Identification Of Fungi Prevalent On Environmental Labour Ward Of General Hospital Umuguma And Umezuruike Hospital Labourward

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Abstract: There has been an increase in the frequency of fungal infections over the past decade. Nosocomial transmission of fungal pathogens and the recognition of resistance to antifungal agents pose a significant problem. This study identified the fungi species prevalent in the labour ward of the general hospital Umuguma and Umezuruike Hospital, Owerri Imo State Nigeria. Fungi are eukaryotic cells and therefore more complex than bacteria. The data available shows that Mucor Species and Rhizopus Species are the predominate species found in both hospitals in decreasing order. Fungal infection are often severe, rapidly progressive and difficult to diagnose or treat, therefore a thorough appreciation and understanding of fungi infections, including diagnostic and therapeutic modalities are needed among clinicians and microbiologists to provide a better patient care.
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Introduction

Advances in the medical and surgical therapy over the past two decades have changed the type of patients cared for all over the world. Newer technologies and therapies such a bone marrow or solid-organ transplants and chemotherapeutic agents have become common at many medical centres resulting in many immuno-compromised individuals. Also, care in specialized units and the use of invasive monitoring devices, patient's nutrition, broad-spectrum anti-microbial agents and assisted ventilation have helped to treat patients suffering from previously devastating or fatal diseases and have provided life to premature neonates previously thought to be nonviable.

However, these successes have also resulted in complications in the severely ill and immuno-compromised patients who are highly susceptible to nosocomial infections caused by organisms such as fungi that were previously considered to be of low virulence or "non-pathogenic" (Bodey, 1988). Fungi infections in these patients are often severe, rapidly progressive and difficult to diagnose or treat (Edwards, 1991). In the mid -1980s, many institutions, including cancer research, university and community hospitals reported that fungi were becoming common pathogens in nosocomial infections (Harvey and Myers, 1987). In addition, National Nosocomial Infections Surveillance (NNIS) system reported a steady increase in the rate of nosocomial fungal infections, from 2.0 to 3.8 per 1,000 discharges (Beck-Sague and Jarvis, 1993). The modes of transmission vary and include environmental spread through air, carriage on the hands of hospital personnel and contamination of medical products or devices before (ie intrinsic contamination) or after (ie extrinsic contamination) shipment to hospitals. Understanding the pathophysiology of pathogenic fungi is critical in determining the cause of an outbreak (Benneti *et al*, 1995).

Nosocomial infection could be defined as infections which are as a result of treatment in a hospital or treatment in a healthcare service unit, but secondary to the patient's original condition (Andereoli *et al*, 1997; Nester *et al*, 2004) that is hospital acquired. These infections can also appear within 30 days after discharge, it may be rampant among people who are sick and whose immune systems are in a weakened state, host – flora equilibrium imbalance caused by prolonged intake of antibiotics, the pathogen could be exogenous or endogenous (Andreoli *et al*, 1997). Opportunistic mycoses are equally pressing problems, and occurs primarily in immuno copromised patients (particularly those with malignancies and AIDS) and in patients who have undergone major surgery, bone marrow or solid organ transplantation or who have been severely burned. *Candida albacores*, *Aspergillus* spp. and *zygomycetes* spp. (Bross *et al*, 1989) have been implicated in mycoses infection. *Aspergillus fumigatus*, *A. flavus* and A. *terreus* have become a common cause of nosocomial infection in highly immunocompromised patients such as those with haematologic malignancy undergoing bone marrow or solid organ transplantation or receiving corticosteroid therapy (Anaissie and Bodey, 1989). *Trichosporon bergelii*, *Acremonium* Spp., *Candida* Spp. (*C. albicans* is by far the most common Candida Spp causing infections in humans),

Fusarium Spp., *M. Pachydermatis, Paecilomyces* Spp. have all been implicate in one nosocomila infection or the other (Rowsey *et al*, 1979; Chang *et al*, 2007). Some studies have identified common risk factors for patients developing fungal infections in labour ward, some due to the presence of immunosuppressant or a combination of factors (Karabinis *et al*, 1988). The health care environment can become highly contaminated with nosocomial pathogens that are able to survive for long periods of time like weeks or even months, on bed rails, telephones, call buttons, taps, door handles, mattresses, chairs, floors and on surfaces frequently touched by hand, long enough to be transmitted to cause infection as well as in the air and in dust (Johnson and Conly, 2006). Sometimes health care personnel may be a carrier of a pathogen such as *Candida* Spp. or *Aspergillus* Spp. which they pass on the patient during care providing (Andreoli *et al* 1997; Nester et al, 2004).

