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# RELATIONSHIP OF THE STATE OF THE SYMPATHIC-ADRENAL SYSTEM AND PEROXIDATION PRODUCTS IN THE DEVELOPMENT OF HYPERTENSION IN AN ORGANIZED POPULATION

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**Keywords:** adrenaline, noradrenaline, sympathoadrenal system, arterial hypertension, drivers, stress

**Abstract:**The state of health of the country is important for the state, its economic and cultural development. It affects the mortality rate, overall life expectancy, disability, birth rate, and ultimately determines the population size [1].

Among noncommunicable diseases, cardiovascular diseases (CVDs) account for the majority of deaths, with 17.5 million people dying from CVDs each year [2]. Unfortunately, in our country, CVD affects people of working age, which affects the economic and social condition of the state. In such situations, it is necessary to activate the disease prevention system, both at the state level and at the level of the country's practical health service. Among cardiovascular diseases, hypertension, myocardial infarction, stroke, angina pectoris, and cardiac arrhythmias are of greatest clinical importance in relation to the prevalence, impact on health, life expectancy and working ability of the country's population. These pathological processes develop gradually, due to the influence of certain factors on the individual's body. As a result, such a concept as risk factors is identified [3, 7].

In recent years, the importance of measuring blood pressure (BP) outside the physician's office has been demonstrated to accurately assess the severity of arterial hypertension (HTN) and to identify higher risk in some patients with normal BP. Modern research methods make it possible, from the standpoint of evidence-based medicine, to consider occupational stress as an independent risk factor for CVD [4, 5]. There is irrefutable evidence of the impact of occupational stress on the risk of developing hypertension.

An example is representatives of the operator profession; a model of work stress leading to a negative effect on the cardiovascular system (CVS) was tested. UzAvtoMotors employees (drivers) are an example of the operator profession, which combines significant psycho-emotional stress and frequent acute stressful situations on the roads, which contribute to the development of hypertension. The results of such studies for health care in various countries necessitate the development of systems for screening and monitoring the epidemic situation [12].

One of the priority tasks of industry healthcare today is to ensure the professional health of UzAvtoMotors garage workers, based on the principles of primary prevention of non-communicable diseases, taking into account production and occupational risk factors.

The need for early diagnosis and prevention of stress-induced conditions in these individuals is obvious. However, the question of the contribution of factors to the formation of hypertension remains incompletely studied, the role of stress reactivity in recognizing this disease has not been clarified, the features of CVS remodeling have not been studied, and there is no clear idea of the prognostic role of this form of arterial hypertension. Addressing these issues could improve the early diagnosis of hypertension, as well as formulate a strategy for its prevention and treatment.

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**Purpose of the study:** to evaluate the impact of occupational stress on risk factors and total coronary risk among UzAvtoMotors drivers. To identify the features of the course of arterial hypertension in the workplace among employees of the UzAvtoMotors garage.

**Materials and methods of research.** To study SAS, we examined 77 employees of Uz-avto motors, who were divided into the following 4 groups: Group I (control) - healthy individuals working in an office (12 employees) aged 20-40 years; Group II (experienced) - truck drivers who do not have a GB (20 employees), Group III (experienced) - people working in an office who have a GB (20 employees), Group IV (experienced) - truck drivers with a GB (25 employees ).

All employees were diagnosed based on subjective and objective examination data, laboratory analysis and functional diagnostics.

To assess the sympathetic-adrenal system and the processes of lipid peroxidation, an enzyme-linked immunosorbent assay was used using the Mindray MR-96A apparatus; morning blood and daily urine blood were taken for the study. The results of clinical studies were processed using statistical processing applications in the Excel program, as well as by the Fisher variation statistics method using t-tests of Student tables [2]. The arithmetic means (M) and the average errors of the arithmetic mean (m) are indicated. Differences between arithmetic means were considered statistically significant at $p<0.05$

**Results and discussion.** When analyzing the results, we noted a statistically significant increase in the excretion of A and NA in the blood and daily urine of individuals of group II. Thus, the daily excretion of A in the urine of group II, compared with healthy individuals, is increased by 5.7 times ($P<0.001$), and in the blood by 2.3 times ($P<0.01$). There was also an increased content of A by 2.6 times in the urine and 1.6 times in the blood serum in patients III compared to controls. The difference in A excretion in the fourth group was 8 times in daily urine, 2.8 times in blood ($P<0.05$).

When studying the results of NA, we noted a statistically significant increased content in the blood and urine in groups II, III, IV compared with I. Thus, the daily excretion of NA in the urine in patients of group II compared with healthy individuals was increased 4 times ($P<0.001$ ), in the blood NA is increased 1.8 times ($P<0.05$). There was also an increased content of NA by 2 times in the urine and 1.2 times in the blood serum in patients of group III compared to the control group. The difference in NA excretion in the fourth group was 7 times in daily urine, 2.3 times in the blood compared to the first ($P<0.05$).

Studying DA in daily urine and blood serum, we noted a significantly increased content of this indicator in groups II, III, IV compared to group I. Daily excretion of DA in urine in group II compared with healthy individuals was increased by 6.7 times ($P<0.001$ ), in the blood DA is increased 5 times ($P<0.05$). There was also an increased level of DA in urine (1.1 times) and in blood serum (2.5 times) in patients of group III compared to the control group. The difference in DA excretion in the fourth group was 11.7 times in daily urine, 8.1 times in the blood compared to the first ($P<0.01$).

When analyzing the results of lipid peroxidation (LPO) processes, we noted a statistically significant increase in the level of malondialdehyde (MDA) in the blood, a peroxidation product, in people of group II. Thus, the MDA index in group II compared to healthy individuals increased 4 times ($P<0.001$), in group III by 3.4 times, and in group 4 by 4.7 times compared to the control group ($P<0.001$). 01).

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In order to identify the relationship between the level of catecholamines and lipid peroxidation processes, we also carried out a Spearman correlation analysis. A direct, highly significant correlation was identified between the level of CA in the blood serum and the indicator of peroxidation products.

Thus, the values we obtained indicate a statistically significant increase in the excretion of CA, in particular A, NA and DA in daily urine and in the blood serum and the concentration of MDA in group 4 (truck drivers with hypertension).

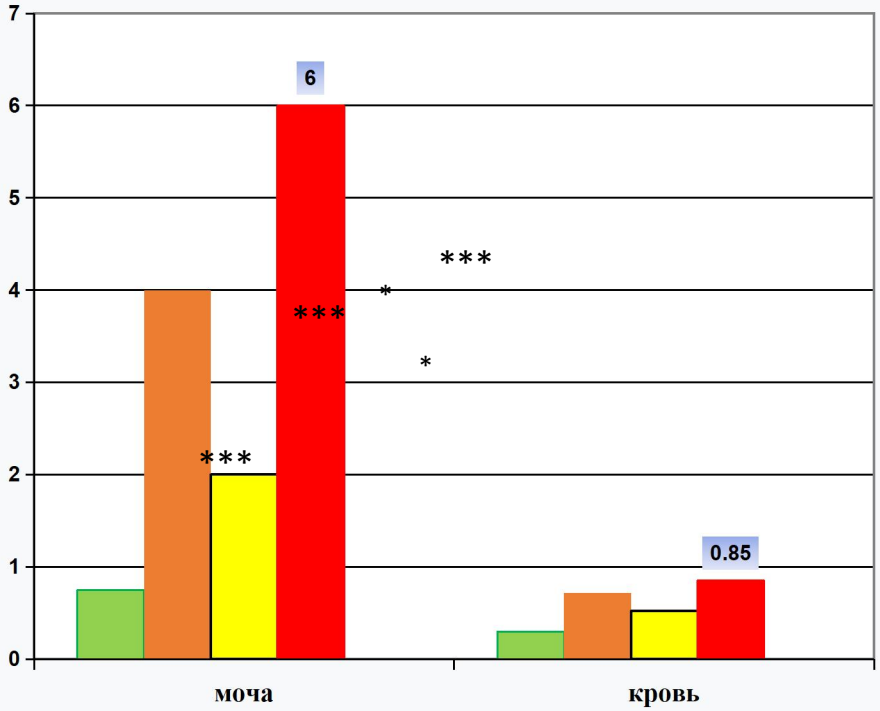


Diagram 1. Content of adrenaline in blood and urine among employees of "UZ-AVTO MOTORS"

(* - P<0.05; ** - P<0.01; *** - P<0.001).

