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ASSESSMENT OF THE RESULTS OF THE LEVEL OF OLIGOPEPTIDES OF AVERAGE MOLECULAR MASS IN THE ORAL FLUID OF EMPLOYEES IN THE PRODUCTION OF AMMONIUM AND NITRATE SALTPETER

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ABSTRACT

Various enterprises of JSC "Samarkandkimyo", which produce a wide variety of ammonium and nitrate saltpeter, are sources of nitrogen, phosphorus, potassium, and ammonium ecotoxicants in the republic. Phosphate manufacture in Uzbekistan, such as superphosphates, hexachlorobutadiene, tri- and tetrachlorethylene, and others, are sources of nitrogen-phosphorus-potassium and ammonium toxicants. JSC "Samarkandkimyo" (petrochemical complex in the city's industrial zone) is one of Uzbekistan's largest enterprises for the production of nitrogen and phosphorus-containing fertilizers of the 2.4-D group, which are among the most effective and widely used, as well as the country's main supplier of nitrogen-phosphorus-potassium and ammonium xenobiotics.

Dioxins, which are considered by many researchers as worldwide superecotoxicants with a broad spectrum of biological activity in extremely low levels on all living things, are formed in tandem with the production of nitrogen-phosphorus nitrate. Dioxins are very harmful for people since they are stable in the environment due to accumulation and have a large potential for entering the body. The personnel of the enterprise (part of JSC "Samarkandkimyo") which manufactures ammonium and nitrate saltpeter (ammophos, nitrophos) were examined. The age of workers in production ranged from 20 to 55 years, of whom 53 were men, 48 women; work experience in these industries ranged from 1 to 35 years.

As a control group, a voluntary group of 100 patients, comparable in age and sex to the main group, who sought dental care at the Samarkand Regional Dental Clinic but did not come into contact with dangerous substances such as nitrogen-phosphorus-potassium and ammonium compounds, were studied.

KEYWORDS:- Ammonium And Nitrate Saltpeter, Mixed Saliva, Oral Fluid, Harmful Production Factors.

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INTRODUCTION

At the current stage of development of the industrial complex in our country, there are opportunities for organizing dental care for workers working in a number of large, first and foremost, hazardous work environments, at a high modern level. At the same time, the implementation of a preventive focus in dental treatment for the working population continues to be an unsolved issue.

In today's world, any medical service's success depends on the mutually acceptable interaction of all connections, all parts of the health-care system, which is heavily reliant on the level of organization and management of their operations in order to optimize the work of medical institutions.

In recent years, studies have been conducted to investigate the subject of improving the organization of dental care for the general public as well as certain types of industrial workers.

However, no in-depth research has been conducted to explore the difficulties of enhancing dental treatment in the new socio-economic conditions of the development of the industrial complex and the reform of the health-care system (supplied to employees in the chemical industry), the current state of the dental service provided in the medical and sanitary unit of a large enterprise. In addition, there is no systematic examination of the availability and quality of dental care supplied to enterprise personnel in their homes and workplaces.

Thus, the importance of this research is determined by the issue of studying the organization of dental care for chemical industry workers in modern conditions.

PURPOSE OF THE RESEARCH

Study of the level of average molecular weight oligopeptides in the oral fluid of workers in the production of ammonium and nitrate saltpeter (ammophos, nitrophos).

OBJECTS AND METHODS OF RESEARCH

The personnel of the enterprise (part of JSC "Samarkandkimyo") which manufactures ammonium and nitrate saltpeter (ammophos, nitrophos) were examined. The age of

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workers in production ranged from 20 to 55 years, of whom 53 were men, 48 women; work experience in these industries ranged from 1 to 35 years.

As a control group, a voluntary group of 100 patients, comparable in age and sex to the main group, who sought dental care at the Samarkand Regional Dental Clinic but did not come into contact with dangerous substances such as nitrogen-phosphorus-potassium and ammonium compounds, were studied.

