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Prevalence and Intensity of Caries and Periodontal Diseases Among Schoolchildren in Nakhchivan, Republic of Azerbaijan

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ABSTRACT

Epidemiological studies conducted in recent years show still ongoing increase in the prevalence and intensity of dental caries and periodontal disease in different regions of the world and in some age groups.

In order to achieve the optimization of dental services by studying the prevalence and intensity of major dental diseases-dental caries and periodontal disease, and taking into account the recommendations of the WHO studies were conducted at ages 6, 12 and 15 among all sections of the population of Nakhchivan city.

They were surveyed 299 people living in Nakhchivan city. During clinical studies diagnosis of periodontal disease and dental caries and statistical processing was carried out using modern traditional methods.

In a study of 299 people caries was detected in 76,50-1,57% of them. The intensity of caries DMF index was 9,97- 0,15. A satisfactory level of dental care was identified only in the Nakhchivan city - 51.33%.

An integrated approach to the organization of dental care and systematization of the epidemiological situation, improving the general and individual preventive will reduce dental disease among the population of the Nakhchivan city.

INTRODUCTION

Epidemiological studies carried out in recent years show a high prevalence and increasing intensity of periodontal diseases with dental caries in different age groups in different regions of the world. To solve tactical and strategic issues, it is important to develop optimal options for management decisions for the prevention of major dental diseases among the population (taking into account the region, and residence in different geographic and climatic zones).

The issue of monitoring the spread of dental diseases among the population living in different geographic and climatic zones (taking into account the degree of mineralization of the water used, social and hygienic characteristics, the level of knowledge and skills in individual prevention of dental diseases) is still being studied. A number of authors have studied the level and intensity of tooth decay and found out that there are differences in the prevalence and intensity of tooth decay, which is related to the amount of fluoride in drinking water. Another group of authors believes that the prevalence and intensity of caries depends on the care of the oral cavity. Some studies have shown that there are sharp differences in the level of caries damage between residents of settlements located in the same region and supplied with water, which contain approximately the same amount of fluoride, but differ in the amount of macro- and microelements. Expeditions of the Research Institute of Dentistry revealed significant differences in caries lesions when examining residents of the CIS (Commonwealth of Independent States).

Examinations prove that residence latitude has a higher impact on the frequency of caries in the population than the amount of fluoride in drinking water. Thus, the population living in high latitudes has a statistically higher rate of caries than the people settled in the central part of CIS and further south. This information allows to take a differential approach to the problem of improving the organization of dental services to the population, depending on the

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geographical and climatic zones and latitudes, to optimally solve the problem of providing dental staff, (through the proper placement of this staff). Dental examinations of the population revealed varying levels of tooth decay and periodontal disease since the 60s of the last centuries in the Republic of Azerbaijan [1-4].

The study of the prevalence of caries and periodontal diseases among children, schoolchildren and other age groups is of great scientific and practical importance.

Recently, the staff of the Department of Dentistry of the Medical Faculty of Nakhchivan State University has conducted a dental examination among schoolchildren of Nakhchivan city, studied the epidemiology of caries and periodontal diseases, and also determined the prevalence and intensity of these diseases. Examinations have been conducted in doctor's offices in secondary schools in Nakhchivan. Along with the teachers of the department, students majoring in dentistry have also participated in the examinations. Thus, conditions have been created for students to acquire skills in doing epidemiological research. The following age groups have been selected for the examination. The World Health Organization (WHO) conducts regular epidemiological examinations among certain age groups of the population to monitor the spread of dental diseases, the dynamics of structural changes and to determine the need for dental care. According to WHO guidelines, this method serves to accurately study the intensity of the disease, risk defects, the structure of dental care, treatment and prevention in the minimum number of patients. This method is suitable for any region. Research is conducted in major age groups and is standard for each location. Disease prevalence and severity indices are mainly carried out in the 6, 12 and 15 age groups. At the age of 6 years, deciduous teeth become a complete set, and temporary teeth are formed. The prevalence and intensity of caries in deciduous teeth and the level of their need for treatment are studied [5].

At 12 years of age, all permanent teeth erupt except third molars. Monitoring of major dental diseases, especially caries and periodontal disease in 12-year-old children based on oral health indicators and studying its dynamics in different countries can be used to predict dental care, development trends and staffing needs.

The age of 15 is a very important period for assessing periodontal status. This determines the need for treatment of periodontal diseases at the population level.

