

DENTAL STATUS OF ACTIVE AGE POPULATION
IN THE REPUBLIC OF BULGARIA

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Abstract

Dental health is an important public health component. There is a number of dependencies between the demographic and social characteristics of the population and its dental status. The purpose of the study is to examine the dental status of the active age population in the Republic of Bulgaria and to define its dependence on social and demographic factors. Epidemiologic study and inquiry survey were conducted among 416 Bulgarian citizens aged 18–65 years in six district towns for achieving the aim. The results were processed and subjected to statistical analysis with significance factor 95% ($p = 0.05$). Prevalence per persons (E_P) for the studied sample is 98.56%, teeth prevalence (E_T) has an average value of 52.7%, while the dental caries intensity (DMF-T) is 16.25. Caries incidence and intensity increases with age as a result of a proportional increase in the number of obturated and extracted teeth with patients' ageing. The average number of treated teeth is bigger in individuals with higher education and at the same time, this group has lower average number of extracted teeth. Lower average number of extracted teeth is also reported in persons with high income compared to those on minimal wages and parallel the average number of obturated teeth increases proportionally to the income increase. There is distinct dental status dependence in the active age Bulgarian population on demographic and social factors. Persons, paying regular visits to the dental office, have lower number of caries and extracted teeth, which supports the importance of dental prophylaxis.

Key words: dental status, prevalence, intensity, demographics, social factors

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Introduction. Dental health is an intrinsic part of human public health. The dental prophylactic regimen is basic for dental health protection, preservation and promotion [1]. Untreated caries in permanent and temporary dentition rank on first and tenth place among the 291 most common diseases [2].

Dental health of European citizens has improved significantly in recent years. There is a clear tendency of reduction in the number of caries affected teeth [3-6].

A number of studies witness that caries incidence (DMF-T) and mostly its structure depend on the social and demographic factors (age, gender, educational level, rate of dental office visits). Caries incidence is higher in females than in males. People, living in villages, those of lower level of education have more missing teeth and smaller number of obturated teeth than the ones, residing in cities, those of higher educational level and better oral hygiene [7-12].

The objective of this study is to examine the dental status of the active age population in the Republic of Bulgaria and to define its dependence on social and demographic factors.

Material and method. We conducted anonymized inquiry survey and clinical check-ups to define the active age population dental status. Statistical analysis was performed with the "R" Program for identifying the dependencies between the demographic and social factors and the objective dental status of the patients.

The study enrolled persons in the age group of 18-65 years on the territory of the Republic of Bulgaria, covering a sample of 416 individuals from the cities of Sofia, Plovdiv, Veliko Tarnovo, Vratsa, Burgas and Yambol. Two hundred and thirty women (55.29%) and 186 men (44.71%) took part in this study. The patients were divided into three age groups – 18-29 years – 96 (23.08%); 30-44 years – 175 (42.07%); 45-65 years – 145 (34.86%). The participants' breakdown under residence reveals that 383 (92.07%) live in cities, 29 (6.97%) live in villages, while 4 (0.96%) did not indicate place of living.

Considering the enrolled person by the social factor education we found out that 243 (58.41%) had higher education, while the remaining 173 (41.52%) were of lower educational level. The breakdown by income is: no income – 28 (6.73%) of all the patients; income below the minimum wage – 53 (12.74%); income within the range 610-1000 BGN – 71 (17.07%); income range 1000-1500 BGN – 94 (22.6%); income of 1500-2000 BGN – 63 (15.14%); income range 2000-2500 BGN – 37 (8.89%); income range 2500-3000 BGN – 25 (6.01%); income above 3000 BGN – 36 (8.65%), while 9 (2.16%) did not report their income.

Results. The study of 416 patients established that only six of them (1.44%) had no caries, obturated or extracted teeth. Prevalence per persons (E_P) in the studied cohort is 98.56%. The dental caries incidence (DMF-T) in this cohort has a value of 16.25. Dental caries incidence (Prevalence per teeth – E_T) average rate for the studied cohort is 52.7%. One hundred and thirty-six patients (32.69%) had no untreated caries, while the remaining 280 (67.31%) have at least one untreated caries.

A total of 12 778 teeth were examined in 416 patients. Of this number caries affected (D) were 1419, treated (F) – 4137, and extracted (M) – 1203, respectively. Caries inflicted are an average of 11.13% of all teeth examined. The average caries damaged rate (D) in the studied cohort is 3.41 teeth. The number of treated teeth (F) in the cohort indicated an average value of 9.95 treated teeth, and 32.3% of the examined teeth on average have undergone some dental treatment. The average value for the number of missing teeth (M) in the cohort is 2.89 teeth, while average 9.24% of the total number of teeth examined have been extracted.

Investigating teeth caries prevalence (E_T), we found out that the highest caries incidence is in the 45–65 age group, where the average percentage is 63.31%, while it is 52.8% in the 30–44 age group, and 36.54% in the 18–29 age group.

