

ABSTRACT

The current state of knowledge indicates that inside the rooms, where people spend more than 90% of their time, there are substances that have a direct impact on health, well-being and efficiency. The nurse's workplace is a special indoor environment, in which exposure to chemical compounds emitted from building, furnishing, finishing materials and especially to cleaning agents, disinfectants and medicines occur.

The aim of the study was to identify chemical agents at the nurse's workplace and to estimate their concentration levels. An analysis of potential health hazards related to the presence of identified chemical substances in health care rooms was carried out. A comprehensive assessment of exposure to chemical agents at the nurse's workplace was performed, based on modern analytical methods (TD-GC/MS; LC-MS/MS), questionnaire survey, ecotoxicological tests of urine and modern statistical methods. The research was carried out in health care units in the Tricity, Poland area.

The number of 613 substances in indoor air samples, 312 in larger diameter particulate matter samples, 370 in smaller diameter particulate matter samples and 449 chemical compounds in dust samples were identified. Among these compounds, there are volatile organic compounds (VOCs) which are classified as toxic, mutagenic, cancerogenic, negatively affecting on reproduction and also pharmaceuticals. The exposure to cytostatic drugs of nurses was proven by the detection of the primary form of dacarbazine in the urine of one of them. Estimation of the total VOC content in health care units confirmed their presence at the level (from 48.65 to 973.33 $\mu\text{g}/\text{m}^3$), which, according to the literature data, may cause a harmful and potentially harmful effect on the health of room users. The highest total VOC content in indoor air was found in hospital departments, and the lowest in outpatient departments. The total concentration of phthalates in primary care facilities was over three times higher than in hospital units. Studies of urine toxicity against *Vibrio fischeri* bacteria indicate, that more than half of the nurses in the study group have good or very good health. This is confirmed by the conducted questionnaire research. In units, in which are given cytostatics are working nurses with less seniority than in non-oncological units. Older nurses work in a one-shift system. Medical personnel working in a one-shift mode have a higher BMI than those with a two-shift. Moreover, the correlation between the total VOC content in the indoor air and the declared health-related parameter is statistically significant and may confirm the influence of some substances present in the air on sleep efficiency, as indicated in the literature.

The research indicates, that inside the rooms of medical units there are substances that have a direct, negative impact on health and well-being of people staying in them. The estimated concentration levels of the identified substances indicate that the limit values have not been exceeded. However, it should be pointed out that the legal regulations have not been updated for years and do not cover many of the compounds identified in the nurse's work environment, as well as do not take into account the latest toxicological and epidemiological studies.