Central Asian Journal of Medicine

DEVELOPMENT OF AN ALGORITHM FOR DETECTING DENTAL DISEASES AND PROVIDING DENTAL CARE TO CHEMICAL INDUSTRY WORKERS

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ABSTRACT

The question of the negative impact of some industries on the oral cavity remains relevant. The relationship of the high prevalence of non-carious lesions of the teeth and oral mucosa with such industrial processes as oil and gas extraction, metallurgy, chemical production, bakery and confectionery production has been proven. Dental health contributes to the preservation of the ability to work of an important part of the non–population of the country - workers of industrial enterprises, especially since a number of studies convincingly reveal the role of the dental system in the general state of the body. [2,6,8,]

The presence of high risks of occupational diseases among workers in industry has been proven. This is due to the entry of compounds of elements into the human body through the oral cavity. Industrial workers are characterized by a high prevalence of dental caries and inflammatory periodontal diseases.

Key words: harmful effects, workers, study, consequence.

INTRODUCTION

Chemicals of the industrial air environment are detected in the oral fluid, hard tissues of teeth, dental deposits, biopsies of tissue structures They worsen the course of dental caries due to the substitution of calcium ions in hydroxyappatite crystals, chronic inflammation in periodontal tissues, violation of the integrity of the epithelium of the oral mucosa [1-10].

However, the influence of chemical factors of industry on the oral cavity of workers, the consequences of these effects have not been fully studied. Given this, the need to continue dental, clinical, functional and microbiological research on this problem has not lost its relevance.

The purpose of this study is to develop an algorithm for the detection of dental diseases, as well as adverse effects on the oral cavity, assessment of the condition and performance of dental services to employees of the chemical industry.

Materials and methods

In order to conduct scientific research, the health status and dental status of workers in the chemical industry of Navoiazot in the city of Navoi, Navoi region, were studied and evaluated.

Research material

In total, 1,262 industrial workers took part in the study, among whom there were from 19 to 60 years of working age, 511 of them (40.5 ± 3.0%) living in the city, and 751 (59.5 ± 3.0%) permanently lived in rural areas. They were formed as a core group.

To compare the results, employees of the industrial administration were taken, from whom a control group was formed. The control group included 245 people aged 19-60 years who do not work in the Navoiazot industry, of whom 191 (77.9 ± 2.0%) are permanent residents of the city and 54 (22.1 ± 2.0%) are permanent residents of rural areas.

In both groups, the number of men surveyed exceeded the total number of women - out of 1,507 employees of the Navoiazot industry (n = 1,262), 837 men (66.3 ± 2.6%) and 425 women (33.7 ± 2.6). Of the surveyed, working in the administration of industry (n = 245) - 150 men (61.3 ± 2.2%) and 95 women (38.7 ± 2.2%). In the main group, men and women were 1:0 and 31, respectively, and in the control group - 1:0 and 40, respectively. It can be seen that the gender differences are the same, which indicates that the studied groups are representative of each other.

Table 1

Comparative indicators of the age composition of the studied contingent

Age Employees of the Navoiazot industry	Employees of the Navoiazot administration	Age Employees of the Navoiazot industry
19-29 лет	448 / 35,5±3,0	117 / 47,5±2,4
30-39 лет	381 / 30,2±2,8	69 / 28,3±2,2
40-54 лет	390 / 30,9±2,9	40 / 16,4±1,8
55 лет и старше	43 / 3,4±1,1	19 / 7,8±1,3
Всего	1262 / 100,0	245 / 100,0

Note: The table contains absolute numbers, relative (%) numbers in the denominator.

The age distribution of the surveyed in the study groups is shown in Table 1.

As can be seen from table 1, the level of working capacity was evenly distributed in the surveyed groups. Statistically, the proximity of the numbers between the two groups proved the representativeness between the compared groups. As shown, the prevalence of able-bodied persons between the two groups is high.

