

**Original Article**

## EXPLORING THE INCIDENCE OF OTOMYCOSIS IN IMMUNOCOMPETENT AND IMMUNOCOMPROMISED INDIVIDUALS

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### ABSTRACT

**Objective:** This study aims to evaluate the incidence, clinical presentation, mycological profile, and treatment outcomes of otomycosis in immunocompetent versus immunocompromised individuals.

**Methods:** This prospective cohort study was conducted over one year and included 300 randomly selected patients with ear complaints, divided equally into immunocompetent and immunocompromised groups. Diagnosis was confirmed via KOH mount and culture on Sabouraud's Dextrose Agar. Treatment involved aural toileting and topical antifungal therapy, starting with Clotrimazole and escalating to Fluconazole if needed.

**Results:** Otomycosis was diagnosed in 101 patients: 26% in the immunocompetent group and 41.3% in the immunocompromised group, showing statistical significance ( $p=0.0070$ ). Males were more affected in both groups. *Aspergillus Niger* was most common in immunocompetent, while *Candida* species dominated in immunocompromised patients. Recovery time was shorter in immunocompetent patients ( $10\pm3.5$  d) compared to immunocompromised ones ( $16\pm4.2$  d), with 35.4% requiring Fluconazole.

**Conclusion:** Otomycosis is more prevalent and tougher to manage in immunocompromised individuals, with *Candida* species as the leading pathogen. Tailored treatment, including timely escalation from Clotrimazole to Fluconazole, is essential in these patients.

**Keywords:** Otitis externa, Otomycosis, Diabetes mellitus, HIV/AIDS

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### INTRODUCTION

Otomycosis or fungal otitis externa is a fungal infection of the external auditory canal with infrequent complications involving the middle ear. It is due to an imbalance protective Lipid/acid mechanism in ear [1].

Fungus is the etiologic agent in 10% of all cases of Otitis Externa [1]. In the recent years there has been an increase in the incidence as a result of possibly huge number of immunocompromised patients. Fungi thrive in environments like soil and sand containing decomposing organic matter, and their spores are often airborne. The risk of infection is higher during the monsoon season when humidity levels rise. Immunocompromised individuals such as those with Diabetes Mellitus, AIDS or Cancer are more susceptible to fungal infections. Pathologically, fungal infections of the External Auditory Canal can lead to small abscesses, hemorrhagic granulations, thrombosis, and even perforation of the tympanic membrane [2].

Patients typically present with nonspecific symptoms, including itching, discomfort, pain, aural fullness, tinnitus, hearing loss, and ear discharge. History of frequent ear cleaning, swimming, or antibiotic ear drops may be elicited as predisposing factors. Otomycosis can be difficult to treat and frequently recurs, particularly in immunocompromised patients, making it a challenging condition for both patients and Otorhinolaryngologists. Accurate diagnosis requires high clinical suspicion and microbiological confirmation.

Given the rising incidence of Diabetes Mellitus and other immunocompromised states, studying the incidence, disease patterns and treatment responses in normal versus immunocompromised individuals is essential. Therefore, this study was conducted to explore these aspects.

The aims and objectives of the study were to compare the incidence of Otomycosis in normal and immunocompromised individuals, to study and assess the clinical presentation and mycological profile

with an attempt to study and evaluate treatment outcome between the two groups.

### MATERIALS AND METHODS

#### Study design

A prospective cohort study that included 2 groups of patients with complaints pertaining to ear who attended to ENT Department of a state-run tertiary-care institution over a period of 1 y. A total of 300 patients of Otomycosis were included in the study. All these patients were randomly selected.

#### Inclusion criteria

- Patients of both sex with ear complaints were taken into the study.
- Age group taken into the study were between 1-60 y
- Patients with immunocompromised conditions taken into the study are:
  - Diabetes Mellitus.
  - HIV/AIDS.
  - Leukemia.
  - Undergoing Chemotherapy/Radiotherapy.

