SMOKING, PRODUCTION FACTORS AND PULMONARY INJURIES IN MECHANICAL ENGINEERING WORKERS

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ABSTRACT

The aim of the study is to determine what is the incidence of respiratory diseases among workers in mechanical engineering enterprises and which are leading risk factors. The subject of the study are 80 persons working in mechanical engineering enterprises. The studies were carried out at the University Hospital - Pleven during the period 2017-2020. Specific clinical and instrumental methods of diagnosis have been used. The largest number are people with professional experience over 15 years, 72% of them are smokers. The most frequent cases are Chronic Obstructive Pulmonary Disease and Chronic bronchitis. The risk of developing lung disease in smokers (OR) is 22,71 times higher than their non-smoker counterparts in the same work environment. When using modern protective equipment, the main risk factors for respiratory diseases among mechanical engineering workers are related to lifestyle and smoking as a leading factor.

Keywords: respiratory diseases, smoking, mechanical engineering,

BACKGROUND

Mechanical engineering is one of the major branches of the industries in Bulgaria [1]. The technological processes in machine-building enterprises are numerous and diverse [2]. The workers in mechanical engineering are exposed to a variety of risk factors related to the working environment - dustiness, adverse microclimate and chemicals [3, 4, 5]. The workers are also exposed to other health-threatening factors, most notably their lifestyle [6, 7]. The aim of the study is to determine what is the incidence of respiratory diseases among workers in mechanical engineering enterprises and which are leading risk factors.

MATERIALS AND METHODS

The subject of the study are 80 persons working as grinders, locksmiths and welders in mechanical engineering enterprises from Pleven, Lovech and Gabrovo districts. The studies were carried out at the Department of

Occupational Diseases of University Hospital – Pleven during the period 2017-2020. Specific pathological, clinical and instrumental methods of diagnosis have been used [8, 9, 10].

RESULTS

The total number of respondents is 80. All of them are male.

The distribution of the surveyed persons by age is shown in Fig. 1. They are aged from 21 to 62 years, and the average age ($n = 80$) is 46.12 ± 6.91 years.

Fig. 1. Distribution of persons by age.

The distribution of patients by the total length of employment is shown in Fig. 2. The average ($n = 80$) is 14.66 ± 3.42 years.

It is noteworthy that there are two peak periods in terms of occupational disabilities in relation to work experience - respectively, between 11 and 15 years and from 21 to 25 years. The study subjects work under similar conditions, all using personal protective equipment and provided with ventilation.

Fig. 2. Distribution of persons by the length of employment

Regarding the presence of bad habits, the subjects reported smoking - more than 5 cigarettes per day (Fig. 3).

Fig. 3. Distribution of persons by the presence of smoking

With regard to lung diseases acquired during the work experience, the distribution of the surveyed workers is as follows (Fig. 4).

Fig. 4. Distribution of persons by the presence of lung diseases

In the studied contingent of workers, there are no cases of benign neoplasms in the lungs (lipoma, fibroma, adenoma), oncological processes (sarcoma, lymphoma, bronchogenic carcinoma) and pneumoconioses.

The subjects were diagnosed with bronchial asthma, chronic obstructive pulmonary disease, chronic bronchitis, pleurisy (Fig. 5).

The most frequent cases are Chronic Obstructive Pulmonary Disease (57%) and Chronic bronchitis (35%).

Fig. 5. Distribution of cases by diagnoses

The distribution of cases according to their health and exposure status is given in Table 1.

The study shows that 91% of smokers have respiratory diseases, compared to 31% among non-smokers ($p=0.001$). The risk of developing lung disease in machine-building (OR) smokers is 22.71 times higher than their non-smoker counterparts in the same work environment.

Table 1. Distribution of cases according to their health and exposure status

Exposure / Lung disease	Smokers	Non-smokers	Total
Sick	53	7	60
Healthy	5	15	20
Total	58	22	80

CONCLUSION

When using modern personal and collective production protective equipment, the main risk factors for respiratory diseases among mechanical engineering workers are related to lifestyle and smoking as a leading factor.

REFERENCES:

1. Gandev V. [Occupational Hygiene]. Sofiia: Meditsina i fizkultura. 1990: pp.128-139. [in Bulgarian]
2. Vasconcelos de Moraes M, Padula RS, Bernardes RA, Negreiros A, Chiavegato LD. Effect of time of exposure to environmental risk on the lung function of foundry workers: a cross-sectional study. *J Phys Ther Sci*. 2016 Jan;28(2):506-10. [PubMed]
3. Rego G, Martínez C, Quero A, Blanco TP, Borquea JM. [The effects of dust inhalation in slate industry workers] [in Spanish] *Med Clin (Barc)*. 2001 Mar 3;116(8):290-1. [PubMed]
4. Toren K, Vikgren J, Olin AC, Rosengren A, Bergström G, Brandberg J. Occupational exposure to vapor, gas, dust, or fumes and chronic airflow limitation, COPD, and emphysema: the Swedish CARDIOpulmonary BioImage Study (SCAPIS pilot). *Int J Chron Obstruct Pulmon Dis*. 2017 Nov 29;12:3407-3413. [PubMed]
5. Saraei M, Masoudi H, Aminian O, Izadi N. Respiratory Health and Cross-Shift Changes of Foundry Workers in Iran. *Tanaffos*. 2018 Oct;17(4):285-290. [PubMed]
6. Barbeau EM, McLellan D, Levenstein C, DeLaurier GF, Kelder G, Sorensen G. Reducing occupation-based disparities related to tobacco: roles for occupational health and organized labor. *Am J Ind Med*. 2004 Aug;46(2):170-9. [PubMed]
7. Osinubi OY, Afilaka AA, Doucette J, Golden A, Soriano T, Rovner E, et al. Study of smoking behavior in asbestos workers. *Am J Ind Med*. 2002 Jan;41(1):62-9. [PubMed]
8. Burilkov T. [Occupational lung diseases.] Sofiia: Meditsina i fizkultura. 1990: pp.118-126. [in Bulgarian]
9. Charakchiev DD. (editor). [Laboratory diagnostics of occupational diseases and ecopathology.] Bulgarian Publishing House Ltd., Sofia. 2006: pp.238-245. [in Bulgarian]
10. Gholami A, Tajik R, Atif K, Zarei AA, Abbaspour S, Teimori-Boghsani G, Attar M. Respiratory symptoms and diminished lung functions associated with occupational dust exposure among iron ore mine workers in Iran. *Open Respir Med J*. 2020 Jan 23;14:1-7. [PubMed]

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