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Study of the Functional State of the Cardiovascular System Working in Modern Pharmaceutical Productions

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Abstract: The article presents data on heart rate, arterial pressure, pulse pressure, heart stroke volume, heart minute volume, and mean diastolic pressure adaptation of workers of the main professional group in the injection drug production workshop of a pharmaceutical enterprise.

Keywords: pharmaceutical enterprise, injectable drugs, cold season, warm seasons, sterile solutions, background value.

Introduction.

Scientific and technological progress and socio-economic changes in the world have led to fundamental changes in the working conditions of workers in many areas of production, including the pharmaceutical industry [1. Zanina I., 2. Zavarov N., 4. Kutakova N., 7. Yakubova I.]. The medical sector is being developed in our country, the medical system is being adapted to the requirements of world standards, including the elimination of diseases caused by deteriorating working conditions in enterprises. [3., 8. Iskandarova G.]. In this regard, in accordance with the seven priority directions of the Development Strategy of New Uzbekistan for 2022-2026, tasks such as "... increasing the quality of qualified services to the population in the field of primary health care..." are being solved. determined to increase the level of medical care for the population to a new level. Based on these objectives, it is desirable to conduct research aimed at improving hygienic working conditions and preventive measures in pharmaceutical enterprises. [5., 6. Tashpulatova M.].

The main part.

In order to assess the level of impact of the labor process and production conditions on the workers' body, a study was carried out on the functional state of some workers' body systems. When studying changes in the functional state, examinations were carried out in the dynamics of the working day as follows: before work (at

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8:00), before the lunch break (at 12:00) and at the end of the working day. working day (at 16:00). The scope of the study and the choice of methods are related to the need to describe the influence of working conditions and study the body systems of workers that can adequately reflect the state of the body of workers in the process of professional activity.

To conduct physiological tests at pharmaceutical enterprises, workers of the leading professional group were selected, these are workers in the department for preparing sterile solutions, workers in the cutting and preparing ampoules department, workers in the ampoules washing department, and shop workers. departments for filling sterile solutions into ampoules, workers in the caulking and sterilization department, workers in the control and preparation of finished ampoules, there were workers in the labeling department and workers in the packaging department. It was determined by what percentage the functional changes in the workers' bodies differed from their pre-work state. In each group, 10-12 healthy workers aged from 40 to 49 years old, with 10-15 years of work experience, were examined. Observations were carried out over 2 weeks in the dynamics of the working day (before work, before the lunch break and at the end of the working day), in warm and cold periods of the year.

Researcher located at the address: Tashkent city, Mirabad district, T. Shevchenko street, 23. It was held in the workshop for the production of injectable drugs of "OZKIMYOPHARM" JSC named after S.K.Islambekov. The workshop for the production of injectable drugs employs 132 people, of which 97 are women.

Average pulse rate among workers in the department for the preparation of sterile solutions during the working day (warm period of the year 72±0,90, 76±0,71, 88±1,46), (cold period of the year 70±0,74, 75±0,73, 85±0,97) increased. Blood pressure in the warm season (max 115±1,27, 118±1,32 and 120±1,27 mm Hg), (min 72±1,68; 72±1,61; 75±1,38 mmHg) increased during the day. In the cold period of the year, the maximum value (114±1,22, 116±1,00 and 118±0,91 mmHg) slightly increased from the initial result during the day, and the minimum value (72±1,68; 73±1,58; 71±1,63 mmHg), increased before the lunch break, but at the end of the working day this figure decreased slightly. We observed that pulse pressure increased during the warm period of the year (43±0,95, 46±1,12, 45±0,93 mm Hg) towards the middle of the working day and decreased slightly towards the end of the working day. During the cold period of the year (42±0,91; 43±0,82; 47±0,96 mmHg) it significantly increased. To get a complete picture of the cardiovascular system, heart rate and cardiac output were also studied. The stroke volume of the heart increases slightly during the warm period of the year before the lunch break (52,936±1,52, 54,3±1,47), but at the end of the working day this indicator is restored to the background value (52,136±1,19 ml). During the cold period of the year (52,5±1,49, 52,4±1,44 and 55,628±1,55 ml) a slight increase was observed by the end of the day. The minute volume of the heart increased during the working day both in the warm period of the year (3811,6±120,70, 4131,16±123,09 and 4579,2±115,93 ml) and in the cold period of the year (3681,8 ±116,6; 3932,9±112,58; 4734,3±1,48 ml) increased. The average dynamic pressure during the day in the warm period of the year, these results were 86,4±1,49, 87,33±1,42, 90,07±1,27 mm Hg) before the lunch break the result increased slightly, and we observed that (86,67±1,36 mm Hg) was restored by the end of the working day.

The average pulse rate among workers in the cutting and preparation department of ampoules significantly increased in the warm season (70±0,60, 76±0,81, 82±0,77), and in the cold season during one working day before work on average was 72±0,73, the result obtained before the lunch break was 76±0,81, and at the end of the working day 75±0,93. It can be seen that blood pressure exceeded the results of the warm period of the year (maximum 115±1,80, 117±1,50 and 120±1,43 mmHg), min before work was 71±1,73, before lunch break 73±1,50, at By the end of the working day, the mercury column was equal to 71,6±1,84 mmHg. In the cold period of the year, the first result was max 113±1,63, the second result was 118±1,12, the third result was 110±1,47 mmHg., min 72±1,66; 73±1,47; 71±1,68 mmHg. Pulse pressure increased in the warm period of the year (44±1,29, 44±0,91 and 49,2±1,03 mmHg), while in the cold period of the year it manifested itself as follows: 41±1,66; 43±1,08; 39±1,53 mmHg of mercury. The stroke volume of the heart before work during the warm period of the year was 53,55±1,56, in the middle of the working day 52,35±1,32, at the end of the working day 55,8±1,67 ml. By the cold period of the year, the results were normal - 51,9±1,55, 52,26±1,23 and 51,46±1,48 ml. The cardiac minute volume significantly dynamically increased in the warm season (3754,1±121,05, 3980,02±111,10 and 4572,3±140,15 ml), while in the cold season it was 3740,4±128,83, before the lunch break – 3967,6±96,75, at the

end of the working day amounted to 3862,4±122,84 ml. The average dynamic pressure increased by 85,67±1,65, 87,67±1,44, 88±1,65 mm Hg in the warm period of the year and in the cold period it was first 85,67±1,45, then 87,33±1,41 and finally 84±1,45 mm Hg.

The average pulse rate among workers in the ampoule washing department of the workshop for the production of injectable drugs tends to increase during the work shift in the warm season, the average value before work was 72±1,01, before work - 72±1,01, during the lunch break to 79±0,86, at the end of the day there is an increase to 87±0,68 beats. This situation was repeated even during the cold period of the year (71±0,94; 77±1,06; 78±0,85), that is, the results increased during the day. In the warm period of the year, the maximum value of blood pressure during the working day increased to 114±1,39, 118±1,22 and 120±1,18 mmHg, and the minimum value increased before the lunch break (72±1,58, 70±1,93) decreased slightly and recovered to the background value at the end of the working day (72 ± 1,85 mm Hg). During the cold period of the year, the indicators (max 112±1,68; 115±1,32; min 70±1,56; 72±1,61) increased significantly in the middle of the day, and at the end of the working day the initial result was lower (max 110 ±1,41, min 69±1,76 mmHg) decreased slightly. Pulse pressure in the dynamics of the working day in the warm period of the year (42±1,16, 48±1,08 and 48±1,16 mm Hg), in the cold period of the year (42±1,53, 43±1,04; 41±0,71 mm Hg) these results were recorded. The results of the stroke volume of the heart were obtained and analyzed in the warm season (51,7±1,47; 55,3±1,80; 54,872±1,80 ml) and in the cold season (53,2±1,39, 52,48±1,49 and 53,28±1,38 ml). Minute volume of the heart in the warm period of the year (3727,2±128,33, 4367,5±142,75, 4774,8±160,04 ml) and in the cold season (3782,1±116,87, 4026,39±103,14, 4146,98±104,94 ml) from the results obtained it is clear that the indicators increased during the working day. The average dynamic pressure in the warm period of the year (86,13±1,42, 86,33±1,65) did not change during the working day, while at the end of the working day there was a slight difference (88,27±1,56 mm Hg). According to the indicators in the cold period of the year (84±1,43, 86,33±1,44, 82,67±1,62 mm Hg) it was clear that before the lunch break the result increased significantly, but by the end of the working day decreased slightly from the initial figure.

The average pulse rate among workers of the main professional group working in the department of filling sterile solutions into ampoules before work in the warm period of the year was 71±0,86; during the first half of the day this figure significantly increased to 77±0,53, and at the end of the working day it was 80± 0,58. By the cold period of the year, the initial indicator was 69±0,81, subsequent indicators were 73±0,79 and 74±2,89. In the warm period of the year, blood pressure before work was max 112±1,50, min 70±1,70, by the middle of the working day - max 115±1,33, min 71±1,85, at the end of the working day. It has been established that max is 118±1,25 mm Hg, min is 68±1,75 mm Hg. In the cold period of the year, the first indicator was max 114±1,61, min 71±1,78, the results obtained before the lunch break and at the end of the working day were max 118±1,12 and 112±1,38 mm Hg, with min 73±1,50 and 72±1,58 mm Hg showed. Pulse pressure indicators throughout the working day in the warm period of the year are 42±0,49; 44±0,86; 50±0,89 mm Hg in the cold season it was 43±2,12, 45±1,04 and 40±0,65 mm Hg. The stroke volume of the heart before work in the warm season was 53,076±1,41, by the middle of the working day – 53,99±1,7 and at the end of the working day – 58,5±1,58 ml. During the cold period of the year, 52,98±1,83, 52,78±1,43 and 50,88±1,27 ml were obtained. The minute volume of the heart in the warm period of the year was 3777,44±118,79, the results of two times of the working day were 3980,02±111,10, 4572,3±140,15 ml, and the first result in the cold period of the year was 3658,048±132,46, the second and third results were 3842,3±94,9 and 3773,4±177,89 ml. The average dynamic pressure during the warm period of the year over three working days was 84,13±1,62, 85,86±1,64, 84,93±1,55 mm Hg and the indicators in the cold season are 85,33±1,40, 88±1,29, 85,33±1,49 mm Hg of mercury were equal.

The average pulse rate among workers in the welding and sterilization shop of our enterprise conducting scientific research was (74±1,06, 80±0,71, 82±0,67), and in the cold season (69±0,77, 74 ±1,06, 80±0,71) these data were recorded. As can be seen from the results obtained, the indicators increased during the working day. Blood pressure during the warm period of the year, the maximum value (116±1,19, 118±1,25, 119±1,20 mm Hg) significantly increased during the working day, and the minimum value (71±1,81; 72±1,76; 68±1,68 mm Hg) decreased by the end of the working day. By the cold period of the year, the maximum index (114±1,22, 117±1,08 and 112±1,35 mm Hg) and minimum index (71±1,87; 73±1,47; 72±1,53 mmHg). Shortly before the lunch break,

we noticed that it had decreased towards the end of the working day. Pulse pressure increased by 45±0,91, 46±1,09, 51,4±0,84 mm Hg in the warm season, and in the cold season (43±1,38 and 44±1,04) before the lunch break, if it increased slightly, we found that it decreased significantly by the end of the working day (40±0,96 mm Hg). The stroke volume of the heart increased at the end of the working day in the warm season (53,844±1,58, 53,8±1,56, 58,8±1,51 ml) and during the day in the cold season (53,4±1,78, 52,7±1,39, 51,288±1,38 ml) the results decreased. Minute volume of the heart in the warm period of the year (3976,7±119,46, 4305,8±123,71 and 4823,9±122,7 ml) and in the cold season (3671,04±109,00; 3899,2 ±116,11; 4107,336±123,42 ml) significantly increased. The average dynamic pressure increased slightly before the lunch break in the warm period of the year (86,53±1,58, 87,4±1,52) and decreased by the end of the working day (85,13±1,49 mmHg). During the cold period of the year, it increased slightly before the lunch break (85,33±1,55, 87,67±1,26), but at the end of the working day this indicator returned to the background value (85,33±1,40 mm Hg).

Analysis of the results shows that the average pulse rate among workers in the department for control and labeling of finished ampoules in the warm season was 70±1,50 per minute before work, 75±1,05 before the lunch break and 82±0,67 at the end of the working day, and in the cold period of the year the average heart rate was 69±1,34 before work, 73±0,90 before the lunch break and 77±0,87 at the end of the working day. During the warm period of the year, blood pressure values were max 114±1,41, min 71±1,89 before work, max 115±1,50, min 72±1,80 before the lunch break and max 118±1,54 mmHg at the end of the working day, min. 70±1,70 mm Hg it was equal. In the cold period of the year, the same indicator was max 114±1,41, min 72±1,87 before work, max 116±1,38, min 73±1,83 before lunch break and max 115±1,22 mm Hg, min 71±1,76 mm Hg showed. If before work the pulse pressure was 43±1,04 in the warm season, then before the lunch break it was 43±0,80 and by the end of the working day it was 48,6±0,74 mmHg. Before the lunch break, 0.76 was shown and at the end of the working day - 44±0,87 mm Hg. The stroke volume of the heart before work in the warm season was 53,0±1,71, before the lunch break 52,6±1,52, at the end of the working day 56,3±1,47 ml, and in the cold season before work it was equal to 52,12±1,64, 52,02±1,57 before the lunch break and 53,72±1,58 ml at the end of the working day. The cardiac output was also studied in two periods of the year, with the result obtained before work being 3707,4±141,42 in the warm season, before the lunch break – 3940,5±117,78 and at the end of the working day – 3940,5±117,78 amounted to 4609,456±118,04 ml and in the cold period of the year – 3600,4±133,3 ml before work, 3796,3±118,65 before the lunch break and 4130,5±121,8 ml at the end of the working day. The average dynamic pressure in the warm period of the year was 85,34±1,68 before work, 86,47±1,66 before the lunch break, 86,4±1,61 mm Hg at the end of the working day, in the cold season this figure was 86,5±1,68 before work, 87,33±1,65 before lunch break and 85,67±1,55 mm Hg at the end of the working day.

The pulse rate of the workers of the main group of the packing shop increased during the working day (71±0,88, 79±0,90, 83±0,72) in the warm period of the year, and by the cold period of the year it was 73±0,99 before work, 82±0,78 before lunch and 80±0,46 at the end of the working day. In the warm season, the maximum value of blood pressure (114±1,55; 116±1,44; 119±1,38 mm Hg) increased during the working day, and the minimum value before work was 71±1,63, 72±1,63, before the lunch break 72±1,44 corresponds to 69±1,70 mm Hg of mercury at the end of the working day. During the cold period of the year, the maximum index was 114±1,55 at the beginning, 117±1,44 in the middle of the working day and 115±1,50 mm Hg at the end of the working day, and the minimum index was 72±1,63, during the working day corresponded to 73±1,66 and 70±1,91 mm Hg. During the working day, pulse pressure significantly increased to 43±0,50, 44±0,87 and 49,8±0,89 mm Hg in the warm season, and in the warm season it significantly increased to 42±0,50, 44±0,76, 45±0,91 mm Hg. The results obtained at three different times of the working day in the warm season were 53,2±1,26, 53,072±1,25, 57,652±1,51 ml and in the cold season – 52,432±1,22, were 83±1,34 and 55.132±1,64 ml. It was noticed that the cardiac output increased by 3782,9±109,7, 4188,8±99,43 and 4779,8±119,26 ml in the warm period of the year and by 3830,7±103,1, 4331,1±116,04, in the cold period of the year 4414,744±139,95 ml. Results increased throughout the workday. The average dynamic pressure during the working and warm periods was 85,33±1,59,

in the middle of the working day 86,67±1,38 and on the central working day – 85,8±1,55 mm Hg. The results were 86±1,59, 87,67±1,55, 85±1,73 mm Hg of mercury slightly different.

Conclusion.

Thus, all of the above allowed us to draw the following conclusion: in the process of work, workers of a pharmaceutical enterprise experience shifts that characterize the mobilization of the functional reserves of the cardiovascular system, and the changes mainly represent shifts that do not deviate from the volume of physiological reactions, but in the changed conditions of the working environment at pharmaceutical enterprises in the body of workers may be associated with the effectiveness of adaptation of physiological processes to professional activity.

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