

## Original Research Article

# CLINICAL STUDY OF OTOMYCOSIS IN TERTIARY LEVEL HOSPITAL

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Received : 07/04/2025  
Received in revised form : 02/06/2025  
Accepted : 22/06/2025

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DOI: 10.70034/ijmedph.2025.3.8

Source of Support: Nil,  
Conflict of Interest: None declared

Int J Med Pub Health  
2025; 15 (3); 42-46

## ABSTRACT

**Background:** Otomycosis is fungal infection of external ear and middle ear, commonly seen in tropical and subtropical regions. It is common condition encountered in ENT practice. **Objective:** To study mode of presentation, predisposing factors and types of fungi causing otomycosis.

**Materials and Methods:** This observational study was included 166 patients (90 females and 76 males), 18-60 years of age group who were clinically diagnosed patients of otomycosis, and was carried out in Tertiary Care Hospital & Medical College of India over period of six months from July to December. A detailed history was taken including symptoms and various predisposing factors. Two swab samples were taken from affected ear and were sent to microbiology for identification of fungi causing otomycosis. After that patients were treated by ear cleaning and given antifungal drops/tablets according to presentation.

**Results:** Our study showed maximum patients were of 21-40 years of age (77.71%), female preponderance (54.22%) and unilateral ear involvement (96.98%). Itching (83.13%) was the most common presentation in present study. Most common pre-disposing factor was self-cleaning by unsterile object (83.53%). *Aspergillus Niger* (79.08%) was found to be the commonest isolated fungus causing otomycosis.

**Conclusion:** Present study highlights the commonest isolation of *Aspergillus* species in cases of clinically diagnosed otomycosis with common risk factor like self-cleaning to get relief from ear itching.

**Keywords:** Otomycosis, *Aspergillus*, *Candida*.

## INTRODUCTION

Otomycosis is found to be a one of the commonest problem in India in ENT OPD.<sup>[1,2]</sup> Otomycosis derived from the Greek word "Oto" which means Ear and mycosis means fungal infection. Otomycosis is defined as a superficial, diffuse fungal infection of the external auditory canal.<sup>[3]</sup> The ear is constantly exposed to outer environment So ignorance of these pathogens may lead to prolonged or improper treatment. It is not clear that the fungi are the true infective agents or more colonization species because of compromised local host immunity due to bacterial infection.

Various predisposing factors for otomycosis include self-cleaning of ear, humid climate, presence of wax, immunocompromised host, increased use of topical antibiotics / steroid preparations, patients who have undergone open cavity mastoidectomy and those who wear hearing aids with occlusive ear mold.<sup>[4]</sup> Usually the infection is in unilateral ear; characterised by pruritus, aural fullness and otalgia.<sup>[5]</sup> Patients presenting with symptoms of ear itching, discharge, earache, ear fullness, hearing loss and tinnitus along with otoscopic findings of black, grey, yellow, or whitish discharge with debris resembling wet newspaper are considered to have clinical otomycosis. The fungal hyphae cause irritation of the ear canal which is responsible for ear itch and

fullness. The cause of hearing loss in otomycosis is blockage caused by the fungal hyphae, debris and wax accumulated in ear canal. It has been a challenging and frustrating entity for both patients and otorhinolaryngologists as it requires treatment and follow-up for longer duration.

Most common fungus that forms biotin inside the ear canal are mostly *Aspergillus* and *Candida* species.<sup>[1,6]</sup> The flora found in the external auditory canal is made up of a series of microorganisms viz. genus *Aspergillus* or yeast-like fungi, *Candida* spp., *Staphylococcus aureus*, *Staphylococcus epidermidis*, *Streptococcus* species, *Micrococcus*, *Corynebacterium* species, *Bacillus* species, *Pseudomonas aeruginosa*, *Escherichia coli*, *Haemophilus influenzae*, *Moraxella catarrhalis* etc. As long as the balance between bacteria and fungi is maintained in the external auditory canal, commensal flora is not pathogenic.<sup>[7]</sup> Treatment of otomycosis includes regular microscopic suction cleaning of ear, topical/oral antifungal agents, symptomatic treatment, and control of pre-disposing factors. Objective of present study was to study the mode of presentation, predisposing factors and types of fungi causing otomycosis.

