

Endotoxin, ergosterol, fungal DNA and allergens in dust from schools in Johor Bahru, Malaysia- Associations with asthma and respiratory infections in pupils

ABSTRACT

There are few studies on associations between respiratory health and allergens, fungal and bacterial compounds in schools in tropical countries. The aim was to study associations between respiratory symptoms in pupils and ethnicity, chemical microbial markers, allergens and fungal DNA in settled dust in schools in Malaysia. Totally 462 pupils (96%) from 8 randomly selected secondary schools in Johor Bahru, Malaysia, participated. Dust was vacuumed from 32 classrooms and analysed for levels of different types of endotoxin as 3-hydroxy fatty acids (3-OH), muramic acid, ergosterol, allergens and five fungal DNA sequences. Multiple logistic regression was applied. Totally 13.1% pupils reported doctor's diagnosed asthma, 10.3% wheeze and 21.1% pollen or pet allergy. Indian and Chinese children had less atopy and asthma than Malay. Carbon dioxide levels were low (380–690 ppm). No cat (Fel d1), dog (Can f 1) or horse allergens (Ecu cx) were detected. The levels of *Bloomia tropicalis* (Blo t), house dust mite allergens (Der p 1, Der f 1, Der m 1) and cockroach allergens (Per a 1 and Bla g 1) were low. There were positive associations between levels of *Aspergillus versicolor* DNA and daytime breathlessness, between C14 3-OH and respiratory infections and between ergosterol and doctors diagnosed asthma. There were negative (protective) associations between levels of C10 3-OH and wheeze, between C16 3-OH and day time and night time breathlessness, between cockroach allergens and doctors diagnosed asthma. Moreover there were negative associations between amount of fine dust, total endotoxin (LPS) and respiratory infections. In conclusion, endotoxin at school seems to be mainly protective for respiratory illness but different types of endotoxin could have different effects. Fungal contamination measured as ergosterol and *Aspergillus versicolor* DNA can be risk factors for respiratory illness. The ethnical differences for atopy and asthma deserve further attention.

Keyword: Respiratory symptoms; Schools; Malaysia; Asthma; Chemical microbial markers; Allergens; Fungal DNA