Respiratory hazards: clinical and functional assessment in aluminum industry workers

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Abstract:

Background Aluminum is one of the prevalent alloys on the earth. With the revolution industry, aluminum was very important in all aspects of life from cooking to war weapons. The aim of this work is to study the prevalence of respiratory hazards and changes in pulmonary function among aluminum industry workers. Materials and methods This is a case series study which was conducted in an aluminum factory in Nag Hammadi and included 320 workers, who were subdivided into 2 groups according to the duration of daily exposure to aluminum gases and exhausts. Group 1: it included 260 exposed workers, who were randomly selected from potrooms and cast house sectors, and exposed to hazardous effects of primary aluminum industry 8 h continuously per day. Group 2: it included 60 interrupted or partially exposed workers, who were randomly selected from the factory maintenance, potroom maintenance, cast house maintenance workers, as well as the general maintenance workers; and exposed to less than 8 h interrupted per day on average 2/3 h. Data were collected using modified British Medical Research Council (BMRC) questionnaire, and pulmonary function tests, chest X-ray, and laboratory studies were done. Results Group 1 workers had more chronic and acute work related respiratory symptoms. There was a significantly higher occurrence of asthma among exposed workers with p value 0.004 while no significant difference for the occurrence of COPD in both groups, also CRP significantly more frequently occurred in exposed workers with p value 0.001. There was a significant negative correlation between FVC%, FEV1% and PEF25–75% and duration of exposure in years among exposed workers. Interpretation of chest X-ray denoted that reticular, nodular and reticulo-nodular patterns significantly more frequently occurred in exposed group (p value 0.01) also diaphragmatic abnormalities were more in exposed ones (p value 0.04). Solitary pulmonary nodules could be detected in three cases. Conclusions Aluminum industry is hazardous to both the workers and the community. The pulmonary hazards are significantly higher in workers who are continuously exposed to gases and pollutants for more than 8 h/day. Moreover the free radicals of silica and polycyclic aromatic hydrocarbons may have a direct relationship with the recorded changes in diaphragmatic and pulmonary functions and may be precancerous.

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