Thus, by showing the prevalence of major dental diseases in different age groups, the need for dental care in both the country and the city is determined. The number of people examined in different age groups during the epidemiological examination should be 25-50 people. If the level of caries and periodontal disease in the population is low, the number of examined should be 25, if it is medium and high, the number of people should be 50 in each age group. This amount is considered representative to obtain accurate statistical results in epidemiological studies. Intra-regional surveys should be conducted in several large cities and districts to obtain more accurate survey results.

The following indicators are used to assess tooth decay according to the WHO nomenclature.

The prevalence of caries is the percentage of people in any age group, in any locality (country, city, region, etc.) with caries, filled and extracted teeth. If the prevalence of caries is less than 30%, it is considered low. This indicator is considered medium if it ranges from 31% to 80%, high if it is 81% or more [6].

The severity of caries is determined by the number of carious teeth (C-carious teeth, F-filled teeth, E-extracted teeth) in individuals. CFE = C + F + E is the number of teeth. For this purpose, the WHO Expert Committee on Dentistry (1962) recommended the use of the CFE index for adults, temporary or milk index-CF for children (teeth c-caries, teeth f-fillings). It is recommended to use the index - CFE + CF for children who replace teeth. The intensity level of caries is assessed by five degrees.

12-year-old children:	Adults between the ages of 35- 44
From 0-to 1,1 very low:	0,2-1,5-very low
1,2-2,6-low:	1,6-6,2-low
2,7-4,4-medium:	6,3-12,7-medium
4,5-6,5-high:	12,8-16,2-high
6,6 and more-very high:	16,3 and more- very high

The level of dental care for the population (LDC) was determined by the LDC index proposed by P.A. Leus.

$$\mathrm{LDC} = 100\% - (100 * \mathrm{C} + \mathrm{E})/\mathrm{CFE}$$

LDC - level of dental care; 100% - conditionally maximum level of the population's need for dental care; C-untreated carious teeth; A-teeth removed, but not yet prosthetic**;** CFE is the average intensity of caries, fillings, and extracted teeth [116]. Depending on the amount of LDC, the results obtained are determined by the following indicators.

LDC-75%-and more-good

LDC- 50-74% satisfactory

LDC 10-49% unsatisfactory

LDC 10%- and less- is considered very bad.

Diagnosis of periodontal diseases during clinical examinations was carried out in accordance with modern traditional rules. Examinations have been conducted with a questionnaire and complaints of the patients have been studied; pain, bad breath, bleeding gums (when eating, brushing teeth or spontaneously), swelling, etc. The history

of illness includes diseases patients experienced, concomitant diseases, diet, heredity, bad habits, oral care and so on.

The physical examination covers facial skin, red border of the lips, mucous membrane of the mouth, lip frenulum and and bites. Attention has also been paid to alignment, grinding of teeth, caries and its complications, non-carious diseases, calculus and prosthetic structures. Examination of the mucous membrane and gums (gums) reveals its color, hyperemia or swelling, dental papilla, gingival hypertrophy, atrophy, pathological gingival hypertrophy, etc.

The prevalence and intensity of periodontal disease were determined by the coefficient of CPITN (Community Periodontal Index of Treatment Needs) and PMA (Physical Medium Attachment} in accordance with the WHO recommendations.

CPITN is a coefficient of periodontal demand for treatment of periodontal tissue diseases. Before determining this ratio, it is necessary to examine the surrounding tissues in the area of 6 sextants (17/16, 11, 26/27, 37/36, 31, 46/47) in the upper and lower jaw. Indicators of this ratio are recorded with the following codes:

0-no signs of bleeding, tooth decay, pathological gingival pocket;

1. Bleeding after exploration;
2. Tartar;
3. Pathological pocket with a depth of 3.5-5.5 mm;
4. Pathological pocket with a depth of more than 5.5 mm.

Signs of severe damage are taken into account by recording the value of the code in each of the 6 examined sextants. Based on this information, it is possible to calculate the number of healthy, bleeding sextants in the examined person, etc., and also determine the average values for the survey groups.

PMA is papillary-marginal-alveolar coefficient - gingivitis coefficient. Inflammation of the papilla (P) is rated 1 point, inflammation of the edge of the gums (M) - 2 points, inflammation of the alveolar gums (A) - 3 points.

The numerical value of the PMA coefficient is the sum of the indicators of the condition of the marginal periodontium of all existing teeth and is always expressed in whole numbers.

