

Review Paper:

Relationship between CO₂ and Environmental Factors with Sick Building Syndrome in Students



Zahra Aghalari¹, Abdoliman Amouei^{2*}, Ahmad Zarei¹, Mojtaba Afsharnia¹, Zahra Graeili³, Mehdi Ghasemi¹

1. Department of Environmental Health Engineering, School of Public Health, Gonabad University of Medical Sciences, Gonabad, Iran.

2. Social Determinants of Health Research Center, Health Research Institute, Babol University of Medical Sciences, Babol, Iran.

3. Department of Environmental Health Engineering, School of Public Health, Gonabad University of Medical Sciences, Gonabad, Iran.

ABSTRACT

The aim of this study was to determine the relationship between Carbon dioxide (CO₂) and other environmental factors with Sick Building Syndrome (SBS) in schools and houses of students. This descriptive cross-sectional study was conducted on students in in Babol county, Iran in winter 2018 who were recruited using random sampling method. To measure CO₂, temperature and humidity, the standard TES-1370 device was used. Data were collected by standard questionnaire MM040EA (Miljomedicine040) and through interview. Chi-square, ANOVA and t-test were used to determine the relationship between SBS and environmental parameters. CO₂ measurement performed in 55 primary, middle and high schools (215 classrooms) reported that the highest level of CO₂ was 4263 ppm for primary schools in winter, while the lowest level was 806 ppm reported for middle schools. CO₂ and temperature had significant association with SBS symptoms in winter (P=0.001). Among 12 SBS symptoms, the most common symptom was headache in winter (n=337, 44.4%), and fatigue (n=327, 43%) in spring. A significant association was found between the type of heating/ventilation/air conditioning and SBS symptoms (P=0.001). Also, at different educational levels, CO₂ concentration was higher in most of the study classrooms during winter and spring and had a significant relationship with SBS symptoms.

Keywords: CO₂, Sick Building Syndrome, Student
