factors approaches should be used to integrate oral health with national health programmes. (1)

Europe recognized the World Health Organization (WHO) recommendations as guidelines for action, and many European countries continued even more intensively with the existing prevention programs, and those who had not have , launched initiatives to create preventive programs with main purpose, to promote oral health and increased effectiveness of prevention programs. (9)

In the EU, the socio-economic burden of oral diseases is significant and accounts for 5% of public health budget. Treatment costs more than those for other diseases, including cancer, heart disease, brain stroke and dementia. According to estimates of the WHO, the treatment of oral diseases is in 4th place at the cost. (1)

This is a disturbing fact because many of the oral diseases can be prevented.

The goal of most of the numerous successful initiatives is to find a commonly appropriate approach to preventing oral diseases which would reduce the socio-economic burden of each country and reduce existing inequalities in providing health services to the population. (10)

This is achieved through several measures, such as:

- reduction of socio-economic and environmental risk factors for chronic diseases
- community-based prevention initiatives
- provision of better access to dental care and
- promoting better routine of oral hygiene

The best preventive programs include different target groups and different preventive measures appropriate for the particular population for which they are intended. Some preventive measures are targeted at specific age groups or specific categories of the population (children, adolescents, people with disabilities and a population living in poverty) and some for the entire population of the country. (9,11)

During the last decade and a half in the Republic of Macedonia, reforms in the healthcare system have taken place with a focus on privatization, first of all to the primary and later, to the secondary dentistry. In the area of public health, emergency dental health care and pediatric and preventive dentistry remained. The unfavorable



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conditions for accepting children in privatized dental clinics, the low fee for the services provided by the Health Insurance Fund, the rich daily pathology of the children's population and the high DMFT values among children at age 12 clearly showed that preventive activities are necessary. Also, the fact that pediatric and preventive dentistry has remained within public health system (meaning that the state has a professional staff for the implementation of an organized preventive program), also that children are the most vulnerable category population and that childhood is the period when it is most easily prevented diseases and the easiest way to acquire proper life habits, a public health program for the prevention and promotion of oral health between children in the Republic of Macedonia was imposed.

In addition, the intention of the Republic of Macedonia to raise the standards for quality of life from the aspect of oral health imposes a need for creating a quality calibrated epidemiological team that will expertly and accurately collect data on the oral and health status of children through which the etiological factors for the occurrence of oral diseases and the necessary measures to prevent them, to this category of population for the achievement of oral health standards recommended by the World Health Organization.(12)

II. OBJECTIVE

The vision of the National Strategy is an educated, highly motivated population with preserved oral health.(34,35,37)

III. MATERIAL AND METHODS

On November 13, 2017y., at 104th Session of the Government of the Republic of Macedonia with Act No. 6448-1, the National Strategy for Prevention of Oral Diseases among Children at age 0-14 in the Republic of Macedonia for the period 2008-2018y. was accepted and it started with implementation from 01-01-2008y. (12) National Strategy for Prevention of Oral Diseases among Children at age 0-14 in the Republic of Macedonia is a document of the Macedonian Ministry of Health, which appointed a team for easier implementation of the program goals stipulated by the Strategy. The National Coordinator and the Coordinative Body organize, monitor and evaluate the work of the Regional Coordinators who organize, monitor and evaluate the work of 147 preventive teams at the level of the whole country. Strategic partners and signatories of the National Strategy are the Ministry of Labor and Social Policy, under the authority of which are all pre-schools in the Republic of Macedonia, the Ministry of Education, under the authority of all primary schools in the Republic of Macedonia, as well as the Ministry of Local Self-Government and the Institute for public health.(13)

Ministry of Health in 2001y. appointed an expert team of pediatric dentists who during the preparatory period from 2001-2006y. conducted a large number of activities:

- estimation of the number of children at aged 0-14 in the Republic of Macedonia
- perceiving their demographic distribution
- assessment of the coverage of children in pre-school and school institutions
- organization of training for calibration of epidemiological teams with assistance of an expert from the World Health Organization
- assessment of oral health in children aged 6 and 12 in the Republic of Macedonia by calibrated epidemiological teams
- dental office condition in public health institutions
- estimation of the number, distribution and age structure of the preventive teams
- estimation of the concentration of fluorine in the tap water from the public water supply
- selecting the most appropriate preventive methods applicable in the Republic of Macedonia
- preparation of a program evaluation plan and evaluation of the results.(14,15,16,17)



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Within the framework of the National Strategy, using the experiences from the developed countries, and in accordance with the needs and opportunities in the Republic of Macedonia, five preventive measures were foreseen:

Mechanical and chemical control of dental plaque

Application of fluoride

Discipline in sugar intake

Using a teeth sealants

Education and motivation of keeping oral health (18,19,20,21,22,23,24,25)

These preventive measures are implemented in all children at aged 0-14 in the Republic of Macedonia, respectively, which are included in pre-school and school institutions and those children who are not included in mentioned institutions - through gynecological departments and vaccination departments in health institutions.

