THE ACOUSTIC ENVIRONMENT AND HEALTH RISKS IN HOSPITALS

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Background: The increase of outdoor noise pollution in the environment arise the problem of indoor noise pollution, particularly in health care facilities. Noise exposure represents load for patients in the state of higher psycho-vegetative excitability and for the personnel as well. The aim was to investigate the status of noise pollution in different hospital environments, to measure and describe hospital noise and to improve noise awareness of the staff.

Material and methods: Using an integrated sound level meter and an octave band analyzer, recordings were made in various hospital environments (e.g. orthopaedic operating theatre), during various procedures (e.g. total knee replacement). Equivalent and maximal noise levels were measured also in the rooms of hospital wards (patients` room, examination room, etc.). The standard five grade noise annoyance scale was used in a short questionnaire given to the staff participating in our study (5 – annoys extremely, always; 4 – substantially, often; 3 – rather, sometimes; 2 – a little, seldom; 1 – not at all, never). Subjective analysis of noise sources and noise annoyance were assessed in 28 selected university hospital wards in Bratislava.

Results: Results from our noise recordings in operating theatres (equivalent noise levels during orthopaedic surgery went up to LAeq = 71. 3 dB, LAeq, 8h = 68.3 dB, maximal noise levels reached up to 85 dB; equivalent noise levels before surgery achieved up to LAeq = 52.9; LAmax = 68.9 dB) and also in hospital wards (in selected hospital wards equivalent noise levels reached up to 58.7 dB) exceeded permissible noise levels for hospital environment and in the orthopaedic operating theatre even action levels for occupational environment. Octave band analysis of noise showed the maximum in lower frequencies for empty operating theatre and in the higher frequencies for noise during surgery. The main sources of noise in orthopaedic operating theatre were powered instruments (e.g. drill, saw, air hose, air tool) and also the HVAC noise, even in an empty operating room. According to short start up questionnaire, 64 % of hospital staff were annoyed by noise at work, 10 % highly annoyed. The main sources of noise in hospital wards were traffic, hospital service, machinery and hospital equipment.

Conclusion: This study indicates that noise surveys should be conducted in hospitals and that measures to decrease noise should be proposed to hospital authorities, administrators and supervisors. Awareness of staff and public is also needed.