#### Exclusion criteria

- Known cases of Chronic Suppurative Otitis Media (CSOM).
- Patients with negative findings on ear swab mount and culture with clinical diagnosis of Otomycosis.
- Patients with no consent, and who did not turn up for follow-up.

Outpatients who presented to ENT OPD with complaints of itching, pain and discharge in the ear were examined and sterile swabs were

sent for microbiological examination. Otomycosis was confirmed by 10% KOH mount and culture on Sabaroud's Dextrose Agar media.

Treatment was done by aural toileting by suction and aspiration and dry mopping of the debris in the EAC. Patients were put on topical antifungal ear drops for 3 w, initially with Clotrimazole eardrops for 3 w. Those whose otomycosis did not respond to Clotrimazole were switched to Fluconazole ear drops. Patients were advised to keep the ear dry. The patients were examined daily for 4 w and the results were evaluated and studied.

#### Statistical analysis

Statistical analysis was performed using SPSS 17.0 (IBM, Armonk, NY) and Microsoft Excel 2007 for Windows and Macintosh.

Categorical and numerical variables were expressed in percentage and mean ( $\pm$  standard deviation, SD), respectively. The statistical significance was considered for a  $p$ -value  $< 0.05$ . The study was approved by the institutional ethics committee prior to onset. All patients were informed of the study before data collection, based on the procedure, and each participant provided informed consent.

#### CONCLUSION AND RESULTS

The incidence of Otomycosis in normal and immunocompromised individuals attending ENT OPD are discussed below. 39 patients out of 150 immunocompetent group and 62 patients out of 150 among the immunocompromised are diagnosed to have Otomycosis i. e., a total of 101 out of 300 patients were diagnosed to have Otomycosis.

**Table 1: Number of cases positive for otomycosis among the groups**

Patient immune status	Otomycosis	Other diagnosis	Total
Immunocompetent	39(26%)	111(74%)	150
Immunocompromised	62(41.3%)	88(58.7%)	150
Total	101	199	300

From the above values in table 1 and from the fisher exact test, the two-tailed P value equals 0.0070 i. e.  $p$ -value less than 0.05, which implies that the study is statistically significant.

**Table 2: Demographic Data of patients**

Age (y)	Immunocompetent (n=39)	Immunocompromised (n=62)
0-10	02	04
11-20	06	08
21-30	10	07
31-40	09	11
41-50	08	14
51-60	04	18
Sex		
Male	23	38
Female	16	24

In both the cohorts of immunocompetent and immunocompromised patients of 150, ex and age-matched population was taken i. e. each group consists of 75 members male and 75 members females and each age group has 25 patients. From the above study, it shows that Incidence of Otomycosis is higher in Males in both immunocompromised patients (61.29%) and normal individuals (58.97%) [table 2].

**Table 3: Presenting symptoms in study population**

Symptom	Immunocompetent, n=39(39.4%)	Immunocompromised, n=62 (62.6%)	Total, n=101(100%)
Itching	15 (38.4%)	17 (27.4%)	32(32.3%)
Ear Discharge	10 (25.6%)	13 (20.9%)	23(23.2%)
Pain	5 (12.8%)	14 (22.5%)	19(19.2%)
Fullness	5 (12.8%)	9 (14.5%)	14(14.2%)
Hard of Hearing	2 (5.1%)	5 (8.0%)	7(7.1%)
Tinnitus	2 (5.1%)	4 (6.4%)	6(6.1%)

As seen in table 3, itching and ear discharge were more frequent in immunocompetent individuals, while pain, fullness, hearing loss, and tinnitus were predominant among immunocompromised patients.

**Table 4: Mycological profile in study population**

Fungal species	Immunocompetent n=39(39.4%)	Immunocompromised n=62(62.6%)
<i>Aspergillusniger</i>	20 (51.2%)	15 (24.1%)
<i>Aspergillusflavus</i>	6 (15.3%)	7 (11.2%)
<i>Aspergillusfumigatus</i>	3 (7.6%)	6 (9.6%)
<i>Candida species</i>	5 (12.8%)	28 (45.1%)
<i>Penicillium species</i>	3 (7.6%)	3 (4.8%)
<i>Alternaria species</i>	2 (5.12%)	3 (4.8%)

As seen in table 4, in the immunocompromised group, *Candida* species were the predominant pathogen.

#### Treatment outcome

All patients were treated initially with Clotrimazole ear drops. All patients in immunocompetent cohort responded well to Clotrimazole ear drops at the end of 1<sup>st</sup> week. But 22 patients in

immunocompromised cohort showed no response to clotrimazole drops. They were treated with Fluconazole ear drops and all 22 of them responded to treatment.

- **Immunocompetent group:** 100% responded within 10 $\pm$ 4 d

• **Immunocompromised group:** 64.5% responded within 16±4 d; 35.4% required a switch to fluconazole.

No systemic antifungals were needed, and no allergic reactions were noted.

**Table 5: Treatment outcome between two groups**

Group	Mean recovery time	Standard deviation	n
Immunocompetent	10 d	3.5	39
Immunocompromised	16 d	4.2	62
p-value-<0.0001 (unpaired T test)			

As seen in table 5, the patients in the immunocompetent group improved faster than the patients in the immunocompromised group.

## DISCUSSION

Otomycosis is described as a fungal infection of the external ear canal. This infection is worldwide in distribution, but it is more common in tropical and subtropical regions. Wolf stated that around 53 species of fungi are reported to cause the disease [3]. Otomycosis affects 10% of population in their lifetime. In this present study out of the study group of 300 patients, 39 out of 150 among immunocompetent and 62 out of 150 among immunocompromised are found to have Otomycosis. Immunocompromised individuals are at increased risk for the disease, which is reflected in this study, which is similar to Than *et al.* and Yassin *et al.* [4, 5].

In this study, the highest incidence of otomycosis in the immunocompetent patients was seen in the middle-aged group of 21 to 30 y (25.6%) followed by age group 31-40 y (23.07%), which agreed with the findings of Chandler *et al.* [6], Paulose *et al.* [7]. This may be due to higher exposure of young patients to fungal spores.

The highest incidence in our immunocompromised patients was found in the age group of 51 to 60 y (29.03%) followed by 41-50 y (22.58%), which coincides with the study by Viswanatha *et al.* [8]. This could be because of the loss of natural defence mechanisms and associated comorbid conditions which increases as the age of the individual increases.

Otomycosis was higher in male patients than females in both the groups. This could be due to damp working conditions and more exposure to dust in males. However, gender doesn't play a role in immunity of the patient.

Common symptoms of otomycosis are itching and ear discharge, followed by ear pain, blocking sensation, decreased hearing and tinnitus. Itching is the main complaint with 38.4% of immunocompetent and 27.4% of immunocompromised patients presenting with the same.

The most common organisms found in our study were the *Aspergillus* and *Candida* species, which is similar to a study conducted in 2023 by Bojanovic *et al.* [9]. This study also found that the presence of an immunodeficient status can affect the incidence which also correlates positively with our study.

In our study, all the symptoms disappeared in 10 d in the immunocompetent group but took 6 d more in the immunocompromised group. Disappearance of symptoms was found to be similar to a study conducted in 2018 by Swain *et al.* [10] where clotrimazole with povidone iodine was used in the management.

Another study in 2014 by Anwar *et al.* [11] found that the eradication of the otomycosis is much more difficult in cases of Diabetes Mellitus and in presence of a mastoid cavity. This study also correlates well with our study.

## CONCLUSION

The present study found the incidence of otomycosis was higher in immunocompromised individuals when compared to immunocompetent patients. *Candida* species was most common causative agent in immunocompromised whereas *Aspergillus niger* in immunocompetent patients. Fluconazole ear drops worked well in patients who didn't respond to clotrimazole ear drops. Thus, it

can be concluded that immunocompromised patients should be treated with a keen eye since their treatment regime can go on for a longer duration.

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## AUTHORS CONTRIBUTIONS

All authors have contributed equally

## CONFLICT OF INTERESTS

Declared none

## REFERENCES

- Carney AS. Otitis externa and otomycosis. In: Gleeson MJ, Browning G, editors. G. Burton MJ, Clarke R, Hibbert J, Jones NS, Lund VJ, Luxon LM, Watkinson JC. Scott-Brown's Otolaryngology, Head and Neck Surgery. Vol. 3. 7<sup>th</sup> ed. London: Hodder Arnold Publishers; 2008. p. 3351-7.
- Rutt AL, Sataloff RT. Aspergillus otomycosis in an immunocompromised patient. Ear Nose Throat J. 2008;87(11):622-3. doi: [10.1177/014556130808701107](https://doi.org/10.1177/014556130808701107), PMID [19006061](https://pubmed.ncbi.nlm.nih.gov/19006061/).
- Wolf FT. Relation of various fungi to otomycosis. Arch Otolaryngol (1925). 1947;46(3):361-74. doi: [10.1001/archotol.1947.00690020372009](https://doi.org/10.1001/archotol.1947.00690020372009), PMID [20265711](https://pubmed.ncbi.nlm.nih.gov/20265711/).
- Than KM, Naing KS, Min M. Otomycosis in Burma and its treatment. Am J Trop Med Hyg. 1980;29(4):620-3. doi: [10.4269/ajtmh.1980.29.620](https://doi.org/10.4269/ajtmh.1980.29.620), PMID [6447461](https://pubmed.ncbi.nlm.nih.gov/6447461/).
- Yassin A, Maher A, Moawad MK. Otomycosis: a survey in the eastern province of Saudi Arabia. J Laryngol Otol. 1978;92(10):869-76. doi: [10.1017/s0022215100086242](https://doi.org/10.1017/s0022215100086242), PMID [712219](https://pubmed.ncbi.nlm.nih.gov/712219/).
- Chandler JR. Malignant external otitis. Laryngoscope. 1968;78(8):1257-94. doi: [10.1288/00005537-196808000-00002](https://doi.org/10.1288/00005537-196808000-00002), PMID [4970362](https://pubmed.ncbi.nlm.nih.gov/4970362/).
- Paulose KO, Al KS, Shenoy P, Sharma RK. Mycotic infection of the ear (Otomycosis) a prospective study. JLO. 1989 Jan;103(1):30-5. doi: [10.1017/s0022215100107960](https://doi.org/10.1017/s0022215100107960).
- Viswanatha B, Sumatha D, Vijayashree MS. Otomycosis in immunocompetent and immunocompromised patients: comparative study and literature review. Ear Nose Throat J. 2012 Mar;91(3):114-21. doi: [10.1177/014556131209100308](https://doi.org/10.1177/014556131209100308), PMID [22430336](https://pubmed.ncbi.nlm.nih.gov/22430336/).
- Bojanovic M, Stalevic M, Arsic Arsenijevic V, Ignjatovic A, Randelovic M, Golubovic M. Etiology, predisposing factors clinical features and diagnostic procedure of otomycosis: a literature review. J Fungi (Basel). 2023 Jun 13;9(6):662. doi: [10.3390/jof9060662](https://doi.org/10.3390/jof9060662), PMID [29223643](https://pubmed.ncbi.nlm.nih.gov/29223643/).
- Swain SK, Behera IC, Sahu MC, Das A. Povidone iodine soaked gelfoam for the treatment of recalcitrant otomycosis our experiences at a tertiary care teaching hospital of eastern India. J Mycol Med. 2018 Mar;28(1):122-7. doi: [10.1016/j.mycmed.2017.11.006](https://doi.org/10.1016/j.mycmed.2017.11.006), PMID [29223643](https://pubmed.ncbi.nlm.nih.gov/29223643/).
- Anwar K, Gohar MS. Otomycosis; clinical features predisposing factors and treatment implications. Pak J Med Sci. 2014 May;30(3):564-7. doi: [10.12669/pjms.303.4106](https://doi.org/10.12669/pjms.303.4106), PMID [24948980](https://pubmed.ncbi.nlm.nih.gov/24948980/).