

Otomycosis - Predisposing factors and Microbiological Profile

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Abstract

The otomycosis / fungal otitis externa is a non- life-threatening fungal infection of external auditory canal with complications which involves the middle ear. The disease causes the disability and requires the long-term treatment and follow-ups.¹ Otomycosis is the commonest disease condition with the prevalence of 9% to 27.2%. It is commonly seen in the patients with low socio-economic status and poor personal hygiene.^{5,6} This is a chronic superficial fungal infection which affects the ear canal and tympanic membrane and further lead to depletion of cerumen layer, increases the Ph, modification of microflora of auditory canal and maceration of the skin.⁸ This prospective observational study included 50 clinically diagnosed patients with otomycosis. Data was collected with the help of a structured proforma which consists the items (data) regarding the chief complaints of patients, i.e. itching, pain, fullness of ear, any history of ear trauma, use of cotton swabs or any other object to remove the ear wax, swimming, use of antibiotics ear drop and use of other over the counter aural preparations. It was found that higher incidence of otomycosis was found in 31-40 years of age, majority of the participants were males with male female ratio of 1.38:1, otalgia, itchiness, otorrhoea and headache were the commonest symptoms presented by

the patients. Aspergillus was the commonest causative agent of otomycosis. The study concluded that the otomycosis affects the population living in the hot and humid climate and patients with low socio-economic status and poor personal hygiene were mostly affected. The otomycosis is treated by local antifungal treatment.

Keywords: Otomycosis, External ear infection, Fungal infection, Antifungal

Introduction

The otomycosis / fungal otitis externa is a non- life-threatening fungal infection of external auditory canal with complications which involves the middle ear. The disease causes the disability and requires the long-term treatment and follow-ups.¹

Otomycosis is the commonest disease condition with the prevalence of 9% to 27.2% patients who presented with sign and symptoms of otitis externa and up to 30% patients presented with otorrhoea. Studies further reported that otomycosis is most prevalent in warm, humid climate and monsoon season. In tropics and subtropics regions the disease occurs commonly. Other contributing factors are cleaning the ear with an infected ear buds and applying oil or fatty acids.^{1,2,3,4}

It is commonly seen in the patients with low socio-economic status and poor personal hygiene. It was observed that around 61 fungal species found involved in

the otitis externa. The most common causative agents of otomycosis is *Aspergillus niger* (80%), *Candida albicans*, *Actinomyces*, *Candida Tropicalis*, *Trichophyton* and *Aspergillus fumigatus*.^{1,5,6,7}

This is a chronic superficial fungal infection which affects the ear canal and tympanic membrane and further lead to depletion of cerumen layer, increases the Ph, modification of microflora of auditory canal and maceration of the skin.⁸

Generally patients with otomycosis complain about severe itching, otalgia, hearing loss and tympanic membrane perforation. The fungal infection is a mild to severe infection which is limited to external auditory canal and the complication results from secondary bacterial infection.⁹

The diagnosis is confirmed with examination of the ear canal through otoscopy, bio microscopy and the diagnosis is confirmed through mycological examination. The ear examination found the fine coal dust like appearance of *Aspergillus Niger* spores. In severe cases white, cheesy, sebaceous material is seen in *Candida* infections and granular, friable membrane is seen in Pseudo membrane.^{10,11}

Removal of debris and discharge from the ear canal can be done by administration of antifungal / antimicrobial ear drops and ear suction. Analgesics are given for otalgia, Burow's solution or 5% aluminum acetate solution used to reduce the swelling and remove the debris. The most severe serious cases requires the intravenous antimycotic therapy with or without surgical management.^{12,13,14}

Thus, the present study was undertaken to identify the predisposing factors and microbiology of otomycosis.

Material and methods

This prospective observational study was conducted in the department of Otorhinolaryngology at MNMC, Hospital, Prayagraj, during the period July 2021 to December 2021 after obtaining approval from the institute's ethical committee.

