

# Assessing the Case Rate of Inflammation in Periodontal Tissues in the Penza Region

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## Abstract

Examination of the residents of two areas in the Penza region has shown that, compared to the regional center, they show higher case rate of inflammatory periodontal diseases.

Such diseases often cause loss of teeth, including among young people. This in turn leads to morphological and functional changes in the masticatory apparatus, which adversely affects the digestive organs, thus impairing facial aesthetics, chewing and speech. In order to adequately assess the case rate, epidemiological dental surveys of the population are performed according to the uniform criteria recommended by the WHO. Such surveys allow to unbiasedly assess the level of oral health among the population, plan preventive programs, and predict future needs of the population in dental care.

**Key words:** periodontium, prevalence, intensity, treatment, dental morbidity rate.

## INTRODUCTION

Periodontal diseases are a complex urgent problem that has not only medical, but social significance as well. This is mainly due to the wide spread and intensity of these diseases in all age groups of our population [1].

Studies of dental morbidity structure of the population in various regions of Russia show the high prevalence of inflammatory periodontal diseases, which varies greatly depending on the age of the patients and is subject to rhythmic seasonal fluctuations [2].

The occurrence of periodontal diseases among the younger age group (5-6 years) ranges between 4.2 and 98%.

Studies of A. I. Grudanov showed that symptoms of periodontal inflammation had been observed even in pupils of the first year. The average frequency of gingivitis in 7-year old children ranges between 12 and 20%. Chronic periodontitis is observed in 25 to 40% of cases in the age under 35 years, and in 80 to 90% - in the age over 40 years [3].

The periodontal diseases' rate in the elderly people is 100% [4]. In the elderly age, periodontal diseases cause loss of teeth leading to various TMJ changes, disorders of mastication and speech [5].

Some researchers indicate that severe periodontitis is characteristic of persons over 40-45 years of age and older [6].

Periodontal diseases have higher case rate in older age groups (15 years old, 35-44 years old, 65 years old and over) than in the younger ones (5-6 years old, 12 years old). This fact may be regarded as a result of tissues' cumulative destruction during the entire previous life of person, and not only as the reason of age-related manifestations of periodontal disease due to aging. In addition, many complications associated with periodontal diseases are more frequent and more severe in middle-aged people [7].

Assessment of the risk of emergence and subsequent development of periodontal diseases in patients may and should significantly affect correct assessment of periodontal tissues, diagnosis of diseases, choice of treatment, provision of the treatment plan, post-treatment monitoring and follow-up care. In the practice of risk assessment, it is possible to correctly identify patients depending on the degree of the risk of occurrence and further progress of periodontal disease, and it is possible to identify patients with increased risk of diseases' development [8; 9; 10].

To date, full-scale dental epidemiological surveys of all age groups have not been performed in the Penza region. The lack of data about the epidemiological situation in the region and the

leading trends in the occurrence rates of caries, diseases of periodontal tissues in children and adult population of the region, and the risk factors impeded development and implementation of a regionally-focused program of preventing major dental diseases, such as dental caries and inflammatory periodontal diseases.

It seems relevant to study the occurrence rate of periodontal diseases in children and adults in the city of Penza and the Penza region in the key age groups according to the methods of the WHO.

## METHODS

According to the recommendations of the WHO, for dental morbidity studying when performing a random epidemiological survey, the number of people examined in the same district should not be less than 20. The following age groups are recommended: 5-6 years old children, 12 years old children, 15 years old teenagers, 35-44 and 65-74 years old adults.

The objects of the study were 1,250 residents of Penza and the Penza region in the age between 6 and 75 years old. Of them, 500 residents were 6 years old children (40%); 250 residents were 12 and 15 years old teenagers (20%); 500 residents were adults aged 35-44 and 65 years and over (40%). Three districts of Penza and two areas of the Penza region were examined. In each age group, there were 50 persons. Children were examined in dental offices at schools. Adults were examined in dental polyclinics in Penza as they came for dental assistance. We assessed the dental status of 1,250 residents of the three districts of Penza: Leninsky, Pervomaisky, Zheleznodorozhny, as well as of residents of the two areas of the region - Mokshansky and Serdobsky. With that, the prevalence and intensity of inflammatory periodontal diseases were assessed, as well as the oral hygiene status.

These indicators were assessed in five age groups according to the WHO. For assessing the occurrence rate and intensity of inflammatory periodontal diseases, the community periodontal index of treatment needs (CPITN) was used, proposed by the WHO for unifying the methodological approach to studying the occurrence rate and intensity of the periodontal diseases. The oral hygiene status was assessed in children up to 5-6 years old using the Fedorov-Volodkin index; in adults - using the Green-Vermillion index.

## RESULTS AND DISCUSSION

Statistical packages "Statistica for Windows 6.0" were used for processing the obtained data (Table 1).

**Table 1. Results of the oral hygiene assessment in the surveyed districts of Penza and the Penza region**

Surveyed districts n=50	Age groups of population					
	The Fedorov-Volodkin Index	The Green-Vermillion Index				
	6 years old	12 years old	15 years old	35-44 years old	65 years old and over	P<
Leninsky district of Penza	1.89±0.01	1.85±0.00	1.19±0.02	1.53±0.00	1.88±0.00	0.05
Zheleznodorozhny district of Penza	1.98±0.02	1.85±0.00	1.19±0.02	1.55±0.00	1.89±0.00	0.05
Pervomayskiy district of Penza	2.16±0.01	1.85±0.00	1.22±0.03	1.49±0.03	1.83±0.02	0.05
Mokshansky area	3.37±0.02	2.28±0.00	2.07±0.03	1.84±0.00	2.04±0.03	0.05
Serdobsky area	3.88±0.00	2.88±0.00	2.19±0.06	2.04±1.25	2.71±0.00	0.05

