

Analysis of indoor air pollutants checklist using environmetric technique for health risk assessment of sick building complaint in nonindustrial workplace

Abstract

Purpose: To analyze and characterize a multidisciplinary, integrated indoor air quality checklist for evaluating the health risk of building occupants in a nonindustrial workplace setting.

Design: A cross-sectional study based on a participatory occupational health program conducted by the National Institute of Occupational Safety and Health (Malaysia) and Universiti Putra Malaysia.

Method: A modified version of the indoor environmental checklist published by the Department of Occupational Health and Safety, based on the literature and discussion with occupational health and safety professionals, was used in the evaluation process. Summated scores were given according to the cluster analysis and principal component analysis in the characterization of risk. Environmetric techniques was used to classify the risk of variables in the checklist. Identification of the possible source of item pollutants was also evaluated from a semiquantitative approach.

Result: Hierarchical agglomerative cluster analysis resulted in the grouping of factorial components into three clusters (high complaint, moderate-high complaint, moderate complaint), which were further analyzed by discriminant analysis. From this, 15 major variables that influence indoor air quality were determined. Principal component analysis of each cluster revealed that the main factors influencing the high complaint group were fungal-related problems, chemical indoor dispersion, detergent, renovation, thermal comfort, and location of fresh air intake. The moderate-high complaint group showed significant high loading on ventilation, air filters, and smoking-related activities. The moderate complaint group showed high loading on dampness, odor, and thermal comfort.

Conclusion: This semiquantitative assessment, which graded risk from low to high based on the intensity of the problem, shows promising and reliable results. It should be used as an important tool in the preliminary assessment of indoor air quality and as a categorizing method for further IAQ investigations and complaints procedures.