СУЧАСНІ ДОСЯГНЕННЯ СТОМАТОЛОГІЇ

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PREVALENCE AND INTENSITY OF DENTAL CARIES AMONG THE POPULATION OF AN URBAN ADMINISTRATIVE DISTRICT

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Анотація: *Мета роботи - дослідження захворюваності на карієс і оцінка інтенсивності каріозного процесу серед жителів Сураханського району м. Баку. У стоматологічне обстеження включено 698 суб'єктів віком 15-70 років із карієсом зубів. Використано стандартний комплекс стерильних стоматологічних інструментів. Визначено КПУ зубів. Поширеність карієсу в середньому становила 98,0±0,53%. Найменше число випадків карієсу спостерігалося у віковій групі - 15-19 років, найбільше число випадків - у віці від 50 до 70 років. Різниця щодо КПУ між віковою групою 15-19 років і 20-29 років була вищою на 20,5% (p=0,001). Різниця величини КПУ між віковою групою 20-29 і 30-39 років становила 21,2% (p=0,001), між віковою групою 30-39 і 40-49 років - 26,9% (p=0,001). КПУ у віковій групі 50-59 років був вищим, ніж у віковій групі 40-49 років, на 30,9% (p=0,001), відмінність між віковою групою 50-59 і 60-70 років становила 9,5% (p=0,021). Загальний показник КПУ був 9,91±0,47. Висока поширеність карієсу передбачає необхідність планування стимулюючих програм з гігієни порожнини рота для дорослого населення. Отримані результати, що вказують на значну кількість видалених зубів і незначну кількість пломбованих зубів, свідчать про необхідність активізувати зусилля щодо поліпшення лікування і профілактики карієсу серед міського населення.*

Ключові слова: *карієс, поширеність, вік, КПУ.*

Abstract. *Aim: to study prevalence and intensity of caries among residents of Surakhani district of Baku city. 698 subjects aged 15-70 years with dental caries were included in the dental examination. A standard set of sterile dental instruments was used. The DMFT was determined. The caries prevalence was 98.0±0.53% on average. The lowest number of caries cases was observed in the age group - 15-19 years, the highest number of cases - at the age of 50-70 years. The difference DMFT between the age group of 15-19 years and 20-29 years was higher by 20.5% (p=0.001). The difference DMFT between the 20-29 and 30-39 age group was 21.2% (p=0.001) and between the 30-39 and 40-49 age group was 26.9% (p=0.001). The DMFT in the 50-59 age group was higher than the 40-49 age group by 30.9% (p=0.001), the difference between the 50-59 and 60-70 age group was 9.5% (p=0.021). The overall DMFT was 9,91±0,47. The high prevalence of dental caries suggests the need to plan incentive oral hygiene programme for the adult population. The findings indicating a significant number of extracted teeth and low number of filled teeth suggest the need to intensify efforts to improve caries treatment and prevention in urban population.*

Key words: *dental caries, prevalence, age, DMFT.*

Introduction.

Tooth decay is the most common oral problem among people of all ages. Oral diseases are reported to affect 3.9 billion people, and untreated dental caries of permanent teeth was the most common disease estimated by the Global Burden of Disease [1]. Epidemiological studies conducted in Azerbaijan indicate a high prevalence of dental caries among the population of all age groups [2-5].

Untreated dental caries, being a global public health problem, is also a serious economic burden, can cause severe pain and discomfort, and if it spreads to the dental pulp, it can also cause infection and eventually sepsis and tooth loss or even aggravate or cause systemic diseases [6]. Untreated dental caries has obvious epidemiological characteristics. The 2017 Global Burden of Disease study showed that the prevalence of permanent tooth decay ranks first among 328 diseases. Approximately 2.3 billion people worldwide suffer from dental caries of permanent teeth, a 9.4% increase from the incidence rate in 2007 [7].

Dental caries is considered preventable and controllable. However, additional scientific evidence will be needed to support approaches to caries prevention and control, in particular epidemiological studies. Epidemiological studies are conducted to design prevention programmes, to assess the population's need for care, and to evaluate the effectiveness of treatment for caries, a common dental disease [8, 9].

A review of the global burden of untreated dental caries has shown that both the prevalence and incidence of dental caries increase after the age of 40 years, affecting 35-40% of older adults [7]. It is expected that the majority of new cases of dental caries in the elderly occur in the roots of teeth. For example, in a recent nationwide oral health survey conducted in China, 62% of adults aged 65-74 years had root caries, with an average of 2.6 decayed and filled tooth roots [10]. Root caries is expected to increase over time. Tooth root caries can lead to pain and tooth loss and can even affect the general health and quality of life of elderly individuals.