## MATERIALS AND METHODS

This observational study was carried out in Tertiary Care Hospital and Medical College of Western India over period of six months- July to December. Total 166 Patients of age group 18-60 years who presented in Otorhinolaryngology outpatient department with complaints of ear itching, pain in ear, sensation of blocked ear/ aural fullness, ear discharge, tinnitus, decreased hearing were included. Patients >60yrs of age, <18yrs of age, suspected malignancy/infiltrating tumour and pregnant women were excluded.

A detailed history of the patient was taken including age, sex, complaints, predisposing factors, immunocompromised condition / major medical illness. Any history of use of ear bud / unsterile object for self-cleaning or removal of wax, instillation of oil, topical ear drops, history of chronic suppurative otitis media, water in ear canal (due to swimming / bath /

rain), trauma, ear surgery (modified radical mastoidectomy, tympanoplasty) was also noted. Immunocompromised condition like diabetes, HIV, autoimmune disorders etc were also noted. Written as well as informed consent was taken from all the patients. All the patients were informed about the purpose, procedure, risks and benefits of the study in the their own language. All patients underwent a detailed clinical examination by otoscope, endoscope / microscope. On examination, findings such as white cheesy material, matted mass of hyphae/spores, wet bloating paper appearance were used to support clinical diagnosis of otomycosis.

Two swab samples were taken from the affected ear of the patient using separate pre-sterile swabs. All samples were sent to microbiology laboratory with maintenance of sterile condition. One of the swabs was subjected to microscopic examination with 10% KOH and second one was inoculated on Sabouraud's Dextrose Agar (SDA) and incubated at 37°C for the isolation of fungus. Identification of the fungi was done by further microscopic procedures.

After taking swabs, patients were treated with aural toileting followed by dry mopping and microscopic suction clearance. All patients were given advice not to clean the ear by their own and keep the ear dry, to instil 1% clotrimazole ear drops 3 drops 4 times a day for 7 days, oral antibiotics prescribed in cases of CSOM for 7 days, tablet levocetirizine 5 mg also given for itching for symptomatic relief.

## RESULTS

We have conducted study on total 166 clinically diagnosed patients of otomycosis, out of which 90(54.22%) were females and 76(45.78%) were males. The highest patients of otomycosis were noted in age group of 21-30 years 68(40.96%) followed by 31-40 years 61(36.74%). In age group of 41-50 years and 51-60 years, 25(15.06%) and 12(7.22%) patients were seen respectively. (Table 1) In our study right ear 84(50.6%) and left ear 77(46.39%) were affected in patients. Unilateral involvement of ear was seen in 161(96.98%) patients. In 5(3.01%) patients involvement of both ears was noted.

**Table 1: Age wise distribution of patients**

Age group	Number (Percentage)
21-30	68(40.96%)
31-40	61(36.74%)
41-50	25(15.06)
51-60	12(7.22%)

Common presenting complaints in our study were itching in ear 138(83.13%) followed by pain in ear 121(72.89%) and sensation of blocked ear/aural fullness 115(69.27%). Other complaints were decreased hearing, ear discharge and tinnitus. (Table 2) Various predisposing factors were seen in our study; self-cleaning of ear by unsterile object like earbud/safety pin/feather/hair pin/stick 137(82.53%),

indeterminate use of topical antibiotic ear drops 126(75.90%), water exposure to ear due to swimming/bathing/get soaked in rainy season 112(67.46%), instillation of different types of oil (ex. coconut oil, mustard oil) 92(55.42%), history of chronic suppurative otitis media 63(37.95%), past history of ear surgery 54(32.53%) and immunocompromised conditions like diabetes/HIV.

8(4.81%) patients of diabetes were seen in this study. Patient of HIV was not noted in present study.