**Table 2. The prevalence and intensity of inflammatory periodontal diseases in the studied groups of residents of districts of Penza and the Penza region**

Surveyed districts	Age group n=50 (years)	Prevalence %				Intensity			
		Healthy	% of persons with symptoms of periodontitis			The number of healthy sextants			The number of excluded sextants
			Total per group	Bleeding	Dental calculus	Pocket 3-5 mm	Pocket 6 mm and more		
Lenin district of Penza	6	92	8	8	0	0	0	5.92	0
	12	24	76	44	32	0	0	4.88	0
	15	14	86	34	52	0	0	4.44	0
	35-44	10	90	10	34	28	18	2.56	1.33
	65 and more	0	100	4	22	20	54	1.28	2.58
Zheleznodorozhny district of Penza	6	84	16	16	0	0	0	4.62	0
	12	22	78	46	32	0	0	3.44	0
	15	10	90	38	52	0	0	2.4	1.0
	35-44	10	90	10	34	26	20	1.96	1.3
	65 and more	0	100	0	18	24	58	0	2.93
Pervomaiskiy district of Penza	6	78	22	22	0	0	0	5.44	0
	12	16	84	48	36	0	0	3.9	0
	15	6	94	42	52	0	0	2.9	1.25
	35-44	6	94	8	36	30	20	2.12	2.0
	65 and more	0	100	0	22	26	52	0	2.8
Mokshansky area	6	62	38	38	0	0	0	3.74	0
	12	12	88	52	36	0	0	2.96	0
	15	6	94	34	60	0	0	2.26	1.0
	35-44	0	100	6	32	34	28	2.02	1.0
	65 and more	0	100	0	12	28	60	0	3.66
Serdobsky area	6	50	50	50	0	0	0	3.34	0
	12	8	92	40	52	0	0	2.48	0
	15	6	94	36	58	0	0	1.98	0
	35-44	0	100	4	26	38	32	1.58	1.14
	65 and more	0	100	0	10	26	64	0	3.66

Note: Statistical significance p&lt;0.05

The figures showed that virtually all inhabitants in the specified age groups in three districts of Penza had satisfactory oral hygiene status. However, 6-year old children in the Pervomaisky district had unsatisfactory level of oral hygiene, as their average value of the Fedorov-Volodkin hygienic index was only 2.16 points (with the norm equal to 1.1-1.5 points). The examined inhabitants of the areas of the region on the average had much worse status of oral hygiene compared to the inhabitants of the regional center. In all age groups, except for children of 6 years of age, oral hygiene was poor, as evidenced by the values of the Green-Vermillion index - over 2 scores (with the norm equal to 0.0-0.6 scores). The oral hygiene status of 6-year old children was very poor. The mean value of the Fedorov-Volodkin hygienic index amounted for them to over 3 points.

The difference in oral hygiene status of the residents of Penza and those from the region not only confirmed the fact that they had low level of sanitary-hygienic knowledge, but also evidenced of the fact that preventive work of regional dentists among the population was insufficient.

When assessing the occurrence rate of inflammatory periodontal diseases, we determined the number of individuals who had certain symptoms, and the number of the surveyed persons without such symptoms detected. The severity of periodontitis was determined by the number of healthy and excluded sextants.

Table 2 contains the obtained indicators about the occurrence rate and intensity of inflammatory periodontal diseases among the examined residents of Penza and the regional centers. Analysis showed that among 6-year old children (districts of Penza) symptoms of inflammation in periodontal tissues were absent in 78 to 92% of children. Unfortunately, only this age group was the most healthy one. In all other age groups, the percentage of persons without symptoms of inflammation in the periodontal tissues ranged between 0 and 24%.

For 15-year old teenagers (districts of Penza), the prevalence of symptoms such as bleeding gums and dental calculus, according to the WHO criteria, was low and medium, respectively. The half of the surveyed 15-year old teenagers had dental calculus. It is disheartening that more than the half of the surveyed persons in the age of 65 years old and over (districts of Penza) had deep periodontal pockets (up to 58%).

Assessment of the intensity of inflammatory periodontal diseases (districts of Penza) bespeaks of the increase in the number of inflammatory periodontal diseases with the age increase.

Thus, the study has shown that residents of the region have medium to high prevalence and intensity of inflammatory periodontal diseases that increase with the age.

Examination of the two areas has shown that, compared to the regional center, they have higher prevalence and intensity of inflammatory periodontal diseases (Table 2). Even in 6-year old

children, the prevalence of symptoms of periodontal inflammation ranged between 38 and 50%. In 15-year old teenagers, the occurrence rate of bleeding gums, according to the WHO criteria, was assessed as average, and the prevalence of dental calculus was assessed as high. Over half of the surveyed 15-year old teenagers (60%) had dental calculus. By the detection rate, in adult residents of these districts such symptoms as the presence of periodontal pockets and dental calculus prevailed. The comparison of the obtained data with the data for residents of the regional center was in the favor of the latter. The same fact was also evidenced by the intensity indicators of inflammatory periodontal diseases. The number of healthy sextants in regional residents on the average was lower than in the residents of the regional center.

## CONCLUSION

Summarizing the primary analysis of the obtained estimates of prevalence and intensity of inflammatory periodontal diseases in three districts of Penza and two areas in the region, a conclusion can be made that the situation with the prevalence and intensity of inflammatory periodontal diseases in the inhabitants of the areas of the region is worse than that in the regional center. This is caused by a number of factors, including lower level of sanitary-hygienic knowledge of the population, inadequate oral hygiene, lower level of provided dental care, and areas' remoteness from the regional center. At the same time, there may be other factors perpetuating this situation.

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