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Prevalence Of First Permanent Molar Caries Among Children At Age 12 In Republic Of Macedonia.

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ABSTRACT

Dental caries is one of most prevalent chronic diseases affecting children and in particular first permanent molar is more vulnerable to caries because of its morphological and functional characteristics. The World Health Organization (WHO) uses the mean DMFT index at 12 years old as a basic index of comparison for oral health of different populations. Objective: To assess the DMFT values and its components in the first permanent molars among 12-year-old children in Republic of Macedonia who are cover with preventive measures of National Preventive Strategy. Material and method: Using explorer and mirror under professional light in dental office, 4 permanent first molars of 73704 12-years-old students were examined from aspect of decay, missing and filing by 147 calibrated preventive team who are part of dental public system during, 2014-2017y. Then DMF6 was accounted for each subject. The statistical analysis was done by SPSS 12.Results: The mean of DMF6 was1.59, 1.46, 1.52 and 1.47 for children who were born in 2002-2004y., respectively. Conclusion: Analysis of DMF6 showed that untreated caries is the most important problem in children at age 12 in Republic of Macedonia. Consistent application of preventive measures from the Strategy will improve oral health in children.

Keywords: first permanent molar, DMFT index, national strategy, caries prevention

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INTRODUCTION

Good oral health is essential for optimal general health and life quality. It encompasses the integrity and health of specific parts of the oral cavity – teeth, oral mucosa, masticatory muscles, tongue, TMJ and salivary glands – used to perform the functions of chewing, speech and swallowing.[11]

Dental caries is a multi-factorial disease involving various factors such as diet, microorganisms, tooth morphology, saliva, as well as genetic predisposition and time. [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)

The most important demographic indicator for the evaluation and measurement of dental caries is decayed, missing and filled teeth (DMFT) index. This index evaluates the number of permanent teeth, decayed teeth, missing teeth due to caries and filled teeth due to decay. The DMFT index is used as an important criterion for the assessment of oral health status. This index does not illustrate the true prevalence of tooth decay in a community. Thus, the report of the percentage of caries free individuals is used as a complementary index for the prevalence of caries in epidemiologic studies.[10]

12 years age has been universally accepted as global monitoring age for dental caries since all permanent teeth, except third molars would have been erupted. [2]

The World Health Organization (WHO) consider children of 12 years of age as one of the most important target groups, because, in most countries, children are in school at this age and they have most of their teeth.[6]

The first permanent molar is unquestionably the most important unit of mastication and is essential in the development of functionally desirable occlusion. Though whole dentition is associated with many functions but first permanent molars are important for the masticatory system and they are more prone to caries because of their anatomical structure and early eruption in the oral cavity.[3]

The maintenance of healthy permanent first molars is important because they erupt at an early age and the first of the series of the permanent dentition. Thus, first permanent molars related studies can be used as a powerful aid for planning a proper health care system at early ages.[4] For centuries, tooth loss and edentulism were unavoidable. A popular expression said, *you come to the world without teeth and you leave the world without teeth* .[5]

One of the goals of the WHO until 2010 was to reduce the DMFT index in children of 12 years of age to less then 1.[7] The new goals of the WHO until 2020 regarding oral and dental health are to assess its previous goals and emphasize the importance of oral and dental health as an essential component of public health.[8] Moreover, this organization suggest that, if possible, each country evaluate its status of oral and dental health once every 5 years.[9]

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.[19]

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.[20]

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.[21]

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.[19,22]

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 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.

