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ЖУРНАЛ СТОМАТОЛОГИИ И КРАНИОФАЦИАЛЬНЫХ ИССЛЕДОВАНИЙ

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MULTIVARIATE ANALYSIS ON PERIODONTAL DISEASES

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ANNOTATION

The multifactorial nature of the etiology of periodontal diseases dictates the need to consider the probability of their development and features of the clinical course using multifactorial and risk assessment models.

Models for predicting variants of the course of pathology are the basis for making decisions about methods and means of prevention and prescribing individual therapy. This was the basis for the assessment of the "total risk of generalized periodontal disease".

Key words: oral cavity, periodontal disease, mucous membranes, diffuse periodontitis. words: oral cavity, periodontal disease, mucous membranes, diffuse periodontitis.

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ПАРАДОНТАЛ КАСАЛЛИКЛАРНИНГ МУЛТИФУНКЦИАЛИ ТАҲЛИЛИ

АННОТАЦИЯ

Периодонтал касалликлар этиологиясининг мултифакториал хусусияти уларнинг ривожланиш эҳтимоли ва кўп факторли моделлар ва хавфни баҳолаш моделларидан фойдаланган ҳолда клиник курс хусусиятларини ҳисобга олиш зарурлигини белгилайди. Патология курсини башорат қилиш моделлари профилактика усуллари ва воситалари тўғрисида қарор қабул қилиш ва индивидуал терапияни тайинлаш учун асосдир. Бу "умумий периодонтал касалликнинг умумий хавфини" баҳолаш учун асос бўлди.

Калит сўзлар: оғиз бўшлиғи, парадонт касаллиги, шиллиқ қават, тарқалган парадантоз

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МНОГОФУНКЦИОНАЛЬНЫЙ АНАЛИЗ ЗАБОЛЕВАНИЙ ПАРАДОНТА

АННОТАЦИЯ

Многофакторность этиологии заболеваний пародонта диктует необходимость учитывать вероятность их развития и особенности клинического течения с использованием многофакторных моделей и моделей оценки риска. Модели прогнозирования вариантов течения патологии являются основой для принятия решений о методах и средствах профилактики и назначения индивидуальной терапии. Это послужило основанием для оценки «общего риска генерализованного пародонтоза».

Ключевые слова: полость рта, пародонтоз, слизистые оболочки, диффузный пародонтит.

The multifactorial nature of the etiology of periodontal diseases dictates the need to consider the probability of their development and features of the clinical course using multifactorial and risk assessment models. [5,3,9,11].

Models for predicting variants of the course of pathology are the basis for making decisions about methods and means of prevention and prescribing individual therapy. This was the basis for the assessment of the "total risk of generalized periodontal disease".

In practice, modeling of population patterns is often used to solve problems of the healthcare system, for example, to evaluate the effectiveness of different treatment and prevention approaches [1, 7,8,11, 20]. This was the basis for the assessment of the "total risk of generalized periodontal disease".

It is obvious that the prevalence of risk factors for periodontitis may differ significantly in different populations due to heterogeneity in terms of medical and demographic, national (hence genetic), geographical and socio-economic characteristics. [1,4, 6,9,12, 14,19].

The solution of the problem lies in determining the integral indicator of the load of risk factors for generalized periodontitis, which takes into account the prevalence of risk factors and their contribution to the occurrence of the disease.

The purpose of this study is to analyze the population determinants of the risk of developing generalized periodontitis.

Materials and methods

Epidemiological surveys of the adult population of Uzbekistan aged 20 and more than 60 years were carried out. The epidemiological study was conducted in the period from 2015 to 2019. The total sample size was 1,036 people, including 555 (53.57%) women and 481 (46.43%) men.

The study was performed in accordance with the standards of epidemiological research in dentistry and the principles of the Helsinki Declaration. The study Protocol was approved by the Ethics Committee. Prior to inclusion in the study, all participants received written informed consent to participate in the study and assess the periodontal condition.

The prevalence of periodontal diseases in each gender and age group was judged by the value of the CPITN index.

Scaling of risk factors was carried out in two categories: 0-absence and 1 - presence of a trait.

The reliability of inter-group differences was calculated in relation to the odds (RR) and 95% confidence interval (CI) of the frequency of risk factors in the comparison groups. Pearson's $\chi 2$ criterion was used for statistical processing of categorical variables. To assess the combined effect of the primary presence/absence of generalized periodontitis on the frequency of combined outcomes, a multi-factor analysis of variance was used. In addition, the combined effect of these factors was estimated using logistic regression analysis with a RAS score of the event probability AND 95% confidence interval (CI).

Encoding in regression analysis of the variable "combined outcome": 0-no, 1-Yes; variable "primary presence/absence of GP": 0-no GP, 1-GP is; variable "gender": 0 – women, 1 – men. The critical level of statistical significance was assumed to be 0.05.

The values of b-coefficients in the logical regression analysis were evaluated as an indicator of the contribution of the risk factor to the prevalence of periodontitis.

Further, the prevalence of risk factors in gender and age groups and in the whole sample was calculated. The load of periodontitis risk factors was calculated as the sum of products of the prevalence of risk factors with their contribution to the risks of periodontitis by the formula

$P = \sum(RC)\ n$, (1)

where P is the load of periodontitis risk factors; R is the prevalence of the risk factor, %; C is the contribution of the risk factor to the prevalence of CHD.

Then the difference between risk factors in gender and age groups compared to the General sample was calculated using the formula

$\Delta R = RGR. – RV.$, (2)

where ΔR is the difference of the load as risk factors in age-sex groups compared to the total sample according to the formula; RGR. – loading risk factors in age-sex groups; Pb. - load of risk factors in the General sample.

Based on the b-coefficient obtained in the course of linear regression analysis, the difference between risk factors in gender and age groups was translated into population risk values using the formula

$P\% = \Delta RV$, (3), where P% is an additional risk of periodontitis to the population due to risk factors, %; – b is the ratio of GP frequency to load by risk factors in linear regression analysis.

The critical level of statistical significance and the p-level for selecting a variable were assumed to be 0.05.

Results and discussion

As can be seen from the presented materials, the male sex causes a statistically significantly higher frequency of periodontitis (RR 1,498; at 95% CI 1,181 – 0.190); the prevalence of generalized periodontal lesions is also associated with low social status (RR 1,579; at 95% CI 1,223 – 2,003) and non – compliance with oral hygiene (RR 1,393; at 95% CI 1,084 – 0.790); at periodontitis, a significantly higher rate of bad Smoking habit (RR 2.869; at 95% CI 2.178-3.750) and chronic somatic pathology compared to individuals without a burdened somatic history (or 1.977; at 95% CI 0.848-1.366); the prevalence of the disease is aggravated by low social and living conditions (RR 1.131; at 95% CI 0.891 -1.436); the predominance of carbohydrates in the diet (RR 1.537; at 95% CI 1.178-2.005) and low (below the subsistence minimum) per capita income (RR 1.946; at 95% CI 1.523 – 2.478) (table 1).

Table 1

The relationship between social risk factors and the possibility of developing generalized periodontitis in terms of the ratio of chances and regression analysis data

Risk factor		OR	S	DI (SI) - DI-SI 5%-95%	χ2 Pearson	p	Б
X1	Male	1,498	0,121	1,181-0,190	14,204	<0,001	0,0185
X2	Social status	1,579	0,122	1,224-2,003	6,725	<0,01	0,0524
X3	Oral hygiene	1,393	0,128	1,084-1,790	58,246	<0,001	0,300
X4	Smoking	2,869	0,141	2,178-3,780	58,628	<0,001	0,103
X5	Chronic somatic pathology	1,976	0,121	0,848-1,366	52,236	<0,001	0,252
X6	Social and living conditions	1,191	0,122	0,891-1,436	11,993	<0,001	0,106
X7	Food	1,537	0,136	1,178-2,005	7,867	<0,006	0,25
X8	Average per capita income	1,946	0,123	1,523-2,478	29,508	<0,001	0,130

Only these risk factors were used for further analysis. Using regression analysis, the contribution of risk factors for periodontal diseases to the presence/absence of the disease in the population was determined.

In terms of impact on the occurrence of periodontitis, the factors are as follows: in 1st place is the non-compliance with hygiene of the oral cavity, the contribution factor is 0.301 units; 2 - the presence of chronic somatic diseases – by 0.252 units.; on the 3rd - the predominance of carbohydrates in the diet – to 0.252 units.; 4-volume - low income increases the presence of periodontitis 0,139 unit; 5-Tom low income – by 0.139 units.; 6-is - Smoking – by 0.106 unit; on the 7th –low social status increases the risk of periodontitis in the population by 0.0524 units of ed. and on the 8th–male sex, leading to an increase in the prevalence of periodontitis on periodontal diseases by 0.0185 units of ed. (table 1).