PMA= 100% • total of points/3•30.

This sum is obtained by summing the highest values of the condition of the marginal periodontium in each tooth. The PMA index is used to determine the severity of gingivitis [7,8].

V. V.Volodkina coefficient and simplified hygiene coefficient - "GE-S" is used to assess the hygienic condition of the oral cavity. The coefficients of V.A Fyodorova and V.V. Volodkina were determined using a 2% solution of methylene acid. This coefficient is applied to vestibular surfaces 43 42 41 31 32 33. Depending on the amount of plaque, different areas of the tooth surface are colored with different intensities. Staining is assessed on a 3-point scale: intense staining of the entire tooth surface - 3 points, weak - 2 points, lack of staining - 1 point.

This ratio is calculated using the following formula:

Kor = E Kn/n

E - the sum of points

Kn - hygienic coefficient of a tooth

n - the number of teeth.

Criteria for evaluating of oral hygiene for Yu.A. Fedorov-V.V. Volodkina coefficient are as follows:

1.1-1.5 - the level of hygiene is good,

1.6-2.0 - satisfactory,

2.1-2.5 – not-satisfactory,

2, 6-3.0 - poor.

The formula for calculating the GA-S of the simplified hygiene ratio (Oni- s, Green Wermillion, 1964) is as follows:

GA-S = E DA / n + E DD / n

E- the sum of the indicator;

DP - dental plaque;

DT - dental tartar;

n - is the number of teeth examined (usually 6 teeth).

Methodology: Visually, plaque and calculus were detected on 11-31 of lip surfaces, 16 -26 on cheek surfaces, and 36-46 on tongue surfaces using a dental explorer.

0 point - dental plaque and dental tartar were not detected;

1 point - plaque and tartar on the gums cover 1/3 of the surface of the tooth;

2 points - plaque and tartar cover 2/3 of the tooth surface and calculus under gum line in the form of separate conglomerates;

3 points - plaque and dental tartar cover more than 2/3 of the tooth surface or subcutaneous dental tartar covers the edge of the neck of the tooth.

subcutaneous calculus in the form of separate conglomerates;

Criteria for evaluating oral hygiene according to the Oni-s coefficient:

0-0.06 - good hygiene level;

0.7-1.6 - the level of hygiene is average;

1.7-2.5 - the level of hygiene is poor;

2.6 and> - the level of hygiene is very poor.

DISCUSSION

The city of Nakhchivan is located at an altitude of 900 m above sea level. Its area is 191.82 km^2 and its population is 95,006 people (01.01.2021). It is one of the oldest cities in Azerbaijan. The city of Nakhchivan is located on the Nakhchivan plain, on the banks of the Nakhchivan River. The climate is continental. The average temperature is -3.5°C in January, 26.9°C in July, and the annual rainfall is 236 mm. The prevalence and intensity of caries detected during clinical-epidemiological examinations among schoolchildren in Nakhchivan are given in **Table 1**.

Table 1. Prevalence and intensity of caries.

Age of examined	Number of examined	Caries by %-	χ^2 p	K	P	Ç	Kp KPÇ	T p
6	102	90 88,24±3,19	-	563	-	-	563 5,52±0,23	-
12	108	69 63,89±4,62	χ^2=16,91; p< 0,001	284	19	-	303 2,81±0,16	t=9,68; p< 0,01
15	89	70 78,65±4,34	χ^2=5,12; p< 0,05	493	28	19	540 6,07±0,26	t=11,02; p< 0,05
Total	299	229 84,50±1,67	-	1340	47	19	1406 9,97±0,15	-

As it is seen from the table, the prevalence and severity of caries among schoolchildren surveyed in Nakhchivan differ. Thus, 76.50 ± 1.67% of 299 surveyed schoolchildren suffered from caries. The caries intensity index was 9.97 ± 0.15. The number of carious teeth in each person was C-5.97, the number of fillings was F-0.93, and the number of extracted teeth was E-3.1.

If we calculate the level of dental care, we can see that LDC (Level of Dental Care) equals to 9.8%. This means that even the urban population has a low level of dental care. As for the individual age groups, the highest rates of caries have been detected in the lower age groups.

This indicator was 88.24 ± 3.19% in 6-year-old children, the lowest level among 12-year-old children, i.e., 63.89 ± 4.62%, and 78.65 ± 4.34% in 15-year-old children.