Human principles and the fundamental values are the main principles stipulated in the Constitution of Republic of Macedonia. The Government of the Republic of Macedonia, within its program objectives, implementing the laws in the country, the international standards and the global health care as the worlds objective of the Constitution of WHO. According to the information received through the health monitoring system, as well as the results from target and selective studies, they have shown that the condition of oral health, especially the condition with the dental caries is serious health problem of all groups. The alarm was activated by the state of increase of the caries incidence, showing a value of DMFT=6.88 in children at 12 years of age, which is considered as a high value compared to the WHO recommendations for oral health (DMFT=3). The experience from the developed countries, as well as the knowledge based on scientific and professional evidence in RM, prove that this desease may be successfully prevented, eliminated and eradicated by conduction of primary preventive measures. The program objectives of the National Strategy for prevention of oral deseases are shared in shorth term, medium term and long term objectives, which aim is eradication of the caries. The Strategy include a prevention of periodontal desease and orthodontic anomalies. The prevention of the caries will be performed by using a five preventive measures: 1. mechanical and chemical control of the dental plaque 2. Discipline of sugar take regime 3. Application of fluorides (systemic and topic) 4. sealing fissures and cavities 5. Education and motivation for sustainnability of oral health. In the frame of the Strategy, we planed a dental dispensarisation of children through registering data in the patients file, as propose by WHO, and arrangement of preventive teams and professional assistance of paediatrics and gynecologists. The evaluation of the effects from the preventive program shall be performed two years from the initiation of the program implementation and the follow-up evaluations shall be performed every year, on the representative sample from the group of children at 6, 8 and 12 years of age covered with the program. The statistical data processing shall be presented at professional and scientific forums and published in the annual report of WHO.[12]

MATERIAL AND METHODS

The oral health survey was performed in children at age 12 attending the six grade of primary school over the 4 years of 2014-2017, when children born in 2002, 2003, 2004 and 2005 were 12-years-old. All

primary schools from 8 regions were included from all over the country with contrasting socioeconomic conditions.

Because the annual health check-up (including oral health check-up) among school children is obligatory in the Republic of Macedonia, permission was not needed. Each school authority was informed by the local dental public health service about the aim of the study.

Oral health assessments were carried out in dental office, under professional light, using dental mirror and probe. No radiographs were taken during the study.

Oral health status was conducted by 147 trained and calibrated examiners. All examiners went through a training and calibration process.[13] The Kappa value for inter-examiner reliability was 0.79. The examiners were advised to take 15 minute break after each hour and to examine no more than 25-30 subjects per day to avoid any bias from visual fatigue.

Obtained results were recorded using special WHO oral health assessment form by a public service dental nurse.

The Statistical Package for Social Science (SPSS) was used. Results were analyzed by means of descriptive statistic following WHO guidelines for presenting results of survey for this population group.

RESULTS

Among the 73704 participants, 37545 (50.94%) were boys and 36159 (49.05%) were girls.

Note: the analyzes for each generation of children are done separately and appropriately, when the children covered by the preventive measures from the Strategy fulled 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.

The point prevalence of Dental caries in first permanent molar in different generation of children was 1.59, 1.46, 1.52 and 1.47 for children who was born 2002y., 2003y., 2004y. and 2005y., respectively. F-component constituted the major part of the index (51.24%, 54.03%, 53.99% and 56.31%) followed by 43.78%, 41.94%, 42.08% and 40.35% of decayed teeth and, 4.97%, 4.01%, 3.92% and 3.32% of extracted teeth (Table 1).

Table 1: DMFT index and its components of 12 years old in Republic of Macedonia

generation	Number of examined children	% of examined children	DMFT of first permanent molars	Number of decayed teeth	% of decayed teeth	Number of missing teeth	% of missing teeth	Number of filled teeth	% of filled teeth
2002	19355	93.94	1.59	13486	43.78	1533	4.97	15783	51.24
2203	18787	93.02	1.46	11555	41.94	1105	4.01	14885	54.03
2004	18116	92.72	1.52	11623	42.08	1084	3.92	14911	53.99
2005	17446	92	1.47	10382	40.35	856	3.32	14489	56.31

There were small statistically differences in DMFT of first permanent molars between boys and girls. The above index was also determinate separately for each generation, according to gender, for each component of this index, namely decayed, missing and filled.

The DMFT values among boys were 1.52, 1.39, 1.48 and 1.43 in each examined generation of boys. Decayed component yielded to be 46.89%, 45.15%, 45.40% and 42.76% , missing 4.51%, 3.52%, 3.96% and 3.17% and, filled 48.59%, 51.33%, 50.63% and 54.05% , for examined boys (Table 2).

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Table 2: DMFT index and its components of 12 years old boys in Republic of Macedonia

generation	Number of examined children	% of examined children	DMFT of first permanent molars	Number of decayed teeth	% of decayed teeth	Number of missing teeth	% of missing teeth	Number of filled teeth	% of filled teeth
2002	9938	93.60	1.52	7089	46.89	682	4.51	7345	48.59
2003	9477	91.81	1.39	5963	45.15	465	3.52	6781	51.33
2004	9302	92.29	1.48	6284	45.40	549	3.96	7008	50.63
2005	8828	91.32	1.43	5409	42.76	402	3.17	6838	54.05

The DMFT values among girls were 1.66, 1.53, 1.56 and 1.51 in each examined generation of girls. Decayed component yielded to be 40.78%, 39%, 38.75% and 38.02% , missing 5.42%, 4.46%, 3.88% and 3.47% and, filled 53.78%, 56.52%, 57.36% and 58.5%, for examined girls (Table 3).

Table 3: DMFT index and its components of 12 years old girls in Republic of Macedonia

generation	Number of examined children	% of examined children	DMFT of first permanent molars	Number of decayed teeth	% of decayed teeth	Number of missing teeth	% of missing teeth	Number of filled teeth	% of filled teeth
2002	9417	94.30	1.66	6399	40.78	851	5.42	8438	53.78
2003	9310	94.93	1.53	5592	39	640	4.46	8104	56.52
2004	8814	93.19	1.56	5339	38.75	535	3.88	7903	57.36
2005	8618	92.70	1.51	4973	38.02	454	3.47	7651	58.5

DISCUSSION

In this study, only the first permanent molars were evaluated since they are a key to the permanent dentition and have almost erupted for about 6 years in the mouth in 12-year-old children. The difference in the type of obtained results should be taken into consideration when comparing to that other studies. The present study investigated DMFT of first permanent molars due to the following reasons: Initially, the first permanent molars are the earliest erupting teeth of the permanent dentition in most cases; they have mighty control over the teeth erupting later behind and in front of them, as they are forced to position to the already erupted and in occlusion functioning first molars[14].

Secondly, they are the biggest teeth, their local position in the occlusal arch supports the main masticatory duty and operation; they influence the vertical distance of upper and lower jaws, the occlusal height and esthetic proportion[14]. In addition, the first permanent molars are at greater risk of damage and loss, because of their special morphology[15]. Thirdly, the health of these teeth can be considered as a good basis to study the oral health status of these children[15]. Finally, such a study can be used as a powerful aid for planning a proper health care system at early ages. Such plans may include improving parents' knowledge about the importance of these teeth, especially because most parents are unaware that these teeth are the first permanent teeth.

The DMFT index and each of its components in a community is representative of the true amount of dental caries and the preventive services provided[6].Also, DMFT values show a cultural, ethnic and geographical position, nutritional status of children, access to dental services, increased awareness of parents and students, adherence to oral and dental hygiene and dental sealant therapy.

In fact the first molar characteristics clearly show that first permanent molar is global burden holder of dental caries among children at age 12.

Because this study points that DMFT of first permanent molars among four generation 12-years-olds was from 1.46 to 1.59, according to WHO [17], Republic of Macedonia is on the low stage. Unlike to the current position, before implementation of National Strategy for prevention of oral disease among children

from0-14 in Republic of Macedonia(2008-2018), 10 years ago, the state was on the higher level with DMFT value of 6.88[18].

The findings in this study show no significant differences in DMFT values of first permanent molars in relation to gender. This fact indicates equality in the application of the National Strategy preventive measures.

F component was a major contributor to DMFT index of first permanent molars though no significant differences between F and D component. But decreasing of the D component and in the same time, increasing on the F component for each subsequent generation, speaks of the successful implementation of the preventive measure of National Strategy - education and motivation for oral health.

In relation to the above, M component shows significant decreasing for each subsequent generation. WHO has drafted new goals for 2020, entitled "Goals for Oral Health 2020". The updated objectives are intended to act as a framework for the formulation of regional an national oral health goals as the slogan "Think globally, act locally" implies. The new goals are allowing for the fact that not all recommendations are applicable equally to all countries and populations. Appropriate differentiation is therefore important[16].

According to these WHO recommendations, the National Strategy for prevention of oral disease among children from0-14 in Republic of Macedonia for next 10 years (2018-2028) is update.

CONCLUSION

The DMFT values among children at age 12 are less than DMFT values before implementation of preventive measures of National Strategy, but not yet achieved WHO goal – DMFT less than 1.Macedonian national oral health goal should be development and implementation of the National Strategy (2018-2028) and other programs, based on education of population and dental practitioners.

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