

## DENTAL CARIES IN PRIMARY SCHOOL PUPILS IN THE REPUBLIC OF MACEDONIA

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**Abstract:** Dental caries is a localized post-eruptional pathological process that causes destruction of the hard dental tissues. It is a multi-causal disease, resulting from an interaction of several factors in the oral medium, such as the existence of a receptive host, cariogenous microorganisms and appropriate substrate, present in a certain timeframe.

Taking care of children's health is a priority in every society. In the Republic of Macedonia, taking care of children's health is conducted through applying prevention programmes and a programme of systematic check-ups.

The aim of this survey was to determine the presence of dental caries in primary school pupils in the Republic of Macedonia covered by the annual systematic check-ups between the school years 2001/2002 and 2005/2006.

In order to fulfil this aim, the survey covered approximately 520,000 pupils from first, third, fifth and seventh grades, and it analysed the following parameters: body posture, body nutrition, spine and chest deformities, feet deformities, sight and vision problems and motility, and the presence of dental caries.

The results analysis shows that of all pathological conditions in primary school pupils in the Republic of Macedonia, the largest percentage (41.6%) falls to dental caries, then feet deformities (23.6%) and spine and chest deformities (21.4%). 17.6% of the children have incorrect body posture, 8.9% are suffering from malnutrition, and 5.3% are diagnosed with sight and vision and motility problems. In our survey, dental caries was more common in male pupils (57.3%) than in female pupils (42.7%).

**Key words:** dental caries, systematic check-ups, prevention, dental health.

*Introduction*

Teeth, along with their supportive apparatus, including periodontium, palate, alveolar endings and jaw-bone, represent a functional entity. In the physiology of the mouth teeth have several functions, of which the most important is certainly the masticatory function. Depending on their form, teeth participate in biting, chopping, grinding and chewing of food and its preparation for further processing in the digestive system. This function is of great importance in childhood because the proper chewing function of the teeth, especially in childhood, enables proper food utilization, and thus the proper physical and psychological development of the child.

Teeth on both jaws, along with the other parts of the mouth, participate in the *articulation of certain sounds*, such as: dento-dental, labio-dental and linguo-dental. Lack of one or more teeth, especially in the frontal region, leads to speech disruption and phonetic disorder.

Correctly positioned and healthy teeth participate in the formation of the *aesthetic looks* of every human. Dental caries, parodontopathy, as well as lack of one or more teeth, disturb the aesthetic harmony of the facial physiognomy and can be a cause of several complexes, which in childhood can negatively affect the child's psyche.

Today, dental caries is defined as a multi-causal, multiphase, infectious disease as a result of the interaction between the causal (primary) and conditional (secondary or proneness) factors. Thus, the basic, primary etiological factors include the teeth themselves, dental enamel, as a factor – *receptive host, cariogenic oral micro-flora* with specific localization in the dental surfaces and factor – *appropriate substrate* (carbohydrates). Dental caries is developed only if all three primary etiological factors are present at the same time, and not momentarily, but over a longer timeframe, thus including the *time* factor in the primary factors [1, 2, 4].

Secondary, or proneness factors in the aetiology of the dental caries are directly related to all the basic etiological factors and influence the intensity and speed of progression of the pathological process itself. Thus, the secondary factors related to the *factor of receiving host* include: anatomical morphological features of the teeth and their positioning in the alveolar ridge, saliva, diet, heritage, sex, pregnancy and breastfeeding, hormones and different kinds of general diseases [10]. Secondary etiological factors include the factors affecting *the causers themselves*, such as: hygiene-dietary regime, contents, presence and features of the oral micro-flora, quality and contents of the saliva, as well as presence of the fluorides in the salivary micro-system. Of course, the secondary factors should be mentioned here as well, which are directly related to the *appropriate substrate* where the cariogenic bacteria's metabolism takes place,

and which include: the physical-chemical features of the food, frequency of meals, food clearance from the oral medium and oral-hygienic habits [8, 9, 11].

Dental caries is a disease of special social and economic significance.

### *Aim*

*The aim* of this survey was to determine the presence of dental caries in primary school pupils in the Republic of Macedonia covered by the annual systematic check-ups between the school years 2001/2002 and 2005/2006.

### *Material and methodology of work*

In order to fulfil our aim, our survey covered approximately 520,000 pupils from first, third, fifth and seventh grades who are obliged to have regular annual systematic check-ups in the the primary schools in the Republic of Macedonia. The following parameters were observed among all pupils: body posture, body nutrition, spine and chest deformities, feet deformities, sight and vision and motbility problems, and the presence of dental caries.