A total of 50 clinically diagnosed patients of otomycosis attending the Ear Outpatient Department were involved after obtaining the informed consent from all the patients. Data was collected with the help of a structured proforma which consists the items (data) regarding the chief complaints of patients, i.e. itching, pain, fullness of ear, any history of ear trauma, use of cotton swabs or any other object to remove the ear wax, swimming, use of antibiotics ear drop and use of other over the counter aural preparations.

Inclusion Criteria

- All the patients clinically diagnosed with otomycosis were included.
- Patients who were willing to participate in the study were included.

Exclusion Criteria

- The patients with co-morbid illnesses were excluded.
- Patients using the topical antifungal / antimicrobial aural preparation were excluded from the study.

A detailed history and ear examination was done. The demographic variables age, gender, socio-economic status and occupation of the patient were recorded. Clinical findings in the both ears were recorded by using otoscope.

All the patients were followed by otoendoscopy and the diagnosis were made upon the clinical history and findings of fungal debris and spores in the ear. The patients were subjected to a thorough aural toilet by

suctioning and removal of fungal debris and clotrimazole antifungal preparation were prescribed.

The successful treatment was defined as reduction and resolution of all the clinical findings of fungal infection on physical examination. Residual disease was defined as condition that failed to respond the initial choice of treatment and the patients who had resolution after initial treatment again symptoms appeared later in the same ear is called recurrent disease.

Data was tabulated, organized, analyzed and interpreted in both descriptive and inferential statistics i.e. frequency and percentage distribution, by using statistical package for social science software (SPSS), version 21. Categorical variables were expressed as number and percentage.

Observations and results

In the present study, 50 clinically diagnosed patients of otomycosis attending the Ear Outpatient Department were included.

Age range was from 11 to 68 years; the youngest patient was 11 years old and the oldest was 68 years old with maximum cases were found in the age range of 31-40 years (36%) as depicted in table no. 1.

Table 1: Age distribution

Age range	No. of cases	Percentage
<10	0	0
11-20	3	6
21-30	14	28
31-40	18	36
41-50	10	20
51-60	4	8
61-70	1	2
71-80	0	0
>80	0	0

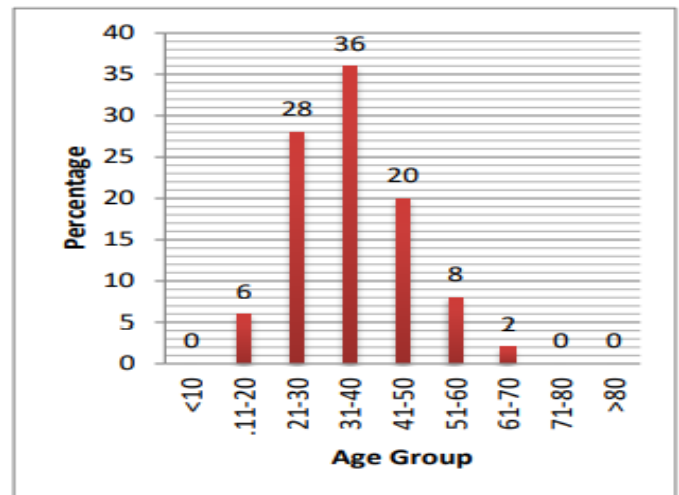


Figure 1: Age distribution

In the present study majority of the cases were males 58% and 42% cases were females with the male female ratio of 1.38:1 as depicted in table no. 02.

Table 2: Gender distribution

Gender	No. of cases	Percentage
Male	29	58
Female	21	42

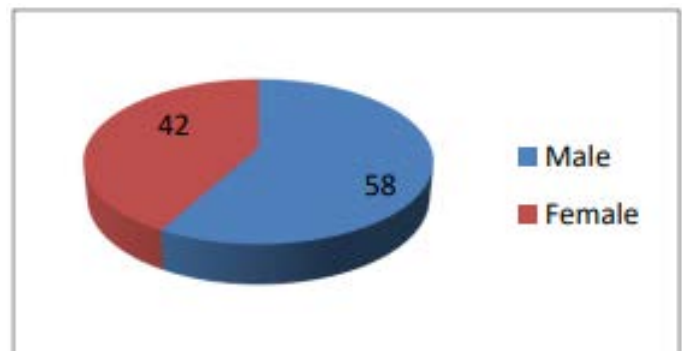


Figure 2: Gender distribution

In majority, (78%) of the participants had unilateral infection as depicted in table no. 03.