All of the people who were assessed were separated into three groups based on their work experience. Persons with less than 10 years of work experience at this industrial firm made up the first group. Employees with 10 to 20 years of work experience made up the second category. Employees with more than 20 years of experience made up the third category.

The collected data was statistically processed using the Microsoft Excel software suite. The Student criteria were used to determine the significance of the differences in parameters.

RESULTS AND DISCUSSION

The findings present that the number of oligopeptides of average molecular weight (MCMW) in the oral fluid of workers who come into contact with pesticides in the course of their professional duties is 3.2 times higher than in the control group ($p<0.01$, RR=3.2). An increase in the level of HMWP was found in workers with an increase in the duration of work: workers with less than 10 years of experience have a content of HMWM in the oral fluid that is 2.3 times greater than the norm, whereas workers with 10 to 20 years of experience have a value of 0.513 units for this indicator - 2.3 times the norm ($p<0.001$, RR=2.3), and 1.5 times greater than those with less than 10 years of experience ($p<0.01$). SMM was 0.613 units for workers with more than 20 years of experience, which is 2.9 times higher than the norm ($p<0.001$, RR=2.9), and 1.5 times higher than for workers with 10 to 20 years of experience, ($p<0.01$) and 2 times higher than in the 1st ($p <0.01$).

The level of HMWM was related not only to

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the length of time spent in contact with chlorine insecticides, but also to the type of contact. The level of oligopeptides of average molecular weight in the oral fluid of laboratory workers was 2.5 times higher than the norm ($p<0.01$, RR=2.5), 1.5 times higher than that of workshop workers producing nitrate saltpeter ($p<0.001$), and 2.2 times higher than that of workshop workers producing ammonium nitrate ($p<0.05$, RR=2,) and 0.3 times higher than that of workshop workers producing nitrate saltpeter ($p<0.01$).

Free radical oxidation conditions in the oral cavity of workers

We determined the level of malonic dialdehyde in the oral fluid because one of the links in the pathogenesis of inflammatory periodontal diseases is an increase in lipid peroxidation, which leads to damage to the structure of cell membranes, and the level of which is determined by the state of the antioxidant defense system. The workers had a high amount of dialdehyde, 4.2 times greater than the norm ($p<0.01$, RR=4), indicating that lipid peroxidation had increased. The link between this indicator and the degree and duration of toxicant contact in workers with nitrogen, phosphorus, potassium, and ammonium compounds was discovered.

The content of MDA in the oral fluid increases dynamically as the length of work increases. If the concentration of MDA in mixed saliva is 0.68 mkmol/l in workers with less than 10 years of experience, it is 3.5 times higher than in the control group ($p<0.01$, RR=3.5), and 0.56 mkmol/l in workers with more than 20 years of experience, it is 4.7 times higher than the norm ($p<0.05$, RR=4.7), and 1.3 times higher than workers who were in contact with toxicants less than 10 years old ($p<0.01$).

Laboratory assistants had the highest MDA content in their oral fluid, which was 4.6 times higher than the control group ($p<0.05$, RR=4), 1.3 times higher than workshop workers for the production of nitrate saltpeter ($p<0.01$, RR>4) and 2.6 times higher than workers in the shop for the production of ammonium nitrate ($p<0.01$).

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Taste sensitivity is lowered significantly in employees exposed to toxicants; in total, this sort of sensitivity is 6.5 times lower than in the control group ($p<0.01$, $RR>6.5$).

The most notable reduction in taste sensitivity to bitter: the threshold for this type of taste sensitivity in the main study group is on average 41 times higher than in the control group ($p<0.01$). Workers' taste sensitivity thresholds for sour are 5 times greater ($p<0.05$), sweet 5.8 times higher ($p<0.05$), and salty 3.5 times higher ($p<0.01$) than in the control group.

The findings of the study revealed that the length of time spent in contact with toxicants had a stronger impact on taste sensitivity. Workers with less than 10 years of experience had 2.8 times lower overall gustatory sensitivity than the average ($p<0.01$, ЯЯ=2.8), workers with 10-20 years of experience have 4.5 times ($p<0.05$, $RR=4.5$), and workers with more than 20 years of experience have 9.8 times ($p<0.01$, $RR>8$).

