SMOKING INFLUENCE ON LUNG FUNCTION CHARACTERISTICS OF POTASH MINERS WITH DIFFERENT INDUSTRIAL WORK RECORD OF SERVICE

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Background:
There are known negative effects of the coal-dust on the lung function [1, 2]. But speleotherapy (microclimate of potash mine) is a method of different lung diseases treatment. The impact of the industrial factors of Soligorsk potash mine on the lung function of the mines with different industrial work record of service has not been so far well investigated. It is important also to investigate the lung function characteristics and frequency of lung diseases of smokers and nonsmokers of potash mine [3, 4].

Objective:
To evaluate the influence of smoking on the lung function characteristics of the potash miners of Soligorsk with different industrial work record of service.

Methods:
132 potash miners of Soligorsk were included in our study (all male, average age 37.7 yrs, average industrial work record of service 16.4 yrs, 80 smokers with 17.3 yrs period of smoking and 52 never smoked. Period of smoking was in average on the 1.3 year more than industrial work record of service. All miners with different industrial work record were examined by spirometry: I group with the record of service less than 10 years, II group has the record of service from 10 to 20 years, and III group with the record of service more than 20 years. 35 workers that haven't been affected by the industrial factors (drivers, administrative workers) were examined as a control group.

Results:
The miner's lung function characteristics were totally very high and according to the normal significance. In average lung function parameters of the miners meet 95-97% of the normal and besides parameters of 92% miners exceeded 100% of normal level. There were no significant differences in characteristics between the miners and

workers that were not affected by industrial factors. Lung function disturbances were discovered only by 9% of miners (obstructive and restriction in 40/60 proportion). Lung function disturbance degree was light in more than 40% cases (Table. 1).

Table. 1. - Lung function parameters of the workers Soligorsk potash mine (M ± m).

Groups	VC,%	FVC,%	$FEV_{1,}$ %	$MEV_{75,}$ %
1. Miners	96.2±12.1	94.9±11.9	95.5±10.5	92.1±10.4
2. Other workers	95.1±10.6	97.2±12.4	90.4±11.3	89.8±10.9

The lung function characteristics analysis for the different groups of miners showed that there are no significant differences between them (Table. 2). We founded only a slight tendency to a very slow increase of lung function disturbance rate and degree with industrial work record.

Table. 2 - Lung function parameters of Soligorsk miners with different exposition of industrial factors (M ± m).

Groups of miners	VC,%	FVC,%	$FEV_{1,}$ %	$MEV_{75,}$ %
1. Group I	98.1±14.6	111.9±15.9	107.5±14.2	99.1±10.4
2. Group II	97.1±11.6	93.3±12.8	95.4±12.6	91.7±10.2
3. Group III	88.9±13.6	87.9±14.8	85.3±13.6	85.2±9.8

In I group of miners lung function characteristics were equal in smokers and nonsmokers. There were no significant differences in characteristics between the smokers and nonsmokers in the II group of miners, but there was a tendency to decreasing VC and MEV_{75} in smokers.
But in the III group VC (76.1±6.5 and 99.8±7.4) and MEV_{75} (79.5±6.4 and 102.5±8.1) were decreased in smokers to compare with nonsmokers ($p < 0.05$).
Lung function disturbance was statistically associated with smoking (Relative Risk (RR) 1.47±0.19; 95% DI 1.25-1.66; p=0.029) but was not associated with industrial factors influence. Frequency of lung diseases

also was associated only with smoking (RR) 1.36±0.21; 95% DI 0.98-1.62; p=0.034) but not with industrial factors.

Conclusion:
Despite of influence of industrial aerosols the lung function of the potassium mines remained normal for a long time. This result is probably influenced by broncholytic and mucolytic effects of potassium salt and absence of microbial contamination of the mine air.

Our investigation shows that smoking exerts more intensive negative influence on the lung function of the potassium mine workers than industrial aerosols. Antismoking programs could be one of the main points of prophylactic strategy in Soligorsk potash mine Medical Center. It is possible positive effect of potassium mine microclimate neutralizes the negative impact of not only industrial aerosols but smoking on the lung function.

Literature:

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