Table 3: Laterality

Laterality	No. of cases	Percentage
Unilateral	39	78
Bilateral	11	22

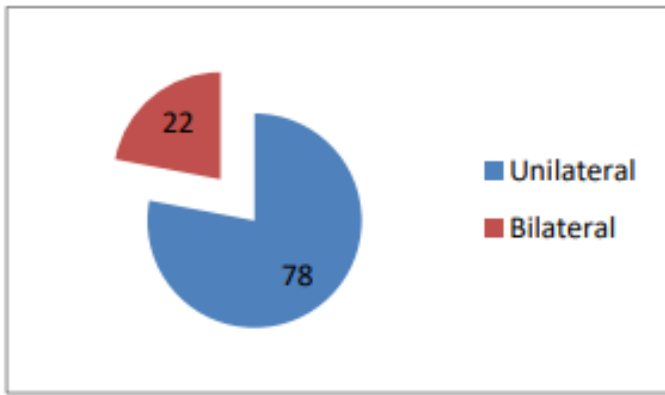


Figure 3: Laterality

In majority of the participants, the swelling was seen on the right side (56%) compared to the left side (44%) as depicted in table no. 04.

Table 4: Side involved

Side involved	No. of cases	Percentage
Right	28	56
Left	22	44

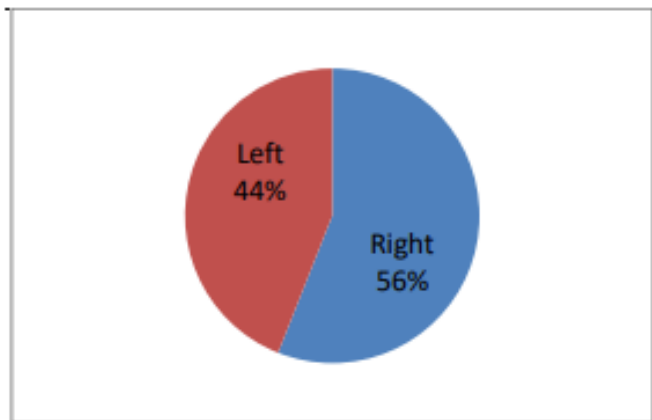


Figure 4: Side involved

Most of the patients diagnosed with otomycosis were labourer (34%), followed by agriculturist (28%), miscellaneous worker (14%), students (10%), businessman (8%), government job employee (4%) and housewife (2%) as depicted in table 5.

Table 5: Occupation

Occupation	Number	Percentage
Government job	2	4
House wife	1	2
Labourer	17	34
Businessman	4	8
Agriculturist	14	28
Student	5	10
Miscellaneous worker	7	14

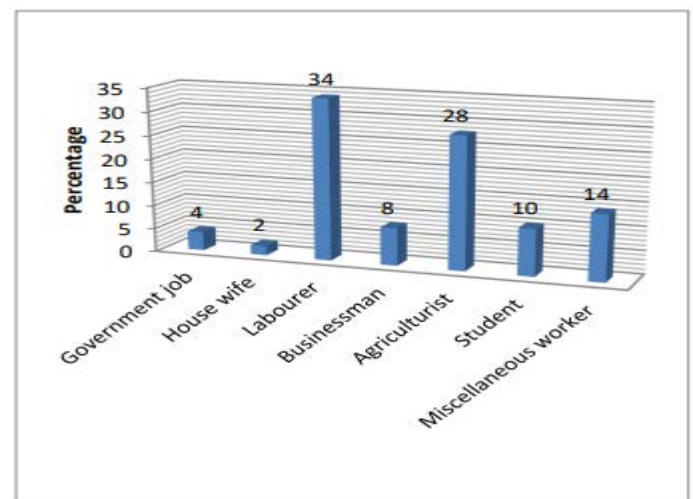


Figure 5: Occupation

The majority (68%) of the patients with otomycosis had low socio-economic status as depicted in table 6.