The decrease in taste sensitivity to bitter is the most noticeable among workers with increasing experience: among workers with more than 20 years of experience, the threshold of sensitivity to bitter is 58 times higher than in the control ($p<0.001$, $RR>6$), 2.1 times higher than in the group with up to 10 years of experience ($p<0.01$), and 1.8 times higher than in the group with 10 to 20 years of experience ($p<0.01$).

The sensitivity to sour is 2.6 times higher in workers with little experience ($p <0.001$, $RR = 2.6$), 5.7 times higher in individuals with 10-20 years of experience ($p<0.01$, $RR>5$), and 8.5 times higher in people with more than 20 years of experience ($p<0.05$, $RR> 8$).

The threshold of sensitivity to sweets is 2 times higher in workers with up to 10 years of experience ($p<0.001$, $RR = 2.6$), 4.5 times higher in workers with 10 to 20 years of experience ($p<0.01$, $RR = 4.6$), and 11.1 times higher in workers with more than 20 years of experience ($p<0.05$, $RR>4$).

Taste sensitivity to salty is 1.5 times lower in workers with less than 10 years of experience ($p<0.01$, $RR = 1.5$), 2.5 times higher in

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workers with 10 to 20 years of experience ($p<0.01$, RR = 2.5), and 6.1 times higher in workers with more than 20 years of experience ($p<0.01$, RR> 6).

According to a research of this feature in workers with diverse patterns of toxicant contact, the overall threshold of taste sensitivity among workers in the ammonium nitrate production department and in the laboratory has about the same value, which exceeds the norm by 4.8 times ($p<0.01$ RR> 4). This indicator is 5.1 times higher than the norm for workers in the nitrate saltpeter production shop ($p<0.01$, RR = 5.1). To bitter and sweet, the highest sensitivity threshold was noted among workers of the ammonium nitrate production shop - 0.51 and 0.34, respectively, to salty among laboratory workers - 0.62, and to sour - among workers in the nitrate saltpeter production shop.

Nonspecific resistance of the oral cavity and indications of humoral and cellular local immunity of the oral cavity were studied, and considerable variations from the norm were found among toxicant workers.

On average, the amount of oral fluid in the main study group's representatives surpasses this indicator in the subjects of the control group by 3.4 times ($p<0.01$, RR=3.4), however there are differences in this indicator among workers with different length of service.

A trend was discovered for a quick increase in the amount of SIgA content in the oral fluid in newcomers and those with little work experience, followed by a progressive decline in this indicator with an increase in the duration of workers' contact with toxicants. Thus, the level of SIgA in the oral fluid among workers in the first senior group is 1.20 g/ ml, which is 5 times higher than the norm (value in the control group) ($p<0.01$), 1.7 times higher than the level of this indicator for workers with 10-20 years of experience ($p<0.001$), and 2.2 times higher than the level of this indicator for workers with the most experience ($p<0.01$).

Analyzing the values of the SIgA level in the oral fluid from workers in different workshops, we observed the following: the

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highest level of SIgA in the horny fluid was found among workers in the nitrate saltpeter production shop, at 1.03 g / ml, which is 1.2 times higher than workers in the ammonium nitrate production shop and 1.5 times higher than laboratory assistants ($p<0.01$).

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Dioxins, which are considered by many researchers as worldwide superecotoxicants with a broad spectrum of biological activity in extremely low levels on all living things, are formed in tandem with the production of nitrogen-phosphorus nitrate. Dioxins are stable in the environment due to cumulation, and are characterized by a wide possibility of entering the body, making them extremely dangerous for humans. On average, dioxins do not exceed formal standards and almost do not exceed this value in the control group: 26.2 g/l in the main group and 26.58 g/l in the control group.

