

The respiratory health effects of occupational exposure to charcoal dust among NAMIBIAN charcoal factory workers.

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ABSTRACT

This is the first study that reports on the dose-response relationships between occupational exposure to charcoal dust, respiratory symptoms and lung function among charcoal-processing workers in Namibia. **Methods:** A cross-sectional study was conducted among 307 workers from charcoal factories in Namibia. All respondents completed interviewer-administered questionnaires. Spirometry was performed on a subset of the sample and ambient and respirable dust levels were assessed in different work sections. **Results:** Exposure to respirable dust levels across most of the job categories was above occupational exposure limits, with packing and weighing having the highest dust exposure levels (median 27.7 mg/m³, range: 0.2-33.0 for the 8 hour time weighted average). A high prevalence of respiratory symptoms was observed among males and females respectively: for cough (39% and 22%), cough for more than 3 months (19.4% and 13%), breathlessness (21% and 35.5%), wheezing (29% and 26%) and phlegm (30.3% and 33%). Higher cumulative dust exposure (CDE) was associated with chronic cough, phlegm for most days, and doctor-diagnosed diseases. Ex-smokers had elevated odds ratio for phlegm for most days (OR: 1.2, 95% CI: 0.4-3.7), shortness of breath (OR: 1.3, 95 % CI: 0.4-.4.1), and wheezy chest (OR: 1.6, CI: 0.5-4.9). Among those having lung function tests (n=291), a lower mean predicted % FEV₁ was observed (98.1% for male and 95.5 % for female) among the higher exposed workers as compared to the low dust exposure category (FEV₁ %: 101.1 % (males) and 104.1 % (females). **Conclusions:** Charcoal dust levels exceeded the US OSHA recommended limit of 3.5 mg/m³ for carbon black containing material. Participants presented with exposure related adverse respiratory outcomes in a dose-response manner. Our findings suggest that stronger enforcement of regulations within the industry is required.

Keywords: Respirable charcoal dust, exposure, lung impairment and respiratory symptoms

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