Table 6: Socio-economic status

Socio-economic status	Number	Percentage
Low	34	68
Middle	15	30
High	1	2

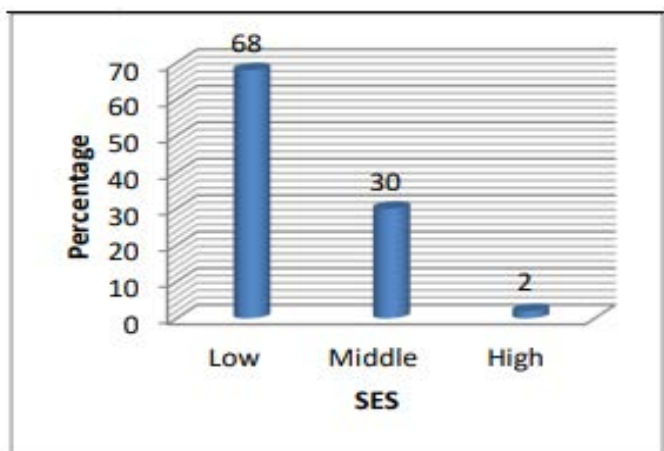


Figure 6: Socio-economic status (SES)

It was observed that most common predisposing factor was use of cotton swabs or other objects to clean the ear wax (36%), followed by history of ear infection (18%), use of antimicrobial ear preparations (14%), swimming (6%), history of ear trauma (2%), use of hearing aids (2%), use of mineral oil (10%) and 12% patient doesn't had any predisposing factors as depicted in table 7.

Table 7: Predisposing factors

Predisposing factors	Number	Percentage
No predisposing factors	6	12
History of ear infection	9	18
Any history of ear trauma	1	2
Use of cotton swabs or other objects	18	36
Swimming	3	6
Use of antimicrobial ear preparations	7	14
Use of hearing aids	1	2
Use of mineral oils	5	10
Any other infectious disease	0	0

Observations found that 94% of the patients had otalgia, 84% patients had itchiness, otorrhoea was in 66%, 46% patients complained about headache, 34% had ear fullness and 4% patients had tinnitus as depicted in table 8.

Table 8: Clinical manifestations

Clinical manifestations	Number	Percentage
Otalgia	47	94
Itchiness	42	84
Hearing loss	0	0
Otorrhoea	33	66
Tinnitus	2	4
Headache	23	46
Ear fullness	17	33

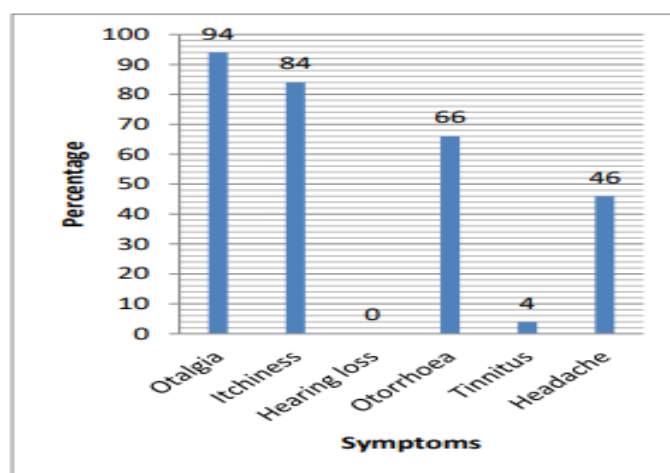


Figure 7: Clinical manifestations

It was observed that most common causative agent was Aspergillus flavus (34%), followed by Aspergillus niger (30%), Aspergillus terreus (10%), Aspergillus fumigates (6%), Aspergillus glaucus (4%), Candida parapsilosis (4%), Penicillium (4%) and Aspergillus glaucus, Candida parapsilosis, Rhizopus spp. 1% each respectively as depicted in table 9.

