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CHARACTERISTICS OF THE CARDIOVASCULAR SYSTEM DYNAMICS IN WOMEN WORKING AT THE NAVOI SILKWORM PLANT AND THE RISK OF DEVELOPING PRE-PATHOLIC CONDITIONS

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Abstract: Working conditions and the character of labor processes in the silkworm industry cause unfavorable changes in the parameters of the cardiovascular system in female workers; the most expressed negative effect on the functional state of the cardiovascular system is produced by the temperature factor (coefficient of determination 96.1% average in all indexes of hemodynamics, coefficient of elasticity 0.065-0.2%). Calculation of correlation, determination and elasticity coefficients makes it possible to predict the risk of pre-pathological conditions, which allows substantiating measures to reduce the adverse effects of production factors on the body of workers.

Keywords: silkworm production, working conditions, cardiovascular system.

In Uzbekistan, the output of natural silk increases from year to year, which is associated with the development of mulberry silkworm production, where breeding caterpillars of mulberry silkworms are grown and get a highly productive elite green.

Over the past few years, more than 2 times increased the volume of production of domestic productive breeds of mulberry silkworms, from which grow cocoons.

Uzbekistan ranks 4th in the world after China, Vietnam, and India's production of live cocoons. Increased production of mulberry silkworm cocoons is directly related to the development of silkworm industries. Currently, 17 silkworm plants and 3 breeding silk stations are operating in Uzbekistan. Mainly women work in the silkworm industry. One of the largest silkworm productions in Uzbekistan is the Navoi silkworm plant, where within the grant project ATSS-24.6 "Development of new methodology of forecasting and prevention of professionally caused pre-pathological conditions at women working at agricultural silkworm productions of Uzbekistan," the studies on working conditions and their influence on the functional condition of different systems of the organism, including the cardiovascular system, were conducted.

The research aimed to reveal the influence of working conditions of female workers of the silkworm production on the functional state of the cardiovascular system.

Research methods. Working conditions were studied by traditional methods, using an aspirator, psychrometer, anemometer, noise meter, luxmeter according to the

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requirements of Sanitary rules, norms and hygienic norms of the Republic of Uzbekistan №№ 0294-11 [2], 0325-16 [3], 0141-03 [4], 0324-16 [5], building norms and rules 2.01.05-96 [8], and a technique "Labour conditions assessment technique and the certification of work places by working conditions" [7].

Hemodynamic indices studied the functional state of the cardiovascular system: pulse rate was counted by the palpatory method on the radial artery, and arterial pressure level was measured by Korotkoff's sonic method. The heart's systolic and minute volumes (SB and MOS) were determined using calculation methods according to the Stahr formula. The Hickam formula calculated the mean dynamic pressure and peripheral resistance in capillaries [6]. All measurements were made directly at the workplaces before the beginning of work (baseline values), before the lunch break and at the end of the working day.

Research results. Studies have shown that one of grenade production's leading adverse production factors is papilionage dust, which has allergenic properties [1]. Papilionage dust is formed during papilionage (mating of butterflies) when scales are separated from the wings of many moths, which fly around in the air. Dust from moths consists of 75-80% of organic substances of animal origin (the smallest chitinous scales) and contains a small amount (about 0.01%) of protein substances. Dimensions of 90-95% of the dust particles are up to 10 microns. They have an irregular shape with pointed edges and long spikes. Research materials showed that the dustiness of papillary dust during different technological operations varies from 3.43±0.13 to 12.05±0.57mg/m^3. In addition, the air of the working area of the silkworm plant is polluted by products of activity of pupae and butterflies of mulberry silkworm: ammonia (NH_3), hydrogen sulfide (H_2S) and carbon monoxide (CO). Average ammonia concentrations exceeded MPC by 1.06-1.07 times, hydrogen sulfide by 1.12-1.31 times, carbon oxide by 1.11 times.

Air temperature at the working places of papilionazhnits fluctuated in the dynamics of a working day from 28,8±0,45 to 32,04±0,23°C on the average, relative humidity from 33,0 to 62,4%, air speed was insignificant -0,12±0,002 m/s.

Illumination of working surfaces in the papilion workshop during the dynamics of the working day ranged from 5.6 to 180 lux, the coefficient of natural light was 0.19±0.09 - 0.45±0.1%, i.e. there was not enough light at the working places.

The labor process of the workers in the papillary plant is characterized by limited general mobility, the monotony of work operations (cutting cocoons to release pupae, separating pupae by floor, working with butterflies), forced, uncomfortable working posture. Production operations are performed when working with pupae. More than 25% of working time is performed in a forced working posture (squatting, kneeling), when mating and separating butterflies more than 80%

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of working time is performed standing, accompanied by the same type of hand movements.

Conditions of work of women working in the silkworm industry refer to the 3rd class of the 3rd degree of harmfulness.

The research was carried out to study the dynamics of indexes of the functional state of the cardiovascular system. Practically healthy women workers of Navoi silkworm plant., aged 19 to 58 with 1 to 33 years of work experience, were examined. Sixty man-days of working observations were carried out.