Caries incidence (DMF-T) in the age group of 18–29 years equals 11.2, while in the age group of 30–44 it is 16.28, and in the age group 45–65 it climbs to 19.55. The breakdown of dental caries parameters (DMF-T and E_T) depending on patient age is given in Table 1. The dispersion analysis proved the dependence of the variables epidemic rate by teeth, number of caries teeth, number of treated teeth and number of extracted teeth from the age variable ($p < 0.05$).

T a b l e 1

Characteristics of age-dependent dental caries parameters

	Age groups			p
	18–29	30–44	45–65	
$E_T \pm SD$	36.54% \pm 21.68%	52.80% \pm 19.47%	63.31% \pm 21.80%	< 2e–16
D \pm SD	3.167 \pm 4.257	4.097 \pm 4.211	2.745 \pm 3.632	0.0096
F \pm SD	6.719 \pm 4.960	10.446 \pm 5.313	11.476 \pm 6.359	9.6e–10
M \pm SD	1.312 \pm 1.611	1.737 \pm 1.980	5.331 \pm 6.329	< 2e–16
I \pm SD	11.2 \pm 6.81	16.28 \pm 6.129	19.55 \pm 6.907	

The average epidemic rate distribution per teeth (E_T) among urban population is 51.88%, while among those living in villages this percentage is 61.73%, the dispersion analysis reporting statistical significance of the obtained results ($p < 0.05$). Statistical analysis of teeth caries epidemic rate does not reveal significant differences among individuals, depending on their educational level ($p > 0.05$), yet it has proven significance of the differences in the values on the number of obturated and extracted teeth dependent on the educational level ($p < 0.05$). The study results for the self-assessment of the general health indicates that the teeth caries prevalence per persons with systemic illnesses is 58.19% at an incidence DMF-T = 17.88, while for those without such illnesses – 50.57% at DMF-T = 15.62. The dispersion analysis proved strong significant difference in the average number of extracted teeth and dental caries prevalence per teeth, depending on the existence of accompanying systemic diseases ($p < 0.05$) (Table 2).

Table 2

Incidence of dental caries parameters based on place of living, educational level and the presence of accompanying diseases

	Residence		<i>p</i>	Education		<i>p</i>	Accompanying diseases		<i>p</i>
	City	Village		Higher	Lower degree		With diseases	Without diseases	
E _T	51.88%	61.73%	0.026	53.41%	51.72%	0.46	58.19%	50.57%	0.0026
±	±	±		±	±		±	±	
SD	22.99%	22.75%		21.99%	24.48%		22.50%	22.93%	
D	3.355	4.138	0.32	3.621	3.116	0.21	3.035	3.563	0.24
±	±	±		±	±		±	±	
SD	4.042	4.315		4.164	3.916		3.306	4.313	
F	9.851	10.483	0.58	10.514	9.145	0.019	10.850	9.636	0.062
±	±	±		±	±		±	±	
SD	5.960	4.961		5.822	5.936		6.061	5.804	
M	2.783	4.310	0.073	2.370	3.624	0.004	4.00	2.417	0.00083
±	±	±		±	±		±	±	
SD	4.402	4.465		3.581	5.266		5.23	3.383	
I	15.99	18.93		16.51	15.88		17.88	15.62	
±	±	±		±	±		±	±	
SD	7.259	6.84		6.947	7.672		7.097	7.233	

Table 3

Breakdown of dental caries parameters based on income

	Income								<i>p</i>
	No income	< 610 BGN	610–1000 BGN	1000–1500 BGN	1500–2000 BGN	2000–2500 BGN	2500–3000 BGN	> 3000 BGN	
E _T	34.98%	53.02%	57.67%	54.15%	52.33%	55.94%	46.43%	55.67%	0.0013
±	±	±	±	±	±	±	±	±	
SD	24.90%	27.45%	22.70%	21.72%	18.28%	23.87%	22.76%	21.39%	
D	2.036	3.434	3.31	3.032	4.048	4.108	3.200	4.194	0.34
±	±	±	±	±	±	±	±	±	
SD	2.937	4.130	4.49	3.814	4.545	3.665	3.606	4.578	
F	6.179	8.604	11.380	10.489	9.111	11.189	9.560	11.556	0.00074
±	±	±	±	±	±	±	±	±	
SD	5.257	6.307	6.156	5.545	5.277	6.346	5.308	5.954	
M	2.429	4.283	3.324	3.149	2.984	1.865	1.320	1.500	0.025
±	±	±	±	±	±	±	±	±	
SD	5.315	6.368	4.218	4.155	4.305	2.616	2.015	2.063	
I	10.64	16.32	18.01	16.67	16.14	17.16	14.08	17.25	
±	±	±	±	±	±	±	±	±	
SD	7.45	8.7	7.293	6.783	5.831	7.467	6.873	6.876	

The breakdown of prevalence per teeth and caries incidence parameters depending on income is given in Table 3. The dispersion analysis proved the dependence of the prevalence per teeth, number of caries teeth, number of treated teeth, and number of extracted teeth variables on the income variable ($p < 0.05$), revealing lower average number of extracted teeth and higher average number of treated teeth in the individuals with higher income compared to those having low income.

