

Epidemiological Study of Aircraft Noise using Sheet-Shaped Sleep Meter: Measurement of Motility, Heart Rate and Respiratory Rate

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ABSTRACT

Night-time noise exposure may affect sleep and its physiological status, e.g. heart rate, respiratory rate and sleep stage, which could lead adverse health effects in cardiovascular system. However, existing techniques to measure sleep status in field settings have methodological disadvantages: PSG is invasive, requires highly professionals and costs a lot, actimetry is less invasive but records limited information of sleep. In this study, we applied a non-invasive and inexpensive sheet-shaped sleep meter which was set under a mattress and recorded the vibration during sleep. We obtained quantitative physiological data from the vibration recording and carried out epidemiological analyses. Around the Kadena US airfield, 30 subjects were recruited. Sleep measurement were carried out by themselves consecutive 26 nights. Noise levels were measured at a monitoring point near their home every second. From the vibration recordings of the subjects, we distinguished motility, heart and respiratory rate using signal-processing techniques. Statistical analysis was made on the relationship between noise exposure and changes of the physiological measures.