The criteria of the groups of the studied contingent (main, control) were as follows:

- inclusion in the main group - working at Navoiazot, aged 19-60 years, willing to participate in scientific research;

- inclusion in the control group – those working in the administration of Navoiazot, aged 19-60 years, who agree to participate in scientific research.

Both groups compared were representative of each other and differed only in whether they had direct contact with chemical compounds in the above-mentioned industry. During the study, attention was paid to the randomization of the study, i.e. a random sample.

Research methods

In order to study the dental status of employees of the Navoiazot industry and the administration of this industry, medical records of all employees were examined and medical examinations were conducted.

Dental examinations were carried out using traditional methods, data from a comparative assessment of the condition of teeth, gums, and oral mucosa, and all the results obtained were recorded in maps prepared specifically for these studies.

For statistical processing of the obtained results, a generally accepted variational statistical method (the Student and Fisher method) was used. This method determined the arithmetic mean (M), the average error (m) and the confidence criterion (t). All tests were conducted on personal computers with a Pentium-IV processor using a special Excel program for biomedical tests. The principles of evidence-based medicine were strictly observed in the organization and conduct of research.

The results obtained and the discussion

The distribution of the studied contingent by work experience is important for the study of dental diseases among the studied contingent. Therefore, the distribution of employees by length of service is shown in Figure 1.

As shown in Figure 1, the majority of the study participants (n = 612, 48.5 ± 3.1%) were employees aged 1 to 5 years, followed by n employees with work experience from 5 to 10 years (n = 496, 39.3 ± 3.0%), as well as with work experience up to 1 year (n = 82, 6.5 ± 1.5%) and with work experience of 10 years or more (n = 72, 5.7 ± 1.4%) took the next place.

Work experience is of great importance in the formation and development of dental diseases, since the period of exposure to adverse factors of the industrial environment also depends on it.

The study of dental status began with the study and evaluation of patient complaints. To ensure the reliability of the results obtained, the comparative indicators of the main and control groups are shown in Table 2.

Table 2 shows that out of 9 indicators, in 8 cases, the parameters identified and analyzed as a result of dental examination (88.9%) of the main group were statistically significantly higher than the control group (R0.05 - R0.001).

The study showed the prevalence of the identified symptoms among employees of the industrial administration, while some symptoms of the studied dental diseases were detected and proved to be significantly different in workers who do not have direct contact with chemicals (P0.05).

Table 2

Comparative indicators of the frequency of symptoms of dental diseases in workers of the main and control groups

Symptoms	The control group, n=245		The main group, n=1262	
	Abs	%	Abs	%
Pain associated with mechanical and thermal effects	51	20,7±1,9	145	11,5±1,9* ↓
Tooth mobility	28	11,5±2,6	482	38,2±3,0* ↑
I degree	15	6,2±1,1	482	38,2±3,0* ↑
Bleeding gums	9	3,6±0,9	275	21,8±3,7* ↑
Increased sensitivity of teeth to sweets	21	8,5±3,4	193	15,3±3,2* ↑
Bleeding while brushing teeth	4	1,5±0,6	140	11,1±1,9* ↑
Discomfort in the oral cavity	3	1,4±0,5	135	10,7±1,8* ↑
Increased sensitivity of teeth to food	15	5,9±1,5	111	8,8±2,4* ↑
Erosion of the front teeth	0	0	14	1,1±0,6 ↑

Note: * - the reliability of the differences in the indicators of the main group relative to the control group; ↑, ↓ - the direction of change.

The differences between the main and control groups in the detection of symptoms in industrial workers were as follows:

- increased sensitivity of teeth to food - by 7.6 times (1.4±0.5% vs. 10.7±1.8%)

- discomfort in the oral cavity - by 7.4 times (6.2±1.1% vs. 38.2±3.0%);

- bleeding gums - 6.2 times (1.5±0.6% vs. 11.1±1.9%);
- increased sensitivity of teeth to sweets - 6.1 times (2.6±3.7% vs. 3.6± 0.9%) - Figure 3.