The statistical significance of the equations verified by multiple correlation coefficient R = 0,86; the coefficient of determination R2 is equal to 0,725, the proximity of the determination coefficient R2 is close to unity the high significance of the regression equation in explaining the behavior of Y. And Fisher's F-test, equal 34,534. Since the actual value of F> Fkp, (34,534 ≥ 2,02), the coefficient of determination is statistically significant and the regression equation is statistically reliable (i.e. the bi coefficients are jointly significant). It was found that in the studied situation, 74.61% of the total variability of Y is due to changes in xj factors.

Table 2 shows the prevalence of periodontal pathology and risk factors for generalized periodontitis in the gender and age groups and in the sample as a whole. The prevalence of periodontitis in the entire population is 66.67% and increases progressively from 18.37 in the younger age group of 20-24 years to 98.35% in the population over 65 years.

Table 2

Prevalence of risk factors and load of risk factors in the surveyed population

Risk factor		Age groups						All population
		20-24	25-34	35-44	45-64	55-64	>65	
GP prevalence		18,34	49,73	60,85	80,0	90,91	98,35	66,67
X1	Gender male	55,0	64,40	61,88	63,53	59,92	56,30	59,95
X2	Social. status	48,17	42,93	59,41	76,47	51,65	61,50	56,07
X3	Oral hygiene	18,18	26,18	34,65	41,18	45,45	50,70	36,33
X4	Smoking	13,76	32,47	39,60	73,53	41,32	19,05	35,36
X5	Chron.somat. pathology	22,94	36,65	43,56	46,78	61,98	70,42	45,15
X6	Physical social. conditions	9,17	20,94	30,20	42,35	68,18	90,14	44,50

X7	Prevail. carbohydrates in nutrition	13,70	23,56	32,67	44,12	33,06	31,46	29,37
X8	Low income	46,30	41,88	34,65	42,35	49,59	75,12	48,79
Load		15,38	37,42	48,09	57,96	59,26	66,37	48,97
Difference		-34,60	-11,52	-0,88	8,99	10,29	17,40	

The prevalence of risk factors in age groups also has significant fluctuations. Relative homogeneity is registered by gender (fluctuations in the range of 55.00% - 63.53 %); at the same time, the social status is higher in older age groups; with increasing age, there is a more careful observance of oral hygiene, an increase in the frequency of bad Smoking habits; a sharp increase in the frequency of somatic pathology, social conditions and per capita income; at the same time, 13.76% of the population aged 20-24 years and 31.46 – 44.12% of the population in the age groups over 60 years and 45 – 54 years give preference to carbohydrates in their diet.

The obtained equation of logical multi-factor regression showed that the presence of the studied risk factors explains the frequency of generalized periodontitis in the adult population by 74.61%.

b-coefficients-links between GP frequency and load risk factors in linear regression analysis were used to calculate population risk using the formula (3).

The calculated load of risk factors and the difference in the load in the gender and age groups compared to the General sample are shown in table 2. the Load of risk factors calculated using logistic regression analysis is equal to 48.97 for the entire surveyed population. With age, the burden of risk factors increases from 15.38 in the population aged 20-24 years to 75.12 in the age group over 65 years (table 2).

An additional risk in the younger age groups below the average for the population in the age group 20 – 24 year – 34,60; 25 – 34 – 11.52; population index age group – as close to the average for the population – below - -0,88 and increases by 8.99 age group 45 – 54 years by 8.99; 55 – 64 years – 10, 20 and more than 65 years – of 17.40.

The data obtained allows us to calculate the load of risk factors.

Conclusion

According to numerous studies of domestic and foreign authors, periodontal diseases make a significant contribution to the health of the population, which determines the need to develop and implement methods for the diagnosis and treatment of combined pathology. [1, 2,8, 10, 11, 12, 16,18]. In this case, the integration of population risk is based on the analysis of both the differences in the prevalence of risk factors and the assessment of their contribution to the development of periodontal diseases.

Ranking factors by the degree of influence on the prevalence of pathology allows us to quantify risk management, focused on identifying the causal relationships of risk factors with the presence of periodontal pathology and to implement adequate preventive measures to reduce the prevalence

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