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WORKING CONDITIONS AND BIOLOGICAL AGE OFDRY CLEANER WORKERS
(BASED ON THE EXAMPLE OF ZABOTA LLC IN TASHKENT CITY)

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Abstract. Studies have shown that working conditions in premium dry cleaning are characterized by the presence in the air of the working area of harmful chemicals (tetrachlorethylene, acetone, ammonia, benzene), the concentration of which is below the maximum permissible concentration, noise, the equivalent level of which is below the maximum permissible level, electromagnetic radiation, the level of which is below the maximum permissible level, the lack of natural light, insufficient illumination of work surfaces, the severity of the labor process, belong to class 3, hazard degree 2. Labor activity under these conditions does not cause premature aging of the body.

Key words: dry cleaning, working conditions, biological age of workers.

Currently, dry cleaning services are considered socially necessary. In accordance with the resolutions of the President of the Republic of Uzbekistan " On measures for the accelerated development of the service sector" dated May 11, 2021 N PP-5113 and "On additional measures for the development of the service sector"dated January 27, 2022 N PP-104 in the Republic of Uzbekistan, the Service Sector Development Program is being implemented. Since 2021, the volume of services provided has increased by almost 20 percent, and through the introduction of new approaches and technologies in the development of the service sector, there are opportunities to increase the volume of the services market by 1.5 times and create an additional 1.5 million new jobs.

One of the most popular consumer service enterprises by the population are specialized dry cleaning and laundry enterprises, the activities of which are strictly regulated and are the most capital-intensive, capital-intensive , energy-intensive and knowledge-intensive industry of consumer services. There are currently 51 dry cleaning and clothing washing enterprises operating in Tashkent, which represent a complex of physical and chemical processes that ensure the removal of contaminants from products in an environment of organic solvents.

The laundry and dry cleaning industries are critical to maintaining cleanliness and hygiene in our daily lives. However, these industries have also been identified as sources of hazardous chemical exposure to workers, which can lead to serious health consequences. Despite growing evidence that solvents such as perchlorethylene and trichlorethylene are carcinogenic to humans, they remain the most commonly used solventswhen dry cleaning clothes [21,25].

There is information in the literature about how working conditions in dry cleaners affect the health of workers. Thus, widely used in dry cleaners, perchlorethylene can cause primary DNA damage to workers [9], autoimmune diseases [17], liver damage and oxidative damage to B lymphocytes [13], and the development of uterine cancer[10], bladder cancer and renal toxicity [11,12,24], increased risk of esophageal cancer [18]. Dry cleaning workers exposed to organic solvents experience changes in the ocular surface and tear film, causing symptoms of irritation commonly present in evaporative dry eye [15].

A study by the International Agency for Research on Cancer (IARC) in four different dry cleaners in the UAE [14] assessing the exposure of dry cleaner workers to perchlorethylene found perchlorethylene to be a "probable human carcinogen" due to its hazardous and toxic health effects.

A comparative analysis of the working conditions of dry cleaning workers in the city of Nagoya in Japan, using petroleum solvents and perchlorethylene, showed that during the work process, workers complained of a strange odor, eye irritation, shaky head sensation, stiff shoulders, fatigue, lumbago, and the percentage of such complaints was higher in workers using petroleum solvents

than in workers using perchlorethylene . Relatively high concentrations of solvents were found in the breathing zone of workers removing clothes from dry cleaning machines, near newly removed clothes, and approximately 30 cm above clothes when cleaning with solvents before placing them in the machines. It has been established that the amount of total trichlorinated compounds in the urine of workers directly involved in dry cleaning with perchlorethylene is usually greater than that of workers using petroleum solvents. Liver function tests showed that the mean values of workers directly involved in dry cleaning with perchlorethylene were significantly higher than those of workers using petroleum solvents [21].

The data presented show that when studying working conditions in dry cleaners, the main attention of researchers was paid to the influence of various solvents, especially perchlorethylene , on the health of workers, but there is no data on a comprehensive assessment of the working conditions of dry cleaners, or on the impact of working conditions on biological workers.

The purpose of the research is to provide a comprehensive description of the working conditions of modern dry cleaning workers and to assess their biological age.

Materials and research methods. The research was carried out at the dry cleaning company ZabotaLLC in Tashkent . Working conditions were studied using traditional methods using a combined device "TKA-PKM" for determining temperature, relative humidity, air speed (mobility) and light level, an ANT-3M gas analyzer, a noise and vibration measurement kit "Assistant Combi" Total Plus", electromagnetic radiation measuring device PZ-41 in accordance with the requirements of Sanitary rules, norms and hygienic standards of the Republic of Uzbekistan No. 0294-11 [3], 0141-03 [4], 0324-16 [5], 0325 -16 [6], building codes and regulations 2.01.05-96 [8], GOST -12.1.006-84 [2].

The biological age of workers (BA) was determined according to the method developed by Ukrainian gerontologists [1,7]. Biological age (BA) was compared with the expected age (DA), which characterizes the population standard for the rate of aging. The rate of aging was determined by the index (BV: DBV),

which allows you to find out how many times the BV of the subject is greater or less than the average age of his peers.

Dry cleaning workers aged from 21 to 52 years with work experience from 1 month to 10 years were examined. The studies were carried out in winter.

Research results. Premium class dry cleaning LLC " Zabota" is equipped with Italian equipment, the reception and delivery of clothes is carried out on the 1st floor of a multi-storey building, the production workshop is located in the basement. A study of the presence and levels of production factors showed (Table 1) that the air temperature at various workplaces in the dry cleaning room ranged from 23.1-28.1 ^{0} C, the average was 25.72 $\pm$ 0.86 ^{0} C at relative humidity 21.1-30.5% and mobility 0.2-0.5 m/sec. The highest air temperatures were determined at the work places of ironers. Considering that all production operations of dry cleaning workers are classified as moderate work (II b), the permissible air temperature level for the cold period of the year is 23 ^{0} C.

Operating equipment is a source of noise, the total level of which ranged from 62 to 83 dB, with an average of 74.2 $\pm$ 2.97 dB, the equivalent noise level ranged from 66 to 76 dBA , with an average of 69.2 $\pm$ 1.82 dBA . The highest noise levels were at the workplaces of the washing technologist and the stain removal technologist.

The lighting of the dry cleaning room, located in the basement without natural light, is made with fluorescent lamps. The illumination of working surfaces ranged from 121 to 324 lux, with an average of 198.0 $\pm$ 21.37 lux, which is below the regulated level. The lighting level was especially insufficient at the stain removal technologist's workplace - 324 lux when the norm was 500 lux . In terms of illumination, working conditions belong to class 3, hazard class 2.

Touch control panels of equipment are a source of electromagnetic radiation, but radiation levels do not exceed the maximum permissible levels, ranging from 0.26 to 3.39W/m.

The air in the dry cleaning work area is contaminated with harmful chemicals (tetrachlorethylene , acetone, ammonia, benzene), however, their concentration is significantly lower than the maximum permissible (Table 1).

Table 1. Indicators of production factors in the dry cleaning company ZabotaLLC

Production factors	Min - Max	M	± m	Standard PDU, MPC
Air temperature, ^{0}C	23.1-28.1	25.72	0.86	13-23
Relative humidity, %	21.1-30.5	25.04	1.9	40
Air mobility, m/sec	0.2-0.5	0.3	0.02	0.2
General noise level, dB	62-83	74.2	2.97	80
Equivalent noise level, dBA	66-76	69.2	1.82	80
Illumination, lux	121-324	198	21.37	200-500
Electromagnetic field, W/m	0.26-3.52	1.7	0.69	17.7
Gas content, mg/^{m3} : -tetrachlorethylene -acetone -ammonia -benzene	 0.21-0.25 25-32 2.36-6.78 0.3-06	 0.22 28.02 3.91 0.42	 0.006 1.29 0.88 0.05	 10 200 20 5

The severity of the work processes of dry cleaning workers is due to the fact that all production operations are performed in a standing position 80% or more of the working time, involve walking, carrying small weights (up to 10 kg) and are accompanied by moderate physical activity. Based on the totality of production factors, their working conditions belong to class 3, hazard degree 2.

Studies have been conducted to assess the biological age of dry cleaning workers. The problem of assessing biological age (BA) is related to the concept of physiological (normal) aging and pathological (premature) aging. This determines its significance from the standpoint of solving a number of problems, including preventive ones, taking into account that working conditions can have a significant impact on BV. Available data indicate that there are certain statistical connections between the rate of aging and a number of social and hygienic factors that can be determined in relation to a specific situation of human life [Voitenko, Ludwig]. Data available in the literature indicate that biological age is an adequate indicator

of a person's functional state, the effectiveness of his professional activities, health status, and that there is a close correlation of BV with working conditions [Voitenko, Ludwig)].

Table 2 shows the results of studies of biological age indicators of the examined dry cleaning workers, which show that with work experience in dry cleaning up to 5 years with an average calendar age of 42.3 ± 4.5 years, the BV of workers on average was 39.4 ± 4.1 years, and DBV - 42.5 ± 2.2 years, i.e. BV is less than DBV by 3.1 years with an aging rate of 1.0 ± 0.1. When workers had more than 5 years of work experience and an average calendar age of 41.7 ± 4.4 years, the BV of those surveyed was on average 34.9 ± 5.3, with a BV of 41.7 ± 4.4 years, i.e. BV is less than DBV by 6.8 years with an aging rate of 0.8 ± 0.1.

Consequently, working conditions in the Zabota dry cleaner do not affect the rate of aging of workers, which, according to research results, is 0.8-1.0, since according to the classification (Voitenko) the difference between BV and DBV up to 5 years is characterized as a normal rate of aging , from 6 to 10 years as slightly prematurely aged, and more than 10 years as prematurely aged.

Table 2. Some indicators of the surveyed sample of dry cleaning workers , M ±m

Indicator, years	Work experience, years	
	Up to 5 years	More than 5 years
Biological age (BA)	39.4±4.1	34.9±5.3
Proper biological age (DBA)	42.5±2.2	41.4±2.5
Calendar age (CA)	42.3±4.5	41.7±4.4
Rate of aging (BV: DBV)	1.0±0.1	0.8±0.1
BV - DBV	-3.0±5.24	-6.4±4.4

Thus, the results of a study of the biological age of Zabota dry cleaning workers showed that working in unfavorable working conditions (class of working conditions 3.2) does not cause premature aging of the body.

The research materials will be used to develop recommendations for occupational safety for dry cleaning workers.

Conclusions:

1. The working conditions of the Zabota dry cleaning workers are characterized by the presence in the air of the working area of chemicals that do not exceed the maximum

permissible limit, noise, the equivalent level of which is below the permissible limit, electromagnetic radiation - below the permissible limit, the lack of natural light, insufficient illumination of work surfaces, the severity of the labor process, refer to Class 3, 2nd degree of harm.

2. Labor activity under these conditions does not cause premature aging of the body.

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