According to the experiences from other countries and the knowledge of eminent professional and scientific journals, we have accepted the using of dental sealants as a simple, fast and painless method easily applicable for children in the Republic of Macedonia.(26)

The efficacy of this method is perceived by reducing the risk of caries to 68.5% after one, 57.9% after two, 40.1% after three and 25.8% after four years of curing in those cases where the sealant remained on the surface to which it was applied. The American Dental Association claims that the teeth with sealants can reduce the risk of cavities in first permanent molars up to 80%.(27)

According to a report of the American Dental Association Science Council, dental sealants are involved in preventing the progression of early unvaccinated carious lesions.(28)

The use of dental sealants is very economical and they keep social money for a wide range of other cost-effective values. The ratio of the required funding for curative versus preventive interventions in some countries is 1: 7.(29,30,31)

Also, experience from other countries shows that education and motivation for oral health is one of the most productive methods for prevention of oral health, although the practical application of acquired theoretical knowledge is not proportional to the acquired theoretical knowledge. But the socio-economic status of trainees does not give any significant difference in the effects of this method if it is repeated every 3 weeks. Also, the attitudes of the parents towards oral health have a great influence on the attitudes of their children towards their own oral health, which is an additional motive for implementation of this preventive measure, both with parents and children.(32,33)

IV. RESULTS

Effects of the implementation of the National Strategy:

Recognition of preventive dentistry and its importance by the health care system in the Republic of Macedonia

- Mass coverage of children (93.94%)
- Free preventive services for all children
- Equal opportunity (affordability) for obtaining preventive services
- Raising awareness of the importance of oral health among parents, pedagogues, children and colleagues from primary prevention
- Unified form for the record of the oral health status of children recommended by the World Health Organization



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Compulsory dental examination and confirmation of the oral status of each child upon enrollment in the first grade in primary school

International cooperation with other countries through the inclusion of the Republic of Macedonia in the oral health educational caravan Orbit

Improving oral health in children shown through the following indicators:

- Increasing the percentage of 6 year old children without caries
- Reduction of the mortality of the first permanent molar
- Reduction of the DMFT values of 12 year old children from 6.88 to:
 - 2.12 for the first generation of children (born 2002) covered by the Strategy
 - 1.91 for the second generation of children (born 2003)
 - 1.97 for the third generation of children (born 2004)
 - 1.89 for the fourth generation of children (born 2005)

Note: the analyzes for each generation of children are done separately and appropriately, when the children covered by the preventive measures from the Strategy filled 12 - which means that the analyzes for the children born in 2002 were made in 2014, for the children born in 2003, the analyzes were made in 2015 year, for children born in 2004, the analyzes were made in 2016 and for the children born in 2005, the analyzes were made in 2017.

V. DISCUSSION

The World Health Organization (WHO) uses the mean DMFT index at 12 years-old as the basic index of comparison for oral health of different populations. This index is of easy collection in primary schools, so that DMFT for this age group has been the best epidemiological index to describe the oral health status of the childhood and adolescence.(36,37)

Because preventive programs produce results after a long period of application of preventive measures, a detailed evaluation of each of the measures being applied and the manner of their implementation is unnecessary. Our evaluation has shown several drawbacks:

There is no organizational body whose sole responsibility would be only organization, monitoring and evaluation of the Strategy. Some colleagues are not at the level of their assignments. There is insufficient support from the relevant institutions for monitoring and regular recalibrating of preventive teams as recommended by the World Health Organization

- Disagreement with some of the governing structures of the involved institutions in the first half of the implementation of the National Strategy
- Purchase of different types of dental sealants that make it difficult to evaluate the achieved results that are projected with a same kind of sealant
- There is no special program for pregnant women
- There is a lack of a special program for small and pre-school children not covered by institutions and this is reflecting through low percentage of Caries Free of 6-year-olds
- Prior to the implementation of the Strategy, the percentage of existing orthodontic anomalies and the condition of the soft oral tissue was not determined (although it was envisaged)
- Children with disabilities were only partially covered



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Based on these recorded negatives from the current implementation of the Strategy for the period 2008-2018, the Republic of Macedonia has future plans and perspectives for the maintenance of oral health in the children's population. A new National Strategy 2018-2028 has already been developed which encompasses and provides:

- Preparation of a pregnant women's program
- Intensive cooperation with the Association of gynecologists
- Preparation of the Program for prevention of early childhood caries
- Preparation of a Program for small and pre-school children who are not included in pre-school institutions
- Intensive collaboration with the Pediatric Association
- Preparation of the Program for children with special needs
- Recalibration, additional training for assessment of orthodontic irregularities and dental support in children covered by the Strategy and intensive monitoring of the work of the preventive teams
- Inclusion of FULL LIFE COURSE - programs as experiences from EU countries with the lowest CEP values for 12-year-olds (Denmark-0.4; Netherlands-0.6; Finland-0.7; Sweden-0.8; UK-0.8; Belgium-0.9 and Switzerland-0.9) (9,2)

VI. CONCLUSION

The implementation of the new supplemented National Strategy will improve the oral health of children in the Republic of Macedonia and an even greater trend of decline in the values of the EPC index in 12-year-olds. Our goal is to achieve the values of the 12-year DMFT index (DMFT <1), increase the percentage of 6 year old children without caries to 60%, reduce the percentage of present orthodontic anomalies, improve the condition of the dental support and lift the awareness of the importance of oral health in children and parents. (35,37)

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