Table 9: Microbiological findings

Microorganism founded	Number	Percentage
Aspergillus flavus	17	34
Aspergillus niger	15	30
Aspergillus terreus	5	10
Aspergillus fumigatus	3	6
Aspergillus glaucus	2	4

Candida albicans	1	2
Candida parapsilosis	2	4
Chrysosporium	1	2
Mixed fungal infections	1	2
Penicillium	2	4
Rhizopus spp.	1	2

Findings revealed that majority (62%) of the patients received clotrimazole preparation in collaboration with other drug therapies and 38% had monotherapy (clotrimazole) as depicted in table 10.

Table 10: Treatment

Treatment	Number	Percentage
Monotherapy – Clotrimazole	19	38
Clotrimazole with collaboration of therapy	31	62

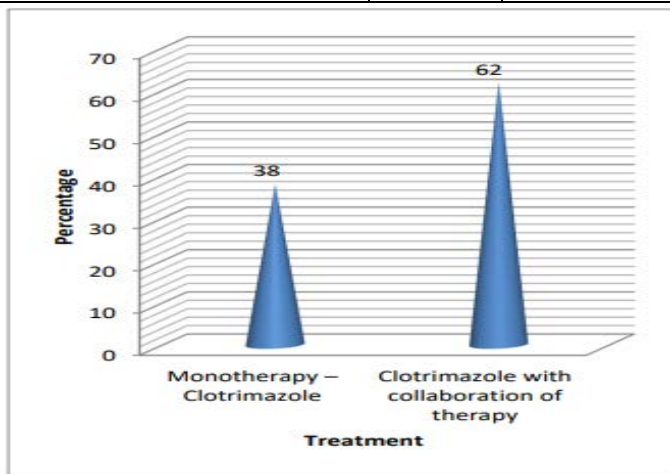


Figure 8: Treatment

Discussion

In this study 50 patients, who were clinically diagnosed with otomycosis upon ear examination were included. Detailed examinations and investigations were carried out in all the cases. Data was analyzed and discussed with previous literature.

In the present study patients ranged between the age of 11 to 68 years; and the maximum cases were found in the age range of 31-40 years (36%) and 58% were male and

42% patients were females. Similarly, Jyothi R. Swarup, et al. (2014), observed that highest incidence of otomycosis was in 21-30 years of age. Anwar K, et al. (2014) also reported that the median age of study participants was 30 and 59% study subjects were males and 41% were females. In another study conducted by Prasad CS, et al. (2014), reported that the highest incidence of otomycosis was in 21-40 years of age and 63% patients in study group was males and 37% were females and in control group 60% were males and 40% were females.

It was observed that the majority (78%) of the participants had unilateral infection and 22% participants had bilateral infection and 56% had right ear involvement and 44% had left ear involvement. In similar study conducted by Prasad CS, et al. (2014), observed that majority (95%) of the study participants had unilateral infection, only 5% had bilateral involvement and in 54% of the study participants had right ear infection and left ear infection was seen in 46% study participants. Similarly, Kadar AMA (2007), found that most of the patients (96%) had unilateral involvement and only 4% had bilateral involvement. Most of the patients with diagnosed otomycosis were labourer (34%), followed by agriculturist (28%), miscellaneous worker (14%), students (10%), businessman (8%), government job employee (4%) and housewife (2%) and majority (68%) of the patients had low socio-economic status. In similar study conducted by Prasad CS, et al. (2014), found that majority of the patients were agriculturist (70%) and 56% patients had low socio-economic status. In another study conducted by Kadar AMA (2007), reported that 26% patients were housewife, 25.3% were miscellaneous workers, 19.3% were agriculturist, 15.33% