Scientific laboratory equipment, cabinets, lab coats and door handles have been found to contain fungal elements, and may be transferred to students, workers and staff. The aim of the present study was to examine the fungal contamination of scientific laboratory equipment in a university medical mycology laboratory of a teaching department of medical mycoparasitology. A total of 180 swabs were collected from different scientific laboratory equipment, such as microscopes, incubators, autoclaves, ovens, refrigerators, freezers, gas flames, centrifuges, rotators, balances, hotplates, waste-bin lids, cabinets, shelves, microscopy slide boxes and drawers. Sinks, lab coats and the floor were also sampled. The swabs were cultured on mycobiotic agar and incubated at 25–30°C for 4 weeks. Seven instruments tested positive for dermatophytes, namely *Trichophyton verrucosum*, *Trichophyton violaceum* and *Trichophyton schoenleinii*. Scientific laboratory equipment were found to be contaminated with fungi that are known to be the aetiologic agents in nosocomial infections. *Nocardia asteroides* and *Sporotrix schenckii* were also isolated from a shelf and a lab coat. The user interfaces of laboratory instruments in a medical mycology laboratory, such as microscope, centrifuge, balance, flame and so on may serve as potential reservoirs for the transmission of pathogenic fungi.

Biological contamination of scientific laboratory equipment, such as microscope, incubator, refrigerator, freezer, gas flame, centrifuge, rotator, balance and so on, may pose a potential health risk to personnel who work, service, repair and handle the equipment (Sewell 1995; Ghadjari *et al.* 1997; Neely and Orloff 2001). This laboratory equipment is commonly used by several students every week, and the specific results indicated that the equipment was contaminated with fungi, and students and staff were potentially exposed while working to these instruments, and therefore these fungi, which cause transmissible diseases. As a result, medical mycology laboratories are potentially critical for contamination to students. The length of survival of the fungi in such an environment is dependent on the genus and species of the fungi and the surface of the equipment (Neely and Orloff 2001). Fungal structures, especially conidia, can survive for years on the surfaces of such instruments. Arthroconidia of dermatophytes can survive for a long time. Fungi may be transferred via hands to people, causing nosocomial infections. These diseases are infections that develop within a healthcare institution, or are produced by organisms acquired during a stay at such a facility. The patient acquires infections during some interaction at the hospital or medical unit (Neely and Sittig 2002).

One hundred and eighty samples were taken from different parts of the laboratory equipment in the medical mycology laboratory. Specimens were taken by moisturized sterile swabs from different parts of the microscopes (*n* = 35), incubators (*n* = 5), autoclaves (*n* = 5), refrigerators (*n* = 4) and freezers and their handles (*n* = 3), gas flames (*n* = 5), centrifuges (*n* = 4), rotators (*n* = 3), balances (*n* = 3), cabinets (*n* = 10), shelves (*n* = 8), laminar hoods (*n* = 5), door handles (*n* = 5), hotplates (*n* = 2), ovens (*n* = 2), curtains (*n* = 5), waste-bin lids (*n* = 5), microscopy slide boxes (*n* = 11), cloths hanging (*n* = 4) and chairs (*n* = 30). In addition, 26 swabs were collected from lab coats (*n* = 5), sink (*n* = 6) and the floor (*n* = 15). Each swab was rolled on the surface of mycobiotic agar plate (Difco, East Molesey, UK). Cultured plates were incubated at 25–30°C for 4 weeks aerobically, and checked weekly. The differentiation of the fungi species was done using morphological features, such as colony topography and slide cultures. *Nocardia asteroides* was also identified based on physiological tests (Rippon 1988).

In the present study, the cultures of seven instruments (3–9%) revealed the presence of pathogenic fungi. The dermatophytes identified included three isolates (1.67%) of *Trichophyton schoenleinii*, one isolate (0.56%) of *Trichophyton violaceum* and one isolate (0.56%) of *Trichophyton verrucosum*. In the present study, one isolate (0.56%) of *N. asteroides* and one isolate of (0.56%) *Sporotrix schenckii* were also identified. The isolates of *T. schoenleinii* were isolated from flame, balance and microscope. Isolates of *T. violaceum* and *T. verrucosum* were recovered from microscope and microscopy slide boxes, respectively. *Nocardia asteroides* and *S. schenckii* were also isolated.
from a shelf and a lab coat. Dermatophytes are a group of pathogenic fungi that invade keratinized tissues. Thus, the presence of dermatophytes on laboratory equipment is a risk for dermatophytosis. Dermatophytoses are common fungal infection of humans, and are considered to be one of the major public health problems in the world. User interfaces of laboratory instruments in medical mycology laboratories, such as microscopes, centrifuges, balances, flame and so on, may serve as potential reservoirs for the transmission of fungi. Young et al. (2005) reported that hospital bed handsets contain organisms (fungi) that are known to be the aetiologic agents in nosocomial infections. In conclusion, laboratory instrument contaminations are not avoidable; hence, there is a need to choose effective cleaning products to minimize contaminations.

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References