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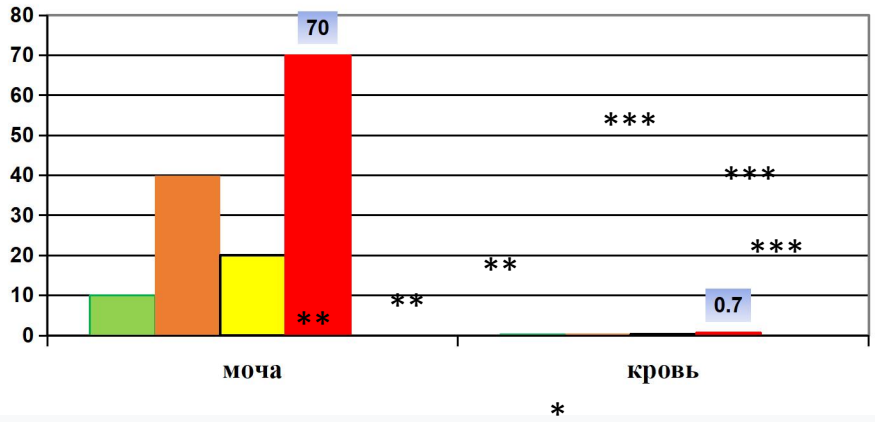


Diagram 2. The content of norepinephrine in the blood and urine of UZ-AVTO MOTORS employees (* - P<0.05; ** - P<0.01; *** - P<0.001)

Table 1.

The content of adrenaline, norepinephrine and dopamine in the blood and urine of "UZ-AVTO MOTORS" employees

| № | Group | Catexolamine | | | | | |
|---|---|---|---|---|---|---|---|
| | | **A Urine (мкg/day)** | **A blood (мкg/day)** | **HA Urine (мкg/day)** | **HA blood (мкg/day)** | **ДА Urine (мкg/day)** | **ДА blood (мкg/day)** |
| 1 | **I group** | 0,75±0,12 | 0,3±0,03 | 9,8±1,2 | 0,3 ± 0,01 | 60,2±3,2 | 0,8±0,01 |
| 2 | **II group** | 4,2±0,2 | 0,7±0,19 | 40,1±2,3 | 0,55 ± 0,02 | 400,4±25,3 | 4,05±0,82 |
| 3 | **III group** | 2,0±0,31 | 0,5±0,04 | 20,6±2,4 | 0,37 ± 0,01 | 65,3±3,4 | 2,3±0,08 |
| 4 | **IV group** | 6,1±0,7 | 0,85±0,09 | 70,3±3,3 | 0,7 ± 0,02 | 700,3±5,9 | 6,5±0,12 |
| **$P_{1-2}$** | | P<0,001 | P<0,05 | P<0,001 | P<0,05 | P<0,001 | P<0,05 |
| **$P_{1-3}$** | | P<0,001 | P<0,001 | P>0,05 | P<0,001 | P<0,001 | P<0,001 |

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| | | | | | | |
|---|---|---|---|---|---|---|
| **$P_{1-4}$** | P<0 ,001 | P<0 ,001 | P>0,01 | P<0,00 1 | P<0 ,001 | P<0 ,001 |
| **$P_{2-3}$** | P<0 ,001 | P<0 ,001 | P<0,05 | P<0,05 | P<0 ,001 | P<0 ,001 |
| **$P_{2-4}$** | P<0 ,001 | P<0 ,001 | P<0,01 | P<0,01 | P<0 ,001 | P<0 ,001 |

Discussion: From a practical point of view, it is absolutely clear that for patients with hypertension it is necessary not only to determine the degree of risk, but also to decide which parameters should be adjusted, in addition to lowering blood pressure, in order to achieve the main goal - maximum reduction in the risk of morbidity and mortality from cardiovascular disease. vascular diseases by influencing all modifiable risk factors, including stress [6, 9, 11]. The choice of priorities is important both for the patient and for the health care system as a whole. In Uz-Avto Motors employees who do not have cardiovascular diseases, under the influence of work psycho-emotional stress, the frequency of modifiable risk factors for the development of CVD increases. In patients with arterial hypertension in the workplace, with increased stress, the absolute risk of developing ischemic events increases.

Hypertension diagnosed in employees requires adjustment of therapy and constant monitoring. Thus, the data obtained on the general condition of the body recommend maintaining a healthy lifestyle, following a diet, and prescribing medications to correct SAS and LPO, preventing the development of serious complications. It is a complete examination of seemingly relatively healthy workers and timely prevention of the development of diseases that will ensure the preservation of the health of the nation and a significant reduction in morbidity and mortality rates from cardiovascular diseases.

**Conclusion:**Thus, our studies allow us to speak with confidence about the pathological role of occupational stress as a risk factor for hypertension and cardiovascular complications. To date, work stress models have been identified that are of greatest importance in the occurrence of CVD, among which drivers have a special position. The need for early diagnosis and prevention of stress-induced conditions in these individuals is obvious.

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