Check-ups were conducted in the regional school practices located near the primary schools.

Dental caries was diagnosed in the dental practices, under a reflector light and using a dental mirror and dental pick.

### *Results and discussion*

Taking care of children's health is a priority in every society. In the Republic of Macedonia, taking care of children's health is conducted through applying prevention programmes and a programme of systematic check-ups, a programme passed annually by the Government of the Republic of Macedonia.

Systematic check-ups cover several medical procedures that determine the sate of health and psychological and physical development of the pupil. It is a method of early detection of diseases or disorders, in order to be able to take the necessary health care measures in good time. It also represents a screening method for determining the state of health of the school pupils.

In the five-year period of the survey, the average annual realization of systematic check-ups was 20,614 first grade pupils, 21,191 third grade pupils, 21,814 fifth grade pupils and 21,662 seventh grade pupils (Table 1).

Table 1 – Табела 1

*Number of pupils examined from primary schools in the Republic of Macedonia, within the framework of systematic check-ups in the period from school year 2001/02 to school year 2005/06.*

*Број на прегледани ученици во основните училишта во РМ, во рамките на систематските прегледи во периодот од учебната 2001/02 до учебната 2005/06*

	First grade	Third grade	Fifth grade	Seventh grade	Total
2001/02	21343	22456	23232	23675	90706
2002/03	20424	20237	18712	18517	77890
2003/04	23913	24665	25943	24569	99090
2004/05	19891	19877	20071	20934	80773
2005/06	17498	18721	21110	20616	77945
Average	20614	21191	21814	21662	85281

Table 2 shows all primary school pupils who underwent systematic check-ups, divided according to sex. It can be noted that on average, for the period surveyed, school year 2001/02 to school year 2005/06, systematic check-ups covered 43886 male pupils and 41395 female pupils.

Table 2 – Табела 2

*Presentation of examined pupils according to gender*  
*Приказ на прегледаниите ученици распределени по пол*

School year	Checked-up male pupils	Checked-up female pupils	Total
2001/02	47244	43462	90706
2002/03	40160	37730	77890
2003/04	51098	47992	99090
2004/05	41062	39711	80773
2005/06	39867	38078	77945
Average	43886	41395	85281

The results analysis from the systematic check-ups conducted shows that of all pathological conditions found in primary school pupils in the Republic of Macedonia, the largest percentage, 41.6% falls under dental caries. It is followed by feet deformities with an average percentage of 23.6% and spine and chest deformities in 21.4%. 17.6% of the pupils have incorrect body posture,

8.9% are malnourished, and 5.3% are diagnosed with sight and vision and motility problems (Table 3).

Table 3 – Табела 3

*Most common pathological conditions found in pupils (in percentages)*  
*Најчешћи патолошки состојби кај ученициите (изразено во проценти)*

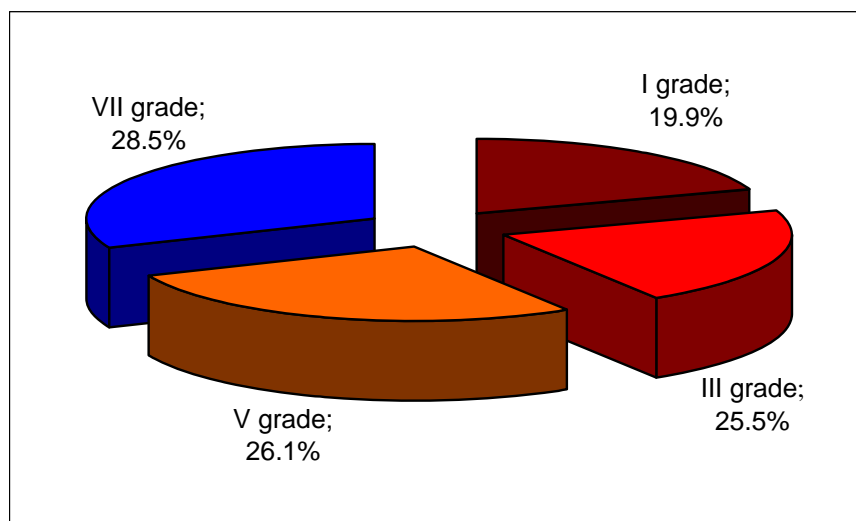
<b>Determined condition/school year (%)</b>	2001/02	2002/03	2003/04	2004/05	2005/06	Average
Body posture – bad	16.5	17.3	18.2	18.5	17.3	17.6
Body nutrition – malnutrition	8.5	7.4	11.8	9.0	8.0	8.9
Spine and chest deformities	18.2	34.2	19.3	17.9	17.6	21.4
Feet deformities	19.2	34.6	21.2	20.2	22.6	23.6
Sight problem and motility	6.0	3.8	5.5	5.6	5.6	5.3
Dental caries	40.9	44.5	40.5	44.5	37.4	41.6

A special interest in determining the presence of dental caries in primary school pupils in our country was to determine the condition of dental caries by classes, i.e. the appearance of such changes in the context of the children's age. The pupils' age is indicated by the classes they attend in the school programme (Table 4 / Graph 1).

Table 4 – Табела 4

*Presence of dental caries in pupils divided according to classes*  
*Застапеност на дениталниот кариес кај ученициите*  
*распределени по одделенија*

School year	First grade		Third grade		Fifth grade		Seventh grade	
	Number	%	Number	Number	%	%	Number	%
2001/02	7596	20.5	9359	25.2	9768	26.3	10375	28.0
2002/03	7655	22.1	8888	25.7	8694	25.2	9389	27.1
2003/04	7862	19.6	9698	24.2	10923	27.2	11607	29.0
2004/05	6441	17.9	9231	25.7	9193	25.6	11104	30.9
2005/06	5695	19.5	7414	25.4	7969	26.4	8069	27.7
Average	7050	19.9	8918	25.5	9309	26.1	10109	28.5



*Figure 1 – Presence of dental caries in pupils divided according to classes, expressed in percentages (legend: VII grade; 28.5%, I grade; 19.9%, III grade; 25.5%, V grade; 26.1%)*

*Слика 1 – Застапаност на денцијалној кариес кај учениците распределени по одделенија, изразено во проценти*

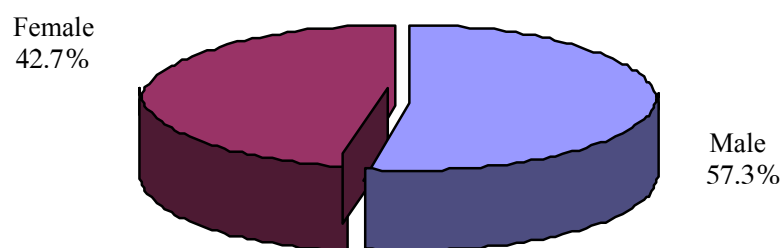
The table and graph show that dental caries mostly appears in pupils in the higher grades (VII grade), i.e. in 28.5% of the pupils, compared to pupils from first grade when it is found in only 19.9% of the pupils. Our results collocate with the findings of Matovska Lj. and Stefanovik R. [6, 9]. The condition determined imposes the need for compulsory urgent rehabilitation of the condition and parallel conduct of all available preventive measures and methods, as well as interactive dental education [8, 11].

Data analysis of our surveys shows that there are certain differences in the presence of dental caries among pupils of different sex (Table 5 / Graph 2).

Table 5 – Табела 5

*Presence of dental caries in pupils divided according to sex, expressed in percentages*  
*Застїайеностї на денїалниой карїес кај ученицїїе расїределени по пол,*  
*изразено во проценти*

School year	Caries (male)		Caries (female)	
	Number	%	Number	%
2001/02	19243	51.9	17855	48.1
2002/03	17937	51.8	16689	48.2
2003/04	20743	83.6	4058	16.4
2004/05	15774	47.8	17195	52.2
2005/06	14951	51.3	14196	48.7
Average	17730	57.3	13999	42.7



*Figure 2 – Presence of dental caries in pupils divided according to sex, expressed in percentages*

*Слика 2 – Застїайеностї на денїалниой карїес кај ученицїїе*

It can be concluded that dental caries is more frequent in male pupils, 57.3%, compared to female pupils, where it is found in 42.7% of the pupils checked.

### *Conclusions*

- Results analysis from the systematic check-ups conducted shows that of all the pathological conditions found in primary school pupils in the Republic of Macedonia, the largest percentage falls to dental caries. This is followed by feet deformities and spine and chest deformities, as well as bad body posture.

