

The effect of environmental pollution on the respiratory system of lignite miners: a diachronic study

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KEY WORDS

Lignite miners; fly ash; chronic bronchitis; atrophic rhinitis; rhinomanometry

SUMMARY

Background: *It is not known whether working in surface lignite mines can cause x-ray lesions or disorders of respiratory function.* **Objectives:** *The aim of the study was to investigate the diachronic impact of environmental pollution on the respiratory system of lignite miners at mines in Eordea, Greece.* **Methods:** *Cases of 199 workers (Group A) residing permanently in the Eordea valley and 151 (Group B) living outside the Eordea valley were studied during Phase I and then re-examined after three years (Phase II). These cases were compared to those of 71 office workers living in Eordea valley (Group C) and to 96 living in Grevena, a region without pollution (Group D). The study included the completion of the MRC questionnaire for the detection of respiratory diseases, pulmonary function tests, measurement of diffusion capacity, otorhinolaryngologic examination, rhinomanometry as well as chest and paranasal cavity X-rays.* **Results:** *Chronic bronchitis was reported by 26.8%, 24.8%, 17.9% and 10.6% respectively of the subjects of groups A, B, C and D according to the answers of the questionnaire ($p < 0.001$). The spirometry and diffusion capacity findings presented no considerable differences either in the 4 groups or between phases I and II of the study. The main problems were detected in the upper airways. A very high prevalence of severe nasal obstruction (73%, 71.2%, 55.7% and 19.3% in Groups A, B, C and D respectively) was detected. Furthermore, a high percentage of atrophic rhinitis (14%) was detected both among workers (Groups A and B) and subjects living in the Eordea valley who participated as controls (Group C). From the X-rays, hypertrophy of nasal turbinates-cartilage and polyposis was observed as follows: Group A: 53.9%, Group B: 48.1%, Group C: 46.5% and Group D: 20.3% ($p < 0.001$). The findings related to the upper respiratory system may be due to excessive pollution by airborne particles (fly ash) pollution in the region and particularly to chromium, nickel, cobalt and lead found at high concentration levels in airborne dust. A marked association between the total air-flow in the nose and the mid-expiratory flow ($p < 0.01$) was detected.* **Conclusions:** *We conclude that subjects working in lignite mines under conditions of excessive pollution by airborne contaminants have a high prevalence of atrophic rhinitis and, in addition to other standard examinations, should undergo rhinomanometry testing and X-ray imaging of the paranasal cavities.*

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