There are significant disparities in the amount of this component of nonspecific local immunity of the oral cavity in workers who have been exposed to toxicants for varying lengths of time. The concentration of lysozyme in the oral fluid of workers with limited experience deviates significantly from the norm, probably as a response to toxicant effects, and is 39.94 g / l, exceeding this indicator of the control group by 1.5 times ($p<0.01$, RR=1.5). Workers with more than 20 years of experience have 2.6 times lower

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lysozyme levels in their mixed saliva than workers with less than 10 years of experience and 1.6 times lower than the norm (RR=1.6). And workers with more than 10 to 20 years of experience have 1.6 times lower lysozyme levels in their mixed saliva than workers with less than 10 years of experience and slightly higher than the control group ($p<0.05$).

It was discovered that the content of lysozyme in the oral fluid is dependent on the kind of workers' exposure with organic toxicants. As a result, the concentration of lysozyme in the oral fluid of the nitrate saltpeter manufacturing workshop workers was 33.1 g/l, which is 1.4 times higher than the norm and significantly higher than the level of this indicator among the other workers. Laboratory technicians have the lowest level of lysozyme in their oral fluid at 15.62 g/l, which is 1.5 times lower than the norm (RR=1.5) and 2.1 times lower than workers in the nitrate saltpeter production workplace ($p<0.01$).

According to M.A.Yasinovsky, smears from a centrifuge of the oral vein of workers in the toxicant production industry revealed leukocytes, mucus, coccal and rod flora, and fungus.

The level of movement of leukocytes in the horny cavity in workers was 3.1 times higher ($p<0.001$, RR =3.1) than in the control group, which is explained by us by the tension between the oral cavity's local protective system and the inflammatory process in the periodontium. The number of neutrophils in employees' oral fluid was also found to be 1.6 times lower than usual (RR=1.6), possibly indicating a decline in the macrophage link of cellular immunity.

With increasing length of service, there was a dynamic decline in leukocyte migration into the oral cavity, but even in workers with the longest length of service, this indicator is 2.5 times greater than the norm – 41.85 ± 3.52 eukocytes / ml. The workers in the first training group had the highest quantity of leukocytes in the oral fluid, with 83.70 ± 5.12 leukocytes / ml, which is 4 times more than the control group indicator ($p<0.01$, КЯ=5).

The amount of neutrophils in the oral fluid

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was slightly higher in workers with less than 10 years of experience (67.8±5.4 % in the group with up to 10 years of experience and 54.6±1.75 % in the control group). The level of neutrophils declines 2.2 times compared to the norm (RR=2.2) as the duration of employees' exposure to toxicants increases up to 20 years, and this indicator is 4.5 times lower than the control ($p<0.01$, RR=4.5) in workers with more than 20 years of experience.

CONCLUSIONS

According to the findings of our studies, the nature of workers' contact with toxicants has practically no effect on the level of leukocyte release into the oral cavity, because the results of this study differ insignificantly among workers in different workshops, and the level of neutrophils in the oral fluid in performance characteristics is dependent on the nature of toxicant contact. Thus, the concentration of neutrophils in the oral fluid among workers in the workshop for the production of nitrate saltpeter is close to the norm and amounts to 49.54±2.01 %, whereas this indicator is reduced by 3.6 times among laboratory workers and by 2 times among workers in the workshop for the production of ammonium nitrate ($p<0.05$).

On average, the level of lymphocytes in employees' oral fluid is 2.5 times lower than the norm ($p<0.01$, RR =2.5). This indicator is 1.7 times lower than the norm for workers in the first seniority group ($p<0.01$) continues to fall with more experience. For workers with more than 20 years of experience, it is 0.12±0.08 %, which is 5.8 times lower than normal ($p<0.05$, RR>4). The level of lymphocytes is closest to the norm across workers in different workshops in the nitrate saltpeter manufacturing workshop (0.50±0.03 %), and the highest deviations in laboratory assistants were 4.8 times lower than the norm ($p<0.01$ RR=4.8). This indicator is 2.5 times lower in the ammonium nitrate manufacturing shop workers than in the control group ($p<0.01$).

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