Current literature shows that despite efforts to improve oral hygiene through brushing and fluorine use, dental caries remains one of the most common dental diseases worldwide. Thus, detection and treatment of this disease is an important public health problem in the field of dentistry and there is a high need for effective preventive programme.

The aim of the study.

To investigate the caries prevalence and the intensity among residents of Surakhani district of Baku city.

Object and research methods.

The study was carried out in Surakhani district of Baku city. 698 subjects aged 15-70 years with dental caries were included in the dental examination. A standard set of sterile dental instruments was used during the study. The DMFT of teeth was determined. Statistical processing

of data was carried out using the SPSS 23.0 (USA) application programme package.

The study was conducted in accordance with the principles of the Helsinki Declaration of Human Rights, the Council of Europe Convention on Human Rights and Biomedicine. Written informed consent was obtained from all subjects who participated in the study.

Research results.

The examined patients were categorized into the age groups presented in **table 1.**

Table 1 – Distribution of the studied patients by age

Age, years	n	%
15-19	59	8,5
20-29	135	19,3
30-39	180	25,8
40-49	139	19,9
50-59	85	12,2
60-70	100	14,3
Total	698	100

As shown in **table 1**, most of the patients were in the age range of 30-49 years, accounting for 45.7% (n=319) of the total number of patients.

Out of the total 698 participants, 326 (46.7%) were females and 372 (53.3%) were males.

The prevalence of dental caries was 98.0±0.53% on average. The study of caries cases showed its frequency in older age groups **(table 2)**.

Table 2 – Caries prevalence among patients in different age groups (%)

Age groups	n	Average	Std. error
15-19	59	89,8	3,94
20-29	135	97,0	1,57
30-39	180	98,3	0,96
40-49	139	99,3	0,71
50-59	85	100,0	-
60-70	100	100,0	-
Total	698	98,0	0,53

As can be seen from **table 2**, the lowest number of caries cases was observed in the youngest age group – 15-19 years, and the highest number of cases – in patients aged 50-70 years.

The intensity of dental caries lesions was assessed using the DMFT index and its elements **(table 3)**.

Table 3 shows that the value of DMFT increased with age. The maximum DMFT was determined in patients of

Table 3 – Intensity of caries

Age groups	n	DMFT index per person surveyed	Including		
			D	M	F
15-19	59	4,81±0,21	1,93	2,78	0,10
20-29	135	6,05±0,29	2,69	3,25	0,11
30-39	180	7,68±0,26	3,14	4,42	0,12
40-49	139	10,5±0,31	2,17	7,78	0,10
50-59	85	15,2±0,51	2,07	13,0	0,12
60-70	100	16,8±0,64	1,07	15,6	0,10
Total	698	9,91±0,47	2,17	7,63	0,11

the oldest age group, and the minimum – in the youngest age group. Comparative analysis showed that the difference in DMFT between the age group of 15-19 years and 20-29 years was higher by 20.5% and statistically significant (t=3.46, p=0.001). The difference in DMFT between the age group of 20-29 and 30-39 years was 21.2% (t=4.18, p=0.001) and between the age group of 30-39 and 40-49 years was 26.9% (t=6.97, p=0.001). The DMFT index in the 50-59 years age group was higher than the index in the 40-49 years age group by 30.9% (t=8.21, p=0.001), the difference between the 50-59 and 60-70 years age group was 9.5% (t=2.32, p=0.021).

The total D (decayed) value was 2.17. At the same time, in the age groups 20-29 and 30-39 years old this indicator was higher than in the older age groups, but the highest D value was observed in the age group: 30-39 years old (3.14), and the lowest (1.07) – in the oldest group – 60-70 years old. As we can see, while the total DMFT was 9.91, the average level of extracted teeth (M) was 7.63, which was 77.0% of the total DMFT.

Discussion of research results.

Dental caries is a complex multifactorial disease characterized by demineralization of the dental hard tissues (enamel, dentin and cementum) of temporary and permanent teeth. Detection of dental caries is the most important step in the treatment and prevention of this disease. Epidemiological studies are considered an important method for determining the requirements of any planned oral care programme and various preventive measures.

An epidemiological study was conducted to expand data on caries prevalence among adults in a "suburban" area of Baku city. In our study, more than half of the participants in different age groups had untreated caries. The results of the present study are consistent with the results of several epidemiological studies on dental caries [11, 12]. However, the participants in our study had higher mean caries rates compared to other studies [13, 14].