**Table 2: Presenting complaints wise distribution of patients**

Presenting complaints	Number (Percentage)
Itching in ear	138 (83.13%)
Pain in ear	121 (72.89%)
Sensation of blockage of ear	115(69.27%)
Decreased hearing	53 (31.92%)
Ear discharge	38 (22.89%)
Tinnitus	12 (7.22%)

Among 166 clinically diagnosed cases of otomycosis, 153(92.16%) cases were positive for fungal culture and 13(7.84%) patients did not have any fungal growth. *Aspergillus* species 139(90.84%) followed by *Candida* species 14(9.15%) were isolated in the study. In *Aspergillus* species most common subspecies was *Aspergillus Niger* 121(79.08%) followed by *Aspergillus Flavus* 18(11.76%).

## DISCUSSION

Concerning ear complaint related visits to Otorhinolaryngology department, it is estimated that otitis externa are about 5 to 20% of the total clinic presentations, and out of it, about 10 to 25% can be attributed to fungal infections broadly called as fungal otitis externa or otomycosis.<sup>[6,8]</sup> Andrall and Gaverret were the first to describe fungal infections of the ear. Otomycosis is commonly seen in tropical and subtropical regions, although it is prevalent worldwide.<sup>[9,10]</sup> Fungi found abundantly on decaying plant, can be spread away in the wind with soil particles and carried away by water vapours in the rainy season, so it is one of the most prevalent in India during rainy season. Present study was carried out from July to December.

In this study 90(54.22%) females and 76(45.78%) males were seen. As such no major difference was seen in gender in our study but female patients were more than male cases. Higher numbers of females were also noted in other studies.<sup>[9-13]</sup> Housewives females more involved in household works like sweeping home/garden and so they may have more exposure to fungal spores. Practice of self-cleaning of ear by unsterile object like safety pin, wooden stick, contaminated finger damages normal lining epithelium of ear which is natural protective defence mechanism against infection. Some studies showed a greater number of male patients.<sup>[1,14-16]</sup> Males are mainly involved in outside work like as labourer, in agriculture. This may be attributed to more exposure to fungus.

Most of patients of otomycosis were noted in the age group of 21-40 (77.71%) in present study. People of this age group are active, involved in different activities, more exposure to infectious agents in the air, more aware and conscious about self-health, this

may be the reason of more cases. Our study results are similar to other study results.<sup>[14-18]</sup>

Otomycosis was predominantly unilateral rather than bilateral. This study showed right ear 84(50.6%) and left ear 77(46.39%) involvement. Unilateral ear involvement was seen in 161(96.98%) cases. Otomycosis is the most commonly presented with unilateral involvement.<sup>[5,6,13,19]</sup> In studies of Aneja KR et al., Aremu SK et al., Yehia MM et al. and Abdullah I et al. right ear involvement had been seen.<sup>[11,14,20,21]</sup> Right ear is more commonly involved, as humans are commonly right dominant handed and self-cleaning with unsterile objects is also more common. Although the predominance of left side otomycosis has been reported in some of the studies.<sup>[12,22]</sup> Bilateral ear involvement was seen in 5(3.01%) patients in our study. In case of immunocompromised patients, bilateral ear involvement is more commonly observed.<sup>[2]</sup>

Most common presenting complaints were itching in ear 138(83.13%) followed by pain in ear 121(72.89%) and sensation of blocked ear/aural fullness 115(69.27%) in present study. Other complaints were decreased hearing, ear discharge and tinnitus. T Dinesh Singh et al. (89%), Paulose et al., and Oliveri et al. stated that itching (88%) was the most commonly presented complaint.<sup>[23,25]</sup> Some other studies showed itching was most common presenting complaint.<sup>[6,10,11-13]</sup> In study of Prassana V et al., Nwabuisi et al. And Mohanty et al. itching and ear pain were the commonest symptoms.<sup>[17,22,26]</sup> Study by Kaur R et al., and Agarwal P et al. reported that ear blockage was the most common symptom 93.7% and 76.6% respectively.<sup>[1,15]</sup> However, Ho T et al. observed ear pain was the most common clinical complaint.<sup>[19]</sup> Cause of Hearing loss is blockage caused by fungal debris as well as accumulated wax in the ear canal. Bineshin F et al. observed hearing loss with other symptoms.<sup>[27]</sup>