- The largest percentage of dental caries was found in seventh grade pupils, followed by fifth grade pupils, then third grade pupils and finally, first grade pupils.
- Related to sex, in our survey, dental caries was more frequent in male pupils compared to female pupils;
- All this imposes the need for the conduct of compulsory preventive dentistry methods and measures that provide for the promotion and protection of dental health, as well as an improvement of quality of life, integrating contemporary scientific knowledge of the etiopathogenesis dental caries, the application of adequate promotional methods and measures of dental health and new approaches in the early diagnosis of dental caries development risk.

#### REFERENCES

1. Bratthall D. (1996): Dental caries: intervened-interrupted-interpreted. Concluding remarks and cariography. *European Journal of Oral Sciences*; 104: 486–491.
2. Carevic, M. (1994): *Uticaj ugljenih hidrata, masti i fluorida na zube i zubni kvar*, Doktorska disertacija, Beograd, Stomatoloski fakultet, Univerzitet u Beogradu.
3. Jankulovska M., Mirceva M. (2000): Interaction beetwen dental education and the oral health, *7<sup>th</sup> Congress of the Balkan Stomatological Society* (Proceedings). Kusadasi (Turkey); Balkan Stomatological Society (Bostanci H. editor), 236.
4. Jankulovska M., Mirceva M. (2000): Salivary Streptococcus mutans in relation to topical fluoride applications, *The International Dental Journal*, 6/00, Congress Abstracts: 347, FDI Paris.
5. Jankulovska M., Apostolska Elencevska S. (2004): *Oralnata mikroflora i dentalniot karies*, Skopje.
6. Matovska Lj. i sor. (1998): Korelacija megju dentalniot status i vozrasta. II Kongres na stomatolozite od Makedonija, 135.
7. Pavlovic V. (1981): *Karies – Patologija i terapija*, Institut za dokumentaciju zastite na radu, Nis.
8. Redzepagic S. (1997): *Fiziologija i patologija razvoja zuba*. Pergament, Pristina.
9. Stefanovic R. (1981): *Duboki karies mlecnih i stalnih zuba u dece*. Magistarski rad, Beograd.
10. Stosic P. i sar. (1991): *Decja i preventivna stomatologija*, Decje novine, Gornji Milanovac.
11. Vulovic M. D. i sar. (2002): *Preventivna stomatologija*, Univerzitet u Beogradu, Stomatoloski fakultet, Beograd.



## Резиме

**ДЕНТАЛНИОТ КАРИЕС КАЈ УЧЕНИЦИТЕ ВО ОСНОВНИТЕ  
УЧИЛИШТА ВО РЕПУБЛИКА МАКЕДОНИЈА****Глигорова Б.,<sup>1</sup> Јанкуловска М.<sup>2</sup>**

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**Апстракт:** Денталниот кариес претставува локализиран постеруптивен патолошки процес кој предизвикува деструкција на тврдите забни ткива. Тој е мултикаузално заболување, резултат на интеракцијата на повеќе фактори во оралниот медиум, како што се: постоењето на приемчив домаќин, кариогени микроорганизми и погоден супстрат, присутни во одреден временски интервал.

Грижата за здравјето на децата е приоритет за секое општество. Во Република Македонија грижата за здравјето на децата се изразува преку примена на превентивни програми и програмата за спроведување на систематски прегледи.

Цел на нашето истражување беше да ја детерминираме застапеноста на денталниот кариес кај децата во основните училишта во Република Македонија опфатени со годишните систематски прегледи во периодот од учебната 2001/02 до 2005/06 година.

За реализација на поставената цел беа опфатени околу 520 000 ученици од прво, трето, петто и седмо одделение, кај кои беа проследени следните параметри: држење на телото, хранетост на телото, деформитети на ’рбетниот столб и градниот кош, деформации на стопалото, пречки на видот и мотилитет и застапеност на денталниот кариес.

Анализата на резултатите говори дека од сите патолошки состојби кај децата во основните училишта во Република Македонија, во најголем процент (41,6%) е застапен денталниот кариес, потоа деформитетите на стопалата (23,6%) и деформитетите на ’рбетниот столб и градниот кош (21,4%). Кај 17,6% од децата е констатирано лошо држење на телото, кај 8,9% слаба хранетост на телото, а кај 5,3% се дијагностицирани пречки во видот и мотилитетот. Денталниот кариес, кај нашите испитаници, почесто беше застапен кај учениците од машки пол (57,3%) во однос на припадничките на женскиот пол (42,7%).

**Клучни зборови:** дентален кариес, систематски прегледи, превентива, дентално здравје.

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