LABORATORY FACILITY DESIGN AND MICROBIAL INDOOR AIR QUALITY IN SELECTED HOSPITAL LABORATORIES

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Abstract. Hospital laboratory is one of workplace areas contaminated with a variety of biohazards. A cross sectional study was conducted to assess the microbial air quality and facility design in the laboratories of four selected governmental hospitals (Hospitals A, B, C, and D) in Bangkok, Thailand. One hundred eighty-eight indoor air samples were collected from 40 laboratory rooms to investigate bacterial and fungal counts using the Millipore air tester. Forty air samples were collected from the waiting areas of those laboratories, and 16 outdoor air samples were collected to use for comparison. Additionally, those laboratory facilities were assessed following biosafety facility design (10 items). Results indicated that the facility design of laboratory in the Hospital A met most of items of the biosafety facility criteria. The rest met only seven items of the criteria. Means ± standard deviation (SD) of bacterial counts of 253.1±247.7 cfu/m^3, 236.8±200.1 cfu/m^3, 304.4±264.2 cfu/m^3, and 146.7±127.0 cfu/m^3, and fungal counts of 500.8±64.2 cfu/m^3, 425.0±21.2 cfu/m^3, 357.0±121.2 cfu/m^3, and 355.7±86.8 cfu/m^3 were found in hospital laboratories A, B, C and D, respectively. The isolated colonies of bacteria and fungi were identified as group or genus. It was found that the most common bacteria was *Staphylococcus* spp (84.1%, 76.0%, 72.1% and 80.5%, respectively), whereas, the most common fungi were *Aspergillus* spp and septate hyphae fungi (42.0%, 37.5%, 39.5%, and 45.7%; *vs* 38.6%, 56.2%, 52.1%, and 37.2%, respectively). These data may be valuable to develop interventions to improve the microbial indoor air quality among hospital laboratories and for preventing the laboratory-acquired infections.

Keywords: biosafety, hospital laboratories, laboratory facility design, microbial indoor air quality

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