Carpet Airborne Microfiber Exposure on Lung Function Level And Respiratory Symptoms Among Office Workers in Selangor

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Abstract

Airborne microfiber exposure in office environments has been identified as a potential contributor to respiratory health issues, particularly due to microfiber released from carpets. This study aims to assess the influence of airborne microfiber exposure on lung function level and the occurrence of respiratory symptoms among university office workers in Selangor. With growing concern over indoor air quality, understanding the impact of carpet airborne microfiber is essential for indoor air quality. A cross-sectional study was conducted measuring indoor air quality, microfiber exposure, spirometry tests, and validated questionnaires for respiratory symptoms. The indoor respirable dust concentrations measured were within the permissible exposure limit of 0.15 mg/m³ set by the Industrial Code of Practice 2010, with the highest recorded value at 0.011 mg/m³ and a mean concentration of 0.004 mg/m³. Several microfiber types were identified: cotton (18.10%), cuprammonium (rayon) (25.79%), polyamide (nylon) (18.55%), polyacrylamide (3.62%), polypropylene (ramie) (4.52%), lyocell (Tencel) (28.05%), and terephthalamide (1.36%). There were significantly different lung function level from the normal spirometric test with 5% shows abnormalities of FVC% ($t= 10.06$, $p\leq0.001$) and 8% abnormalities of FEV_1% ($t=7.46$, $p\leq0.001$). 30.6% of the respondents were having cough and 17.8% were having phlegm. There were negative poor correlation between FVC% and FEV1% with respirable dust ($r= -0.211$, $p=0.106$; $r=-0.223$, $p=0.086$). Lung function abnormalities and the occurrence of cough and phlegm may be influenced by exposure to airborne microfibers. The long-term health impacts of airborne microfiber exposure is crucial in identifying effective mitigation strategies to reduce respiratory risks.

Keywords: Airborne microfiber exposure, lung function level, respiratory symptoms, office workers