Common predisposing factors were self-cleaning by unsterile object (83.53%) followed by indeterminate use of topical antibiotic ear drops (75.90%) and water exposure to ear (67.46%) in our study. For removing ear wax, scratching of ear can cause minor trauma in inner layer of ear canal that can lead to fungal infection in presence of other risk factors. Normal lining epithelium of external auditory canal is natural defence that protect against infections. Use of antibiotic in ear can eliminate the natural flora, and so high chance of local ear infections. And also it may

change pH which favours fungal growth. Water in the canal produces moist environment which removes the protective lining of canal thus favours growth of fungus. Our study findings were in accordance with other studies.<sup>[14-17,28]</sup> Swimming had been reported as a predisposing factor for otomycosis as in the study conducted in Iran.<sup>[29]</sup> Pradhan et al. reported mustard oil is common risk factor as it is often used to get relief from ear itching.<sup>[10]</sup> The reason of increasing case of Otomycosis are having a lack of proper knowledge with certain myths like use of hot oil (coconut or mustard usually) will be helpful in treating ear symptoms. 92 (55.42%) patients were seen in our study with history of application of oil. Postoperative ear-anatomy disruption and meatal damage are favouring condition for fungal growth. This study showed 54(32.53%) patients who had past history of ear surgery. Among 166, 13(7.84%) patients did not have any fungal growth may be due to self-medication with topical agents, unfavourable environment for fungal growth or improper sample collection. 153(92.16%) cases were positive for fungal culture in our study. Other studies like Suraneni VR et al., Aremu SK et al., Singh TD et al., and Gregson AE et al. reported 90%, 98%, 94%, 100% fungal isolation rate respectively.<sup>[13,14,23,30]</sup> *Aspergillus* species 139(90.84%) followed by *Candida* species 14(9.15%) were isolated in present study. *Aspergillus* species are common in airborne dust, and their heavy growth is aided by earwax.<sup>[6]</sup> *Aspergillus* grow at the optimum temperature of 37 degree Celsius and pH of 5.7 and this optimum condition is best provided by the deep part of the external auditory canal. *Aspergillus Niger* was the commonest causative fungi observed in present study. Various studies reported the similar results.<sup>[2,11-14,18]</sup> It is also compatible with other worldwide studies.<sup>[31,32]</sup> In study conducted by Kaur et al. and Barati et al. the commonest fungal agents were *Aspergillus fumigatus* and *Aspergillus flavus* respectively.<sup>[1,33]</sup> Pontes et al. and Kurnatowzki et al. had showed candida as the commoner fungi.<sup>[9,34]</sup> It has been observed that *Candida* is commonly present in temperate climate. Beany et al. found that *Aspergillus* is more common than candida in the isolates because it produces antibiotics which eliminate bacterial agents.<sup>[35]</sup>

## CONCLUSION

Otomycosis is the commonest clinical problem to come across routinely with high incidence in the tropical region and during monsoon. In this study we observed that Otomycosis was more common in middle age, young adults, and females. Itching, ear pain and blocked ear were the most significant complaints in patients. It was found to be more common in people who cleaned ear with unsterile objects and used unnecessary ear drops, so there is

need to spread awareness among population about its serious consequences. By due care of controlling risk factors, a significant decrease in cases of otomycosis can be expected. Out of 166 patients of our study, in 153 cases the diagnosis of otomycosis was confirmed and *Aspergillus Niger* was the commonest fungus isolated.

**Conflict of interest:** The authors declare that there is no conflict of interest.

**Ethical Approval:** Institutional ethics committee approval was taken.

**Informed Consent:** The study had been performed after taking consent from the patients.

**Funding:** There were no funding sources.

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