Studying the self-evaluation for the social factor of general health status, we established that the prevailing number of patients – 302 (68.02%) had no accompanying diseases, while more than one was reported by 22 (5.29%). Questioned on their dental prophylactic regimen adherence and the frequency of the preventive dental check-ups, the respondents provided the following information: at least once annually – 181 (43.51%), each six months – 97 (23.32%), once in a few years – 47 (11.3%), while 91 (21.88%) visit the dental room only if they have pain or need treatment.

By studying the dependence between the frequency of the dental visits and caries rate and severity we obtained the following results: for the patients, having preventive dental visits each 6 months – $E_T = 49.9\%$, $DMF-T = 15.4$; for those having dental appointments once annually – $E_T = 51.19\%$, $DMF-T = 15.79$; for those visiting dental doctor once in a few years – $E_T = 54.68\%$, $DMF-T = 16.79$; and for the patients visiting the dentists only in case of pain or need of treatment – $E_T = 57.71\%$, $DMF-T = 17.78$ (Table 4).

T a b l e 4

Breakdown of dental caries parameters based on dental checkup frequency

	Frequency of dental visits				p
	6 months	One year	In a few years	If needed	
E_T	49.90%	51.19%	54.68%	57.71%	0.076
\pm	\pm	\pm	\pm	\pm	
SD	22.77%	22.79%	25.66%	21.91%	
D	2.371	3.144	4.277	4.604	6e-04
\pm	\pm	\pm	\pm	\pm	
SD	3.429	3.671	4.267	4.926	
F	10.794	10.24	8.809	9.033	0.094
\pm	\pm	\pm	\pm	\pm	
SD	5.545	6.00	6.395	5.695	
M	2.237	2.403	3.702	4.143	0.0037
\pm	\pm	\pm	\pm	\pm	
SD	2.440	3.886	5.853	5.685	
I	15.4	15.79	16.79	17.78	
\pm	\pm	\pm	\pm	\pm	
SD	7.157	7.155	8.183	8.183	

The dispersion analysis revealed strong dependence between the variables **number of caries teeth** and **number of missing teeth** and the variable **dental visits rate** ($p < 0.05$), while the persons, visiting the dental doctor only in case of pain and problem have higher number of caries and missing teeth compared to all the rest.

Discussion. The conducted study clearly reveals that the dental caries incidence (E_P) among the population is 98.56%, manifesting retention and even slight increase compared to previous surveys among persons above 20 years old for the period 2006–2009, where E_P was 98.29% [7] and in 1989 [9], when E_P was 93.42%. The results are uniform with the trend of dental caries high level in Europe [13]. The prevalence for teeth caries (E_T) is 52.7%.

Caries incidence reduction is being observed from 17.76 in 2006–2009 [7] to 16.25. At the same time, the DMF values still remain higher than those in previous studies [9]. We also witness increase in the average number of untreated caries from 1.96 [7] to 3.4, while the trend for their increase among younger individuals and especially in the age group of 30–44 years, reaching an average value of 4.1 is rather adverse.

The teeth caries prevalence (E_T) and caries incidence (DMF-T) climb up with age, which supports all data from previous studies [7]. Proportional increase in the number of obturated and extracted teeth was also proven with ageing of the patients.

Higher teeth caries prevalence (E_T) is noticed among the persons living in villages compared to those residing in the cities as well as among the patients having systemic diseases, mainly due to larger number of extracted teeth. Persons with higher education have larger average number of treated and smaller average number of extracted teeth. Smaller average number of extracted teeth is also observed in persons with high income compared to those on minimal income, and meanwhile proportionally with the income increase the average number of obturated teeth goes up.

Smaller number of caries and extracted teeth are reported in persons, having regular dental appointments, which supports the importance of dental prophylactics.

It is a positive fact that 66.83% of the patients visit a dental room at least once annually and this value is higher, compared to other countries [14–20]. Among this group of persons we see lower values of DMF-T, E_T , D and M and, respectively, higher F value compared to all the others.

Conclusion. Extremely high level of dental caries incidence is being observed among the persons in this study. The established value of the prevalence per persons (E_P) of 98.56% is consistent with the trend in the caries incidence level in Europe. Caries prevalence per teeth (E_T) is 52.7%. The dental caries incidence maintains its high value (DMF-T = 16.25), yet it demonstrates a trend for reduction, mainly due to the reduced number of the patients' extracted teeth.

There is distinct dental status dependence of the active age Bulgarian population on demographic and social factors.

There is a clear dependence of the caries incidence on age, place of living, educational level and income. The caries epidemic rate, number of obturated and extracted teeth increase proportionally with age.

Individuals, paying regular visits to the dental room, have lower number of caries and extracted teeth, which supports the importance of dental prophylaxis. It is a positive fact that 66.83% of the patients pay visits to the dental room at least once annually and this value is higher, compared to other countries. It is an extremely disturbing fact that the persons within the age group of 30–44 years have 4.1 untreated caries, which is due to the low level of health awareness and the high price of dental care.

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