Similar results were obtained for other parameters. It is noteworthy that the pain syndrome from mechanical and thermal effects alone was higher in the control group than in the employees of the main group.

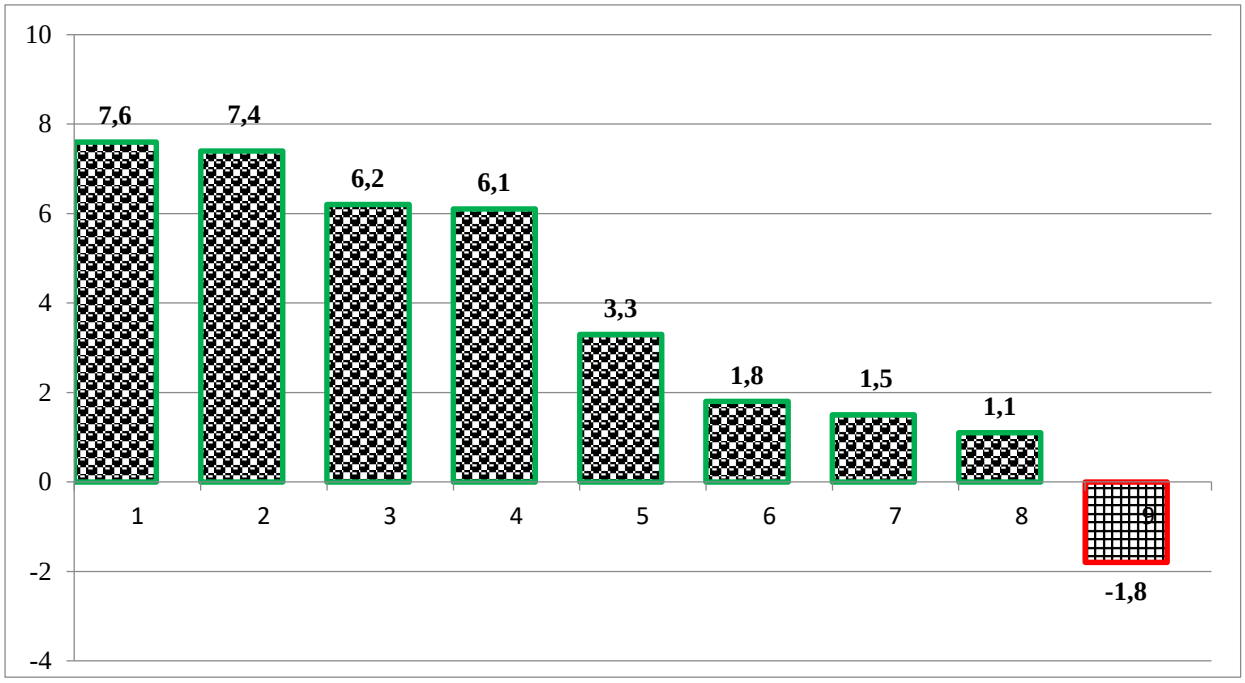

Fig. 2. *Differences in the frequency of dental symptoms in workers in industry and in the administration of the plant, the number of times (1. increased sensitivity of teeth to food; 2. discomfort in the oral cavity; 3. bleeding gums; 4. increased sensitivity of teeth to sweets; 5. I-degree of tooth mobility 6. Bleeding at brushing teeth 7. Erosion of the front teeth 8. Stains on the teeth 9. Pain from mechanical and thermal effects)*

Conclusions: it was found that the incidence of the main symptoms of dental diseases among chemical industry workers is higher than among administration workers who do not have direct contact with the chemical elements industry. Of the 9 identified indicators, 8 turned out to be 1.5-7.6 times more common among industrial workers. Symptoms that differed significantly and required attention when planning preventive measures included increased sensitivity of teeth to food and sweets (7.6 and 6.1 times), bleeding gums (6.2 times), discomfort in the oral cavity (7.4 times).

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