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Indoor environment and sleep quality: A research based on online survey and field study

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Abstract

Indoor environment, in addition to many other factors, such as emotion and body condition, can disturb an individual's sleep. This paper aimed to determine the relationship between indoor environment and sleep quality based on subjective questionnaires and objective measurements. First, a massive online investigation was conducted in China to collect basic information, the Pittsburgh Sleep Quality Index (PSQI) questionnaire, and information on sleep environment control method from respondents. The main qualitative conclusion from this investigation was that individuals have differing perceptions of the effects of environment on sleep quality. Sleep quality varies based on age and personal salary. Gender differences were also discussed in the online investigation. Men tended to have poorer sleep quality than women. To quantitatively explore the effects of indoor environment on sleep quality, a field study was conducted in university dormitories. The field study involved the measurement of various environmental and physiological parameters, and used subjective questionnaires before and after sleep. Preference for different environmental parameters relating to sleep quality were discussed. The most satisfactory operative temperature was found to be 24.2 °C, and subjects have a lower neutral temperature and a broader accepted temperature range during sleep. A multivariate analysis indicated that several environmental factors thought to disturb sleep are interrelated and therefore require more transactional analysis and research.

Keywords: Sleep environment; sleep quality; thermal comfort; online survey; field study

Nomenclature

T_{op}	Operative temperature (°C)
C	Concentration of CO ₂ (ppm)
BMI	Body mass index

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