From the epidemiological point of view, the most common method of caries intensity assessment is the DMFT index. It should be noted that the DMFT index is the best known method. It was introduced by Klein and Palmer in 1938 as a method of identifying carious teeth in individuals and has been used for about 90 years. It is used for both tooth rows, representing the total number of decayed, missing teeth due to caries and filled teeth or surfaces. This indicator is known to refer to a set of indicators whose purpose is to measure the situation/status of dental caries. The advantage of this method is its ease of application with a high level of validity and reliability. At the same time, this method contains several limitations as it only provides a numerical value representing teeth or surfaces that are decayed, missing or restorated. With this method, it is not possible to obtain sufficient data on the carrier, stage, depth of penetration, types of restorations and their conditions, and it cannot detect the initial stages of carious enamel lesions before cavitation. On the other hand, the simplicity and less time-consuming clinical application are the main advantages of this method. Moreover, another advantage is considered to be comparability, since the data of the DMFT can be compared with surveys conducted since the 1940s and compared with data from all over the world [15]. Nowadays, with the development of minimal intervention principles, it is possible to treat early carious lesions with a non-surgical method, avoiding complex and expensive treatments.

Consequently, the selection of the best available caries assessment system capable of recording non-cavitary lesions has become imperative.

In our study, the mean DMFT score was 9.91±0.47. The literature shows that in adults from 23 European countries, the mean DMFT (decayed-missing-filled teeth index) score ranged from 6.6 to 17.6 [16].

According to the results of our epidemiological study, the caries intensity was highest (16.8±0.64) in the age group of 60-70 years and lowest (4.81±0.21) in patients in the age group of 15-19 years. Our results are in accordance with the literature data. For example, in elderly citizens of 21 European countries, the mean DMFT score ranged from 14.7 to 25.5 [16]. Repeated cross-sectional studies of caries trends in adults found a 20% decrease in DMFT value, referring to country-wide data [16]. On the contrary, in Azerbaijan [2], cases of increased DMFT were encountered in repeated examinations.

Some European countries have introduced regular national oral health data collections, which are published in articles and reports [Carvalho], which we believe is useful.

According to J. Ch. Carvalho, U. Schiffner [16], DMFT values for adults range from 6.6 to 17.6. For comparison, the authors cite data from a review published by T.M. Marthaler et al. [17], that showed a range of mean DMFT values from 13.4 to 20.8, clearly indicating a decrease in caries incidence. According to the researchers, more important information can be obtained from within-country comparisons between repeated cross-sectional studies. Most of these comparisons show a clear decline in caries prevalence among adults. The authors note that there was a markedly lower incidence of dental caries in the latter comparisons [16]. A closer look at the changes in DMFT in the countries that conducted follow-up surveys shows that caries incidence ranged from 9.6 to 23.3 in the first surveys, while subsequent surveys showed a range from 6.7 to 15.4. This suggests a 20% reduction in DMFT value with reference to nationwide data [16]. We compared our results with the domestic literature [2] and unlike the European data, we did not find a significant difference in the reduction of caries occurrence in Baku city.

An interesting part of the review by J. Ch. Carvalho, U. Schiffner [16] shows a tendency for caries development in older adults aged 65 to 74 years to be less pronounced than in adults aged 35 to 44 years. While the mean DMFT scores ranged from 15.9 to 30.2 in the first surveys, it turned out to be between 14.7 and 25.5, in later surveys this corresponded to a 13% reduction.

Perhaps even more important than the decrease in the DMFT index is the change in its components, showing lower rates of extracted but higher rates of filled teeth. This indicates a paradigm shift towards restorative rather than extractive therapy and should have significant implications for future dental service research. However, among the participants in our study, component M had the highest rate and component F had the lowest rate **(table 3).**

Missing teeth can be considered as a reliable indicator of the caries process and its consequences in adults and the elderly. Data from our study and reports in the literature suggest that "missing teeth" in the older age group of 60-70 years has not been eradicated. This may also indicate that eradication of the disease among the elderly is unlikely to occur in the short term.

Thus, caries prevalence is high among residents of Surakhani district of Baku city, especially in older age groups.

Conclusions.

The high prevalence of dental caries suggests the need to plan incentive oral hygiene programmes for the adult population. The results obtained, indicating a significant number of extracted teeth and a low number of filled teeth, suggest the need for measures to improve caries treatment and prevention.

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