4th International and 23rd National Conference on Environmental Health
2-4 March 2021
Yazd-Iran

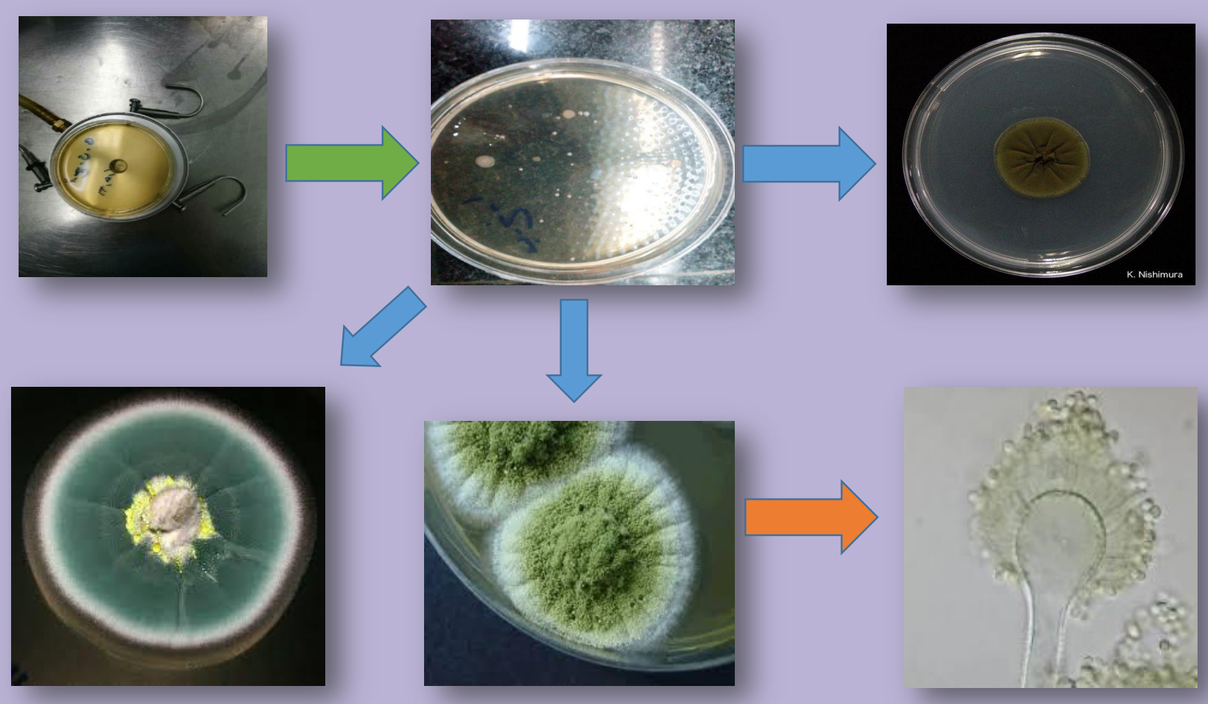
Article Code:132474

Evaluation of the type and concentration of bio-aerosols in the air of operating and isolation rooms of hospital

Authors: Maryam Dashti, Hadi Sadeghi, Mehdi Vosoughi, Seyed Ahmad Mokhtari

Introduction

Hospitals are sensitive places because they can threaten the health of staff and patients or their companions. The aim of the present work was to evaluate the type and concentration of bacterial and fungal bio-aerosols in the indoor air of four operating rooms (ORs) and four wards in Khalkhal during 2019.