The obtained results are statistically correct t <0.001.

Regarding the intensity of caries, the CFE index in the deciduous teeth of 6-year-old children was high, i.e., 5.52 ± 0.23. No filled teeth have been found in these children.

The CFE index was low in 12-year-old children and high in older adults [9].

Accordingly, at the age of 15, the CFE index was 6.07 ± 0.26. At the age of 12, LDC is 9.3%, which indicates that dental care is unsatisfactory. This means that there is a great need to improve dental care.

The prevalence of periodontal diseases and its various forms in different age groups during clinical and epidemiological examinations conducted among schoolchildren in Nakhchivan are given in **Table 2**.

Table 2. Prevalence and intensity of periodontal diseases.

Age of the examined	The number of examined	Periodontal diseases				χ^2 p
		Gingivitis	Periodontitis	Periodontit	Total	
6	102	41 40,20±4,85	-	-	41 40,20±4,85	-
12	108	42 38,89±4,69	13 12,04±3,13	-	55 50,93±4,81	χ^2= 2,43; p>0,05
15	89	32 35,96±5,09	19 21,35±4,34	-	51 57,37±5,24	χ^2=0,80; p> 0,05
Cəmi:	299	115 27,81±2,06	32 16,56±1,71	-	147 58,17±2,27	-

As it can be seen from the table, 58.17 ± 2.27% of periodontal diseases were detected as a result of dental examination of 299 schoolchildren living in Nakhchivan [10].

Periodontal disease was less common in 6-year-old children, i.e., 40.20 ± 4.85%. In the 12-year-old group, this figure was 50.93 ± 4.81%, and in 15-year-old adolescents, this indicator was 57.37 ± 5.24%.

As for the different nosological forms of periodontal disease, only gingivitis was observed in 6-year-old children. It was 38.89 ± 4.69% in 12-year-old children and 35.96 ± 5.09% in 15-year-old adolescents.

Accordingly, periodontitis at this age was observed in 12.04 ± 3.13% and 21.35 ± 4.34%, respectively.

The prevalence and intensity of the main dental diseases detected in the clinical-epidemiological researches conducted among the local population of Nakhchivan city are given in **Figure 1**.

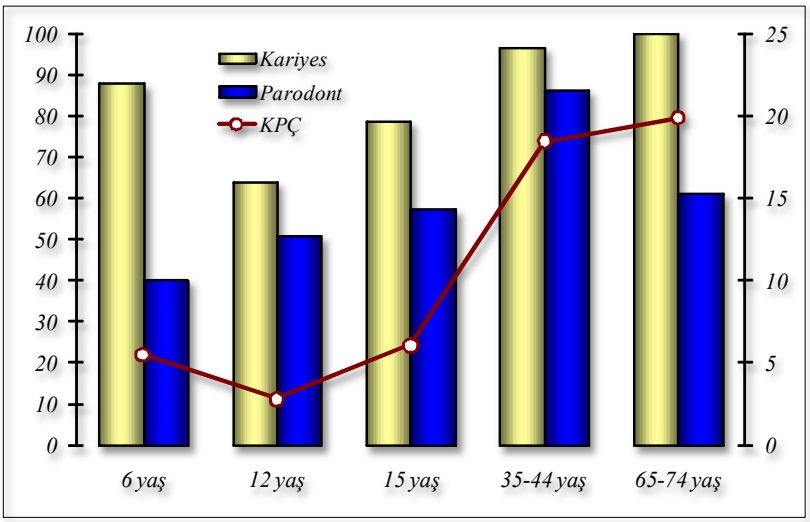

Figure 1. Indicators of caries and periodontal diseases in Nakhchivan.

As it can be seen from the diagram, dental examinations of the local population of the city suggests a high incidence of caries, and periodontal disease.

Thus, the analysis of the obtained results indicates that there is a great need for dental prevention and health education, even among the urban population.

RESULTS

The level of dental care (DSS) during dental examinations among the local population living in Nakhchivan in different age groups is given in **Table 3**.

Table 3. The level of dental care (LDC) was given in Nakhchivan.

The age of examined	The number of examined	Level of Dental Care	Status of Dental Care
6	102	51,33%	Satisfactory
12	108		
15	89		
Total	299		

Thus, the analysis of the obtained results suggests that there is a great need for dental prevention and health education, even among the urban population.

These indicators show that there is a great need to optimize dental service in Nakhchivan.

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