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RESEARCH ARTICLE

UDC-613:6 PHYSIOLOGICAL AND HYGIENIC CHARACTERISTICS WORKING CONDITIONS OF HAIRDRESSERS

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Abstract: Studies have shown that working conditions in hair salons are characterized by the presence of harmful chemicals in the air, as well as the severity and intensity of the work process, and are classified as Class 3, Level 3 hazard levels. Over the course of the workday, workers develop compensatory stress in the cardiovascular system, which is hypertensive in nature. The central nervous system experiences inhibition, which is associated with work-related fatigue. Attention is impaired, muscle endurance, coordination stability, and visual acuity are reduced. Working conditions in hair salons can pose occupational health risks for workers.

Keywords: Hairdressing, working conditions, functional state of the body.

INTRODUCTION

It's heading to UzbekistanImplementation of the Services Sector Development Program. In recent years, there has been a steady increase in demand for hairdressing and beauty salon services. In Tashkent alone, there are 1,869 hairdressing and beauty salons. In the first seven months of 2024, the volume of individual services in Uzbekistan amounted to 7.6 trillion soums. Hairdressing and beauty salon services amounted to 4.9 trillion soums, accounting for 64.4% of the total volume of individual services, indicating that the beauty industry in Uzbekistan continues to actively develop.

The literature contains information that the most common disease among hairdressers is contact dermatitis - irritation and inflammation of the skin [3, 9, 10, 11, 16, 18], which develops due to the huge number of aggressive substances used in hairdressing activities, frequent contact with water, exposure of hairdressers' skin to hairsprays, hair dyes, shampoos, bleaching powders and creams, the presence of nickel, cobalt, 2-hydroxyethyl methacrylate, ethyl cyanoacrylate contained in cosmetic adhesives and others in cosmetics. In addition, hairdressers are exposed to volatile organic compounds, including aldehydes [17]. Hairdressers come into direct contact with most of the products. Substances in the air and settling on the skin can be no less harmful to skin health. Hair bleaching products contain persulfates (salts of persulfuric acid), which are the most common triggers of bronchial asthma: persistent coughing, shortness of breath, wheezing, and chest tightness. Henna, latex, and certain ingredients in hair dyes can also trigger asthma [14,15].

Hairdressers' working conditions and the nature of their work process lead to the development of musculoskeletal disorders [13]. They complain of back, shoulder, and neck pain, which occurs due to standing for long periods, holding their arms above their shoulders, and constantly tilting and turning their heads. This can lead to the development of carpal tunnel syndrome, joint deformities, and interdigital pilonidal sinusitis [4].

It was also established that inMany types of permanent hair dyes contain carcinogens, which, with constant exposure over many years, slightly increase the risk of developing bladder cancer. In small quantities, these substances can be absorbed through the skin and enter the body through inhalation [12]. There is evidence that prolonged standing provokes the development of varicose veins in the lower extremities, leg swelling, and poor blood flow in hairdressers [2].

The data presented show that when studying working conditions in hairdressing salons, the researchers' primary focus was on their impact on the health of hairdressers and a description of the most common diseases for this professional group.

However, to date there is no information on the influence of unfavorable production factors on the physiological reactions of various body systems of workers, patterns of formation of unfavorable shifts in the functional, psycho-emotional state of the body have not been identified, and the influence of working conditions on biological age has not been established.

Based on the above, identifying the presence and levels of harmful production factors in hairdressing salons in Uzbekistan, their impact on the state of various functional systems of hairdressers, assessing occupational health risks, and developing preventive measures are among the pressing issues of modern hygiene.

Purpose of the research– to study the influence of conditions and nature of work in hairdressing salons on

the functional state of various body systems of workers with the development of preventive measures.

MATERIAL AND METHODS

.The research was conducted in a number of hairdressing salons in Tashkent. Working conditions were studied by traditional methods using a combined device "TKA-PKM" for determining temperature, relative humidity, air velocity (mobility) and illumination level, a gas analyzer ANT-3M, a noise and vibration measurement kit "Assistant Combi Total Plus", in accordance with the requirements of the Sanitary Rules, Norms and Hygienic Standards of the Republic of Uzbekistan No. 0294-11 [35], 0069-24 [6], 0324-16 [7], 0325 -16 [7].

Physiological reactions of the body were analyzed in the following order: before the start of work, initial, background characteristics of the functional state indicators of various body systems were recorded, and at the end of the shift, physiological reactions that developed during the working day. To assess changes in the central nervous system, the speed of the visual-motor reaction (VMR) was determined using a chronoreflexometer. The functional state of the visual analyzer was assessed by the critical frequency of light flickering fusion using the KChSM-80 device. The attention function was studied using proofreading tables with adjusted text. Indicators of the cardiovascular system were studied by palpation of the pulse rate and sound measurement of arterial pressure with subsequent calculation of pulse pressure, systolic and minute blood volumes, mean dynamic pressure and peripheral resistance in the capillaries [1], the state of the neuromuscular system was studied by physiological tremor and muscular endurance. The survey involved hairdressing salon workers – hairdressers aged from 29 to 52 years with work experience from 1 to 10 years.

RESULT

A study of working conditions in hairdressing salons showed that hairdressing workers are exposed to harmful production factors during their work. The research results are presented in Table 1. It was established that during their work, hairdressers are exposed to general noise, the level of which is on average 55.81±1.94 dB, when using a hair dryer (50% of the shift time) the noise level is 77.2±1.25 dB, when working with a razor - 71.0±1.0 dB (50% of the shift time). The illumination at the hairdressers' workplaces was on average at the level of 900.8±147.5 lux, and the natural illumination coefficient (NLC) was 7.83±1.2%. The air temperature at the workplaces was on average equal to 20.9±0.4 0 C, with a relative humidity of 39.9±1.4% and low air mobility. During hair coloring work (40% of the working time), toluene is detected in the breathing zone of hairdressers, the concentration of which is on average 2.58 ± 0.4 mg/m3, and ammonia, the concentration of which is on average 18.0 ± 1.8 mg/m3. At the workplaces of manicurists-pedicurists and cosmetologists, acetone is detected in the air of the working zone, the concentration of which is on average 21.5 ± 3.9 mg/m3, and ethyl alcohol, the concentration of which is on average 256.4 ± 4.2 mg/m3 (40% of the shift time).

RESULTS

Table 1. Indicators of production factors in hairdressing salons

Production factor	M±m	Maximum permissible concentration, maximum permissible concentration	% of shift time	Assessment of working conditions by degree of harmfulness
Total noise, dB	55.81±1.94	60	100	2
Noise generated by a hair dryer, dB	77.2±1.25	60	50	3.1
Noise generated by a razor, dB	71.0±1.0	60	50	3.1
Illumination, lux	900.8±147.5	400	100	2
KEO, %	7.83±1.2	0.8	100	2
Air temperature, 0 C	20.9±0.4	20-24	100	2
Relative air humidity, %	39.9±1.4	40	100	2
Gas contamination, mg/m3				
- acetone	21.5±3.9	200	50	2
- toluene	2.58±0.4	50	40	2
- ammonia	18.0±1.8	20	40	2
- alcohol	256.4±4.2	2000/1000	50	2
The severity of the	Standing work posture	Standing work position up to	-	3.2

labor process	more than 80% of the time	40% of the working time		
	Stereotypical working movements involving the muscles of the arms and shoulder girdle up to 3000	Stereotypical working movements involving the muscles of the arms and shoulder girdle up to 1000	-	3.1
The intensity of the work process	Attention span of more than 75% of working time	Attention span up to 25% of working time	-	3.3
	Increased responsibility for the final result of work	Responsibility for individual elements of work	-	3.2
General assessment of working conditions				**3.3**

The rigorous work of hairdressers, both men's and women's hairdressers, stems from the fact that they spend over 80% of their shift standing, performing up to 3,000 stereotypical movements per shift involving the muscles of their arms and shoulders. The intense workload of hairdressers, manicurists, pedicurists, and cosmetologists is due to the concentration required for over 75% of their shift and the heightened responsibility for the final results of their work.

Based on the totality of production factors, the working conditions of hairdressers are classified as class 3, 3rd degree of harmfulness.

Table 2 presents the results of the study of the dynamics of the functional state indicators of various body systems of hairdressing workers.

Table 2. Indicators of the dynamics of physiological reactions of hairdressing workers

Physiological response indicators	**At the beginning of work**	**At the end of the work**	**Reliability**	
	M± m	**M ±m**	**t**	**p<2-3**
1	2	3	4	5
Pulse (beats per minute)	75.1±2.5	88.8±2.2	3.39	0.01
Blood pressure (mmHg) - maximum - minimum - pulse -average dynamic	 114.0±1.8 68.8±2.7 45.1±1.8 83.7±3.0	 128.6±1.8 80.8±1.8 47.7±0 96.7±1.8	 7.8 3.7 4.4 3.1	 0.001 0.01 0.001 0.01
Systolic volume of the heart (ml)	61.2±3.3	58.0±2.8	0.7	-
Cardiac output (ml)	5980.8± 290.4	4917.4± 232.7	2.2	0.05
Peripheral capillary resistance (dyn)	149.63± 130.0	1620.8± 182.8	1.02	-
Time of idle ZMR (in mlsec)	289±0.4	312±6.1	4.26	0.001
Time of consecutive ZMR (in mlsec)	339.8±8.6	448.9±7.1	4.28	0.001
Number of errors per differentiation	0.07±0.01	0.51±0.1	1.8	-
Muscular endurance (sec)	50.2±1.3	40.0±1.2	4.36	0.001
Tremometry: - number of touches - task execution time (sec)	 12.6±1.2 10.7±0.8	 15.4±1.3 15.1±0.7	 1.6 1.1	 - -
Critical frequency of light flicker fusion (Hz)	23.3±0.4	17.4±0.3	4.0	0.05

A study of the dynamics of cardiovascular system indicators in workers showed that from the beginning to the end of work, the heart rate of those examined increases, the maximum, minimum, pulse and average dynamic pressure increases, a tendency towards a decrease in the systolic volume of the heart is observed, however, due to the increase in heart rate, the minute volume of the heart increases slightly with a practically unchanged indicator of peripheral resistance in the capillaries.

The working conditions and the nature of the work process of hairdressing workers cause certain changes in the state of the central nervous system, which are manifested in a decrease in the speed of a simple visual-motor reaction, i.e., in the development of inhibitory processes in the central nervous system, in an increase in erroneous reactions to a differentiating stimulus and in the development of sequential inhibition.

The work performed by hairdressers leads to a significant decrease in muscular endurance. The workers examined experienced increased hand tremors from the beginning to the end of the workday. This may be due to a disruption in the normal balance of key neural processes at various levels of the central nervous system, particularly the motor analyzer, as a result of developing fatigue. Furthermore, the workers experienced a significant decrease in the sensitivity threshold of the visual analyzer.

The research findings formed the basis for guidelines for improving working conditions for hairdressers. These guidelines emphasize that working in a hair salon requires strict adherence to workplace hygiene standards and personal hygiene. These include compliance with sanitary and epidemiological requirements, disinfection and sterilization of instruments, proper storage of the workplace and equipment, as well as personal hygiene and instrument handling. These principles ensure safe and high-quality customer service and support the health and well-being of salon employees. Treatment and preventive measures should include mandatory preliminary, upon hiring, and periodic medical examinations in accordance with Order No. 200 of the Minister of Health of the Republic of Uzbekistan dated July 10, 2012, "On Approval of the Regulation on Conducting Medical Examinations of Employees." A general practitioner and a dermatovenereologist must participate in these preliminary medical examinations. Testing for syphilis and gonorrhea, as well as fluorography, is required. In modern beauty salons, where the primary focus is on providing superior customer service, the importance of sanitation, hygiene, and safety cannot be underestimated. Compliance with sanitary and epidemiological requirements, disinfection and sterilization of instruments, and proper storage of the work area and equipment are essential for a successful and safe operation. Streamlining work and rest schedules is crucial to combating hairdressers' fatigue. Personal hygiene, proper handling of plastic instruments, and sanitary equipment also play a vital role in maintaining high service standards. All these aspects not only ensure comfortable and safe service for clients but also promote the health and well-being of hairdressers' employees and create opportunities to improve working conditions.

CONCLUSION

1. Working conditions in hairdressing salons are classified as class 3, 3rd degree of harmfulness.
2. Working conditions and the nature of work processes of hairdressing workers cause compensatory stress on the cardiovascular system, which is of a hypertensive nature.
3. From the central nervous system of hairdressing workers, inhibitory processes develop from the be-ginning to the end of the working day, which is associated with the manifestation of industrial fatigue.
4. From the beginning to the end of the working day, hairdressing workers experience occupational fa-tigue, which manifests itself in a deterioration in attention function, a decrease in muscular endurance, stability of coordination function, and a decrease in the sensitivity threshold of the visual analyzer.
5. Working conditions in hairdressing salons can cause occupational risks of developing diseases among workers.
6. To optimize working conditions for hairdressing salon workers, it is necessary to implement recom-mendations for improving working conditions.

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