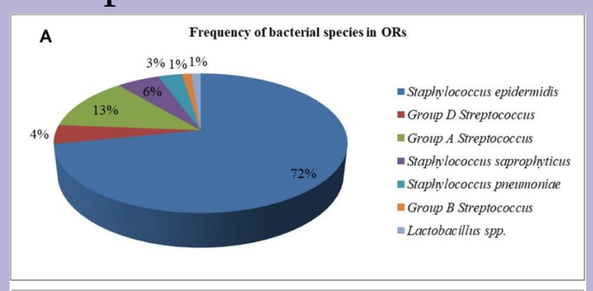


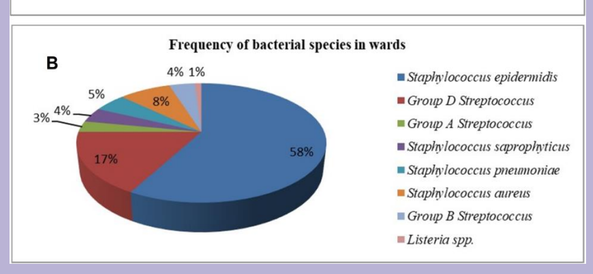
Material & Methods

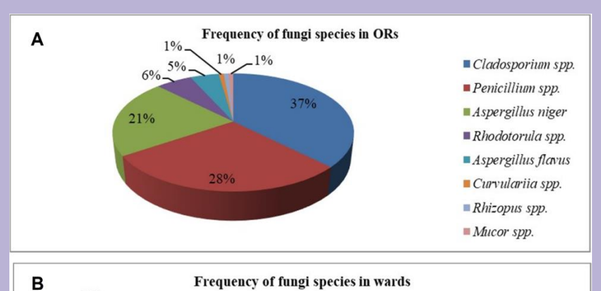
Active sampling was performed in ORs and wards, and a total of 192 bacterial and fungal samples were measured. Samples of bio-aerosols (bacterial and fungal) in indoor air of ORs and wards were collected based on the standard index of microbial air contamination (IMAC for enmorning. Sampler device includes petri dishes(9 cm-containing a solid nutrient medium) was placed at a height of 1.5 m from the floor and at a distance one meter from all four sides of the wall or physical barriers. After sampling, the plates will be wrapped with masking tape, stored at 4°C (using portable plastic cooler box) and moved to a laboratory. The samples of fungal were put in an incubator at 25°C for five days in the reversed positions, whereas the samples of bacterial were at 37°C for 24 to 48 h. Moreover, 15 samples were repeatedly measures as blank samples and the average concentrations of fungal and bacterial in blank samples were subtracted from real samples.

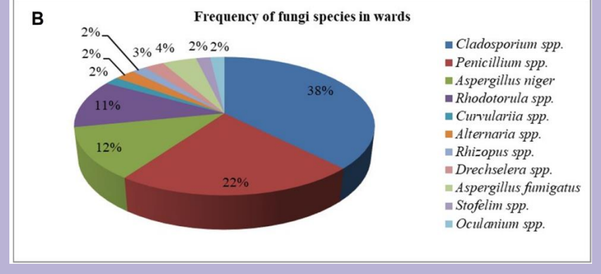
Results & Discussion

The mean total concentrations of airborne bacteria for both of ORs and wards limited between 11±1.2 to 48±3.1 CFU/m3, while for airborne fungi ranged from 95±5.6 to 51±1.2 CFU/m3. The predominant genera of airborne bacterial isolated in the indoor air of ORs vs. wards were Staphylococcus epidermidis (72% vs. 58%), Group D Streptococcus (4% vs. 17%), Group A Streptococcus (13% vs. 3%), and Staphylococcus saprophyticus (6% vs. 4%). In addition, the main fungal species identified in the indoor air of ORs vs. wards were Cladosporium spp. (37% vs. 38%), Penicillium spp. (28% vs. 22%), and Aspergillus niger (21% vs. 12%). A statistically significant correlation was observed between the mean concentration of bio-aerosols and population ($p < 0.05$). The results of statistical analysis reveals that a statistically significant difference exists between the mean concentrations of bio-aerosols and the values recommended by WHO ($p < 0.05$); this may be due to unsuitable and inadequate disinfection, improper design and operation of standard central ventilation (SCV), and high density of visitors and patients.









Conclusion

Designing and operating appropriate of SCV, controlling density of visitors and patients, enforcing more precise, regular, and comprehensive disinfection methods, and supervising of waste, especially medical waste can boost reduction airborne fungi and bacteria in hospital.

Keywords: Fungi and bacterial; Bio-aerosol; Hospital; Operating room; Disinfection