

IMPACT OF OCCUPATIONAL FACTORS IN THE GRAINAGE INDUSTRY ON THE WORKING WOMEN 'S BIOLOGICAL AGE

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Abstract: Nowadays, the issues of labor hygiene of women working at modern, modernized grainage plants of the republic are not studied, the levels of harmful production factors are not established, the degree of their influence on biological age is not defined. The research aim was to study the working conditions of women working at modern grainage plants of Uzbekistan with further assessment of their biological age, taking into account their work experience. The research results of the biological age of women working in unfavorable conditions of grainage production are presented. The work experience in grainage production has been determined (10 years), which causes premature aging and increased risk of health impairment.

Keywords: grainage plants, production factors, biological age, women.

In Uzbekistan, the output of natural silk increases from year to year, which is associated with the development of grainage production, where pedigree caterpillars of mulberry silkworm are grown and highly productive elite grainage is obtained. In recent years, more than doubled the volume of production of domestic productive breeds of the mulberry silkworm gene from which cocoons are grown. In the production of live cocoons Uzbekistan takes 4th place in the world after China, Vietnam and India. Now in Uzbekistan there are 17 grainage plants and 3 breeding silk stations. Women are mainly employed in the grainage plants.

Up to the present time, the issues of labor hygiene of women working at modern, modernized grainage plants of the republic are not studied, the levels of

harmful production factors are not established, the degree of their influence on biological age is not defined.

Biological age (BA) is an integrated expression of age-related pathology hidden or manifested as undiagnosable diseases [3, 10, 11]. Calendar age (CA) is a convenient measure by which the probability of a person's functional capacity decrease and health deterioration can be estimated, but it cannot be an ideal indicator due to the significant individual variability of aging [1]. Available data indicate that certain statistical links exist between the rate of aging and somesociohygienic factors that can be determined for a specific human situation [11]. Biological age may reflect a decrease in the body's functional capacity and performance (functional age) or a decrease in the body's viability (gerontological age) [11]. Data available in the literature indicate that biological age is an adequate indicator of a person's functional state, the efficiency of his or her professional activity, health status, and a close correlation of BA with working conditions [2, 3, 4].

The problem of evaluating BA is related to physiological (normal) aging and pathological (premature) aging. This determines its importance from solving several problems, including preventive ones, considering that BA can be significantly affected by working conditions.

The research aim was to study the working conditions of women working at modern grainage plants of Uzbekistan with further assessment of their biological age, considering their work experience.

The research methods. Working conditions were studied by traditional methods with the use of aspirator, psychrometer, anemometer, noise meter, luxmeter following the requirements of Sanitary Regulations, Norms and Hygienic Norms of the Republic of Uzbekistan № 0294-11 [10], 0325-16 [6], 0141-03 [7], 0324-16 [8], building norms and regulations 2.01.05-96 [8], as well as the methods "Methods of assessment of working conditions and certification of workplaces on working conditions" [9].

The BA of women (BA) was determined by the formula [11]:

$$BA = - 1.463 + 0.415 \cdot PBP - 0.140 \cdot CB + 0.248 \cdot MT + 0.694 \cdot SHA, \text{ where}$$

BA - biological age; PBP - pulse blood pressure, mm Hg; SB - statistical balancing; BW - body weight, kg; SHA - subjective health assessment, heard.

Biological age was compared with the proper BA (PBA), which characterizes the aging population standard rate.

A formula determined the proper biological age of women:

$$PBA = 0,581 \cdot KB + 17,24, \text{ where}$$

PBA - proper biological age; CA - calendar age.

The rate of aging was determined by an index (BA: DBA), which determines how many times the BV of the examinee is more or less than the average age of his peers [9].

The studies were carried out at Akkurgan and Navoi gastronomy plants.

Research results and their discussion: It is established that during the production activity, workers engaged in the production of luxury mulberry silkworm grains are exposed to a complex of unfavorable factors of the working environment (dustiness, chemicals, heating microclimate, lack of lighting, the severity and intensity of work processes). Working conditions of women working in the grainage industry belong to class 3 of the 3rd degree of harmfulness, the category of occupational health risk is high (non-transmissible).

94 women determine biological age. The distribution of surveyed women by EF is shown in Table 1.

Table 1.

Breakdown of surveyed women by calendar age

| Calendar age, years | Number of observed, | |
|---------------------|---------------------|------|
| | abs. | % |
| up to 20 | 12 | 12,8 |
| 21-25 | 8 | 8,5 |
| 26-30 | 16 | 17,0 |
| 31-35 | 9 | 9,6 |
| 36-40 | 9 | 9,6 |
| 41-45 | 13 | 13,8 |
| 46-50 | 13 | 13,8 |
| 51-55 | 3 | 3,2 |
| 56-60 | 4 | 4,3 |
| 61 and more | 7 | 7,3 |

| | | |
|--------------|-----------|------------|
| Total | 94 | 100 |
|--------------|-----------|------------|

The data indicate the prevalence of 41-50 years old (27.4%) and 26-30 years old (17.0%) in the surveyed cohort. The survey population's distribution by work experience (Table 2) indicates that the largest number of working women (56.4%) have 5 years or less work experience. Work experience of 6-10 years was 18.1% of those surveyed and 11.6% of women had more than 26 years of experience.

Table 2

Breakdown of surveyed women by work experience, %

| Work experience, years | | | | | |
|-------------------------------|-------------|--------------|--------------|--------------|---------------------|
| 5 and more | 6-10 | 11-15 | 16-20 | 21-25 | More than 26 |
| 56,4 | 18,1 | 5,3 | 4,3 | 4,3 | 11,6 |

Table 3 shows the biological age (BA), proper biological age (PBA), calendar age (CA), and rate of aging (BA: PBA) of the women surveyed (94 persons) depending on their work experience.

Table 3

Some indicators of the surveyed sample of women workers of grainage production, M±m

| Indicators, years | workexperience, years | | | | |
|-----------------------------|------------------------------|-------------|--------------|--------------|---------------------|
| | 5 and more | 6-10 | 11-15 | 16-20 | More than 20 |
| Biological age (BA) | 37,3±1,1 | 46,6±1,5 | 53,9±5,0 | 48,4±4,1 | 37,3±1,1 |
| Proper biological age (PBA) | 35,5±1,1 | 41,8±1,2 | 41,4±2,0 | 48,4±4,1 | 35,5±1,1 |
| Calendar age (CA) | 29,8±1,3 | 42,0±2,0 | 41,6±3,5 | 46,5±4,4 | 56,6±2,3 |
| Ageing rate (BA : PBA) | 1,07±0,01 | 1,12±0,02 | 1,3±0,05 | 1,09±0,05 | 1,21±0,02 |
| BA - PBA | 1,8 | 4,8 | 12,5 | 4,2 | 1,8 |

The research results show that at the work experience of 5 years and less, the average BA of the grainage production workers, equal to 37.3 ± 1.1 years, exceeds the PBA, which is 35.5 ± 1.1 years, by 1.8 years.

At the work experience of 6-10 years, the average amount of divisional capital of grainage workers, equal to 46.6 ± 1.5 years, exceeds the PBA, which is 41.8 ± 1.2 years, by 4,8 years.

At the work experience of 11-15 years, the average amount of BA of the grainage production workers, equal to 53.9 ± 5.0 years, exceeds the PBA, which makes 41.4 ± 2.0 years, by 12,5 years.

At the work experience of 16-20 years, the average amount of BA of the grainage production workers, equal to 48.4 ± 4.1 years, exceeds PBA, which is equal to 48.4 ± 4.1 years, by 4,2 years.

At the work experience of more than 20 years, the average amount of the BA of the grainage production workers, equal to 37.3 ± 1.1 years, exceeds the PBA, which makes 35.5 ± 1.1 years, by 1,8 years.

Consequently, after 10 years of work in the grainage industry, there is a significant increase in the rate of aging. According to classification [11] (Table 4), the difference between BA and PBA up to 5 years is characterized as a normal aging rate, from 5 to 10 years as slightly prematurely old, and more than 10 years as prematurely old.

Table 4

Classification of aging rate (BA - PBA)

| Agingrate | BA - PBA |
|----------------------------|---------------------|
| Normal aging rate | Up to +5 лет |
| Slightly prematurely aging | from +5 to + 10 лет |
| Prematurely old | + 10 years and more |

Thus, the results of a study of the biological age of women workers in the grainage industry showed that working in harmful and dangerous conditions (working-class 3.3) speeds up women's aging. The work experience determines the degree of aging. Slightly premature aging of the organism is observed in case of work experience in the garage industry from 6 to 10 years, and

premature aging is stated in case of work experience over 10 years, which may be the cause of the increased risk of health impairment, and indicates the need to develop measures to improve working conditions.

Conclusions:

1. Ageing of workers in unfavorable conditions of grainage production, where working conditions are classified as class 3 of the 3 degrees of hazard and danger, is determined by the work experience.
2. Premature aging of women and increased risk of health impairment is observed after 10 years of work in the garage production, which indicates the need to develop measures to improve working conditions.

Reference:

1. Afanasyeva, R.F.; Prokopenko, L.V. Biological age as a criterion of working conditions evaluation (by the example of titanium alloys production) // Journal of Labor Medicine and Industrial Ecology. -Moscow, 2009. -№ 2. -pp.1-5.
2. Bashkirova A.S. Konovalov S.S. Prevention of accelerated aging of workers in harmful industrial conditions. Under the editorship of V.x. Havinson. C. Pb: "Prime-Eurosiak," 2004.
3. Voitenko V.P., Polyukhov A.M., Barbaruk L.G., and others. // Biological age, heredity and aging. Kiev, 1984. pp. 5-15.
4. Ingram D.K. // Biological Age, Heredity and Aging. -Kiev, 1984. -pp. 30-38.
5. Iskandarov T.I., Ibragimova G.Z., Iskandarova G.T., Feofanov V.N., Shamansurova H.S., Tazieva L.D., and others. Sanitary rules, norms and hygienic norms of the Republic of Uzbekistan № 0294-11 "Maximum permissible concentrations (MPC) of harmful substances in the air of the working zone." -Tashkent, 2004. -p.53.
6. Iskandarov T.I., Magai 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 permissible noise levels in the workplaces." - Tashkent, 2001. -p.17.
7. Iskandarov T.I., Ibragimova G.Z., Shamansurova 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 norms of the Republic of Uzbekistan № 0141-03 "Hygienic classification of working conditions by indicators of harmfulness and danger of factors of the industrial environment, severity and intensity of the working process." -Tashkent, 2004. –p.53.

8. Iskandarov T.I., Slavinskaya N.V. Sanitary rules, norms and hygienic norms of the Republic of Uzbekistan № 0324-16 "Sanitary and hygienic norms of the microclimate of production premises. -Tashkent, 2016. – p.10.

9. Nichkasov V.M., Iskandarov T.I., Ibragimova G.Z., Slavinskaya N.V., Iskandarova G.T. "Methods of assessment of working conditions and certification of workplaces on working conditions." -Tashkent, 1996. –p.21.

10. Construction norms and regulations 2.01.05-98 "Natural and artificial lighting." -Tashkent, 1998. – p.48.

11. Ludwig F.K. Biological Age, Heredity and Aging. -Kiev, 1984. - pp.16-24.

12. Methods for determining biological age. Biological Age, Heredity and Aging. -Kiev, 1984. -pp.133-137.