The materials of the researches show that the women workers with 1-10 years of work experience have a reliable reduction of heart rate and increase of both systolic and diastolic pressure in the dynamics of work. The heart rate slows down from 82.2±0.9 to 77.6±0.7 bpm. ($p<0.05$), systolic blood pressure increases from 134.8±1.3 to 141.0±1.9 mm Hg. ($p<0.05$), diastolic pressure increased from 82.0±2.9 to 93.0±1.3 mm Hg. ($p <0,05$). Apparently, such a reaction is connected with the complex influence of unfavorable production factors in combination with the character of the work performed: intensive monotonous work. This was accompanied by an unfavorable tendency of hemodynamic indexes changes: pulse pressure reduced from 52,0±1,2 to 48,0±0,9 mm Hg ($p<0,05$). ($p <0.05$), increase of mean dynamic pressure from 99.3±2.1 to 109.0±1.3 mm Hg ($p <0.05$). ($p <0,05$). In addition, there was a decrease in systolic and cardiac minute volumes from 45.6±1.6 to 37.0±1.1 mL ($p<0.01$) and from 3.7±2.4 to 2.8±2.0 L ($p<0.05$), respectively, from beginning to end of work. The hypertensive orientation of changes in cardiovascular system indices is confirmed by the reliable increase of peripheral resistance in capillaries in the dynamics of work ($p<0,05$).

Female workers with 11 to 20 years of work experience also show significant hypertensive changes in the maximum, minimum and mean-dynamic blood pressure. Moreover, the severity of changes in the indices increases with the length of service. Thus if at the work experience up to 10 years the maximal arterial pressure in the dynamics of work increased by 4,5% from the background to the operational level, then at the work experience up to 20 years this index increased by 7,5%. The minimum arterial pressure increased respectively by 13,4 and 14,5%, and mean dynamic pressure - by 9,7 and 11,3%. Consequently, the severity of adverse shifts of cardiovascular system indices increased with the increase of work experience. This is confirmed by hemodynamic indexes of women with more than 20 years of work experience. The maximum arterial pressure in this group of examinees increases in the dynamics of work already by 8,6% from the background level, other parameters change the same way as in women with up to 20 years of work experience.

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The analysis of the obtained data shows that the labor process of the female papillomaniacs causes the development of unfavorable changes of hemodynamic indices in the dynamics of work, which indicates the weakening of functional reserves of the cardiovascular system [9].

To substantiate the dependence of changes in indicators in the dynamics of the shift on the levels of adverse production factors, a mathematical analysis of the dynamics of changes with the calculation of correlation, determination and elasticity coefficients was performed. The regularity of the dependence of changes in the indices on the levels of factors of working conditions has been established. A high correlation dependence on both air temperature (r -0.93-1.0) and relative air humidity (r -0.62-0.91) has been established for all the changes of cardiovascular system indices.

The regularity of dependence of the dynamics of pulse rate, minimum, mean-dynamic blood pressure, systolic and minute volumes of the heart on microclimatic conditions has been proved.

It has been found out that the temperature factor has the most negative influence on the functional state of the cardiovascular system (the determination coefficient is 96.1% on average by all hemodynamic indices, the elasticity coefficient is 0.065-0.2%).

The method of predicting pre-pathological conditions was developed, which allowed substantiating measures to reduce the adverse effects of production factors on the body of workers.

Conclusions:

1. At women working at Navoi silkworm Plant in dynamics of the working day, there are observed changes of hemodynamic indexes testifying about compensatory tension of processes of regulation of functional condition of the cardiovascular system, manifested in pulse increase and increase of arterial pressure, and also in the tendency to decrease of systolic blood volume that testifies to some weakening of functional reserves of the cardiovascular system.

2. Expression of changes in cardiovascular system indexes increases with working experience.

3. Calculation of correlation, determination and elasticity indexes allows to prognose physiological shifts and prepathological conditions and to substantiate measures on the decrease of the unfavorable influence of production factors on the functional condition of different systems of the organism.

Reference.

1. Andriesh L.P., Kozlyuk A.S. Sensitizing properties of some silk production ingredients // Immunodiagnostics and specific prophylaxis of infectious diseases. -Kishinev. -2004. -pp.159-162.
2. Iskandarov T.I., Ibragimova G.Z., Iskandarova G.T., Feofanov V.N., Shamansurova H.Sh., Tazieva L.D. Sanitary rules, norms and hygienic standards of the Republic of Uzbekistan №0294-11 "Maximum allowable concentrations (MAC) of harmful substances in the air of the working area". -Tashkent, 2004. -p.53.
3. Iskandarov T.I., Magay M.P., Tashpulatova G.A., Iskandarova G.T, Adylov U.H. Sanitary rules, norms and hygienic norms of the Republic of Uzbekistan №0325-16 "Sanitary norms of acceptable noise levels in working places". -Tashkent, 2001. -p.17.
4. Iskandarov T.I., Ibragimova G.Z., Shamsurova H.Sh., Slavinskaya N.V., Iskandarova M.S., Demidenko N.M., Iskandarova G.T., Parsegova L.G, Feofanov V.N. Sanitary rules, norms and hygienic normative documents of the Republic of Uzbekistan N 0141-03 'Hygienic classification of working conditions according to the harmfulness and hazard of factors of the industrial environment, the severity and intensity of the labour process'. -Tashkent, 2004. -p.53.
5. Iskandarov T.I., Slavinskaya N.V. Sanitary rules, norms and hygienic standards of the Republic of Uzbekistan № 0324-16 "Sanitary and hygienic norms of the microclimate of industrial premises. -Tashkent, 2016. -p.10.
6. Likhnitskaya I.I. Assessment of the state of functional systems in determining the ability to work. - Leningrad, 1962, 237p.
7. V.M. Nichkasov, T.I. Iskandarov, G.Z. Ibragimova, N.V. Slavinskaya, G.T. Iskandarova, "Methods of assessing working conditions and workplace certification by working conditions. -Tashkent, 1996. – p.21.
8. Construction Norms and Rules 2.01.05-98 'Natural and artificial lighting'. -Tashkent, 1998. – p.48.
9. Umidova ZI, Glezer GA, Yanbaeva HI, Korol GP Essays of Cardiology of the hot climate. - Tashkent, 1975. – p.394.