Materials And Methods

Preparation Of Media, Chemicals And Reagents

Samples collected were from floor, bed rail, mackintosh, wall and mattress etc. sterilized swab stick moistened with sterile peptone water was used to swab the wall, floor, mackintosh, mattress, bed rail and baby bed in the labour ward while the air was sampled by exposing Sabourand dextrose agar (SDA) plate for 2hrs. The samples collected using the swab stick was inoculated onto the already prepared SDA plates dried in the oven at 40^{o}C and incubated for 72hrs (3 days) at room temperature. Identification using microscopic examination was done by wet preparation using lactophenol cotton blue stain and then examined under the microscope. Cultural and morphological characteristics were also used for the identification. The size, shape, speculation and pigmentation were seen with a magnifying lens, identity of the isolates were further confirmed microscopically with reference to Barnett Hunter (1987). The prominent fungi isolated includes Aspergillus, Mucor, Penicillum, Rhizopus species (yeast) and Candida.

Results: Same sample used for the two hospitals

TABLE 1: *Aspergillus niger*

Sample Code	Colony Code	Gross morphology macroculture	Microscopic Appearance	Most Probable Identity
Uf	Ufi	Black spores with white condiospores. It grows in colonies or clusters	Septate hyphae conidia occur on large radiating heads. condiospores arises from a segment of mycelium called a foot cell.	Aspergillus niger
Um	Um	Black spores with white condiospores.	Aseptate unbranched stipes with swollen vesvlerhizoids are borrn derectly on the vescile.	Aspergillus niger
Gw	Gwi	Black spore with white condiospore in zones. Conidia head radiate and tends to split	Conidiosphores stipes smooth walled; Conidia borne on the stigma	Aspergillis Niger
	GBB_2	Black spores with white condiospores in zones conidia head radiate and tends to split.	Conidiosphores stipes smooth walled, Conidia borne on the stigma.	*Aspergillus niger*

TABLE 2: *Candida* Species

Sample Code	Colony Code	Macroculture	Microscopic Appearance	Most Probable Identity
	GMT_2	2mm whitish colonies with short-hair like spite around the periphery irregular	Large gram positive oval budding yeast cells with short strands of pseudomycellium	Candida species
	UF_2	About 2mm whitish colonies with short hair like spite around the periphery and irregular shape.	Large gram positive oval budding yeast cells with short strands of pseudomycellium	Candida species

TABLE 3: *Penicillium* Species

Sample Code	Colony Code	Macroculture	Microscopic Appearance	Most Probable Identity
	UIR_2	Olive green spores with white periphery.	Septate hyphae conidiophores with smooth stripe and branched.	Penicillium species
	GW_2	Olive green spores with white periphery.	Septate hyphae conidiophores with smooth stripe and branched.	Penicillium species.
	GBR	Olive green spores with white periphery.	Septate hyphae conidiophores with smooth stripe.	Penicillium species.

TABLE 4: *Rhizopus* Species

Sample Code	Colony Code	macroculture	Microscopic Appearance	Most Probable Identity
UBB	UBB	White filamentous hyphae bearing black spores.	Sporangia are globose with slightly rough walled stolen opposite the branched rhizoids.	Rhizopus species
	UMT	White filamentous hyphae bearing black spores.	Sporangia are globose with slightly rough walled stolen opposite the branched rhizoids.	Rhizopus species
	GA_2	White filamentous hyphae bearing black spores.	Sporangia are globose with slightly rough walled stolen opposite the branched rhizoids.	Rhizopus species

TABLE 5: *Mucor* Spp

Sample Code	Colony Code	macroculture	Microscopic Appearance	Most Probable Identity
GF	GF	Black spores with white periphery	Colony composed of both tall and short sporangia which are branched in conopodia fashion.	Species
GBB	GBB_1	Greyish cotton hyphae raised from plates.	Non septate hyphac, sporangiospores symbolically branched with long and short criminate branches	mucor Species
	GA_1	Black spores with white periphery	Colony composed of both tall and short sporangia which are branched in conopodia fashion	mucor Species
UBR	UBR	Greyish green cotton hyphae raised from plates.	Non septate hyphae, sporangiospores symbolically branched with long and short criminate branches	mucor Mucor Ciricinelloides
ULR	ULR_1	woolly like hyphae spreading on the surface of the plate.	Colony composed of both tall and short sporangia which are branched in conopodia fashion.	Species
GMT	GMT	Olive green spores with white periphery	Colony composed of both tall and short sporangia which are branched in conopodia fashion.	Species
	ULW	Olive green spores with white periphery	Colony composed of both tall and short sporangia which are branched in conopodia fashion.	Species

NOTES:
UMT: Represents Umezuruike Hospital mackintosh
GBR: Represents General hospital Umuguma Bedrail
GBF: Represents General hospital Umuguma floor
GW: Represents General hospital Umuguma wall
GM: Represents general hospital Umuguma mattress
GBB: Represents General hospital Umuguma baby bed
GA: Represents General hospital Umuguma Air

DISCUSSION

The effects of fungi in labour wards cannot be under estimated, the result obtained showed that *Aspergillus* Spp have become a common cause of nosocomial fungal infection in highly immuno compromised patients such as those with rheumatologic malignancy undergoing bone corticosteroid therapy. *A. funigatus* are tolerant at temperature up to 50^{o}C, colonies grow rapidly and are white and velvety at first but soon become green, yellowish or black and powdery as the conidia are formed. *Aspergillus* Spp. infections usually occur in the lungs, people breathing clouds of conidia from the air of granaries, barns and silos, spores simply germinate in the lungs and form fungus balls. In the more invasive form, *Aspergillus* Spp. produces a necrotic pneumonia and disseminates to the brain, heart, skin and a wide range of other organs systemic aspergillosis usually occurs in very ill hospitalized patients with a poor prognosis (Anaissie and Bodey, 1989). Candida Spp the prevailing opportunistic pathogens of humans are the yeasts of Candida which are extremely wide spread yeast, it is the major cause of Candisiasis (also called Candidosis or moniliasis). *Candida albicans* occurs as normal flora in the oral clarity, genitalia, large intestine or skin of 20% humans. Although Candidacies is usually endogenous and not contagious, it can be spread in nurseries or through surgery, child birth, sexual contact and it account for nearly 80% of nosocomial fungal infections and 80% of nosoconial infections, 30% of deaths from nosocomial infections in general; *Candida albicans* causes local infections of the mouth vagina, skin and lungs. It can also disseminate to internal organs. The mucous membranes most frequently involved are the oral cavity and vagina (Bodey, 1988). The rhizopus species are extremely abundant saprobic fungi found in soil, water and food. Their large prolific sporangia release multitudes on humans and usually do little harm beside spoiling foods and rotten of fruits and vegetables. But an increasing number of critically ill patients are contracting a disease called zygomycosis which can cause a patchy infection of the nail bed like tineaungium involved in infection of the lungs of tubercular or highly immunosuppressed patients and occasionally infect the eyes, toe, nails and burned nails. (Rowsey *et al*, 1979). Mucor species can be differentiated from moulds of genera absidia, Rhizomes and Rhizomucor by the shape and insertion of the columnella and the lack of rhizoids. Some mucor species produce chlamydospores. The species have become a common cause of nosocomial fungal infection in imminocompromised patients such as renal failure, diabetes mellitus, receipt of antimicrobial agents, severe underlying disease and exposure to hospital construction activity. Penicillum Spp have been considered as an important causative agents of extrinsic bronchial asthma, they can penetrate the living of the intestine and invade the liver, lungs and skin. Untreated cases with extensive damage to the organs experience a high death rate.

From this study it has become pertinent to note that nosocomial fungal infection are becoming more prominent. There is an increase in the number of immunocompromised patients and patients receiving a broader range of antimicrobial agents in hospitals today compared with previous years. Consequently infections due to previously obscure fungi are being seen more commonly in hospitalized patients. Although diagnostic and therapeutic modalities for some fungi are improving such as those used for Candidiasis or aspergillosis, there is still much to learn about many of the other fungi discussed. Standards for susceptibility testing are currently being developed and should help guide clinicians and hospital epidemiologists in the management of nosocomial fungal infections. Continued epidemiologic and laboratory research is needed to better characterize these pathogens, allowing for improved diagnostic and therapeutic strategies in future. Sensitivity of organisms to antibiotics in use should be checked, needles and sharp objects should be discarded in rigid, puncture proof container without contact using bare hands or replacement of needle caps. Linen and solid reusable items should be placed in protective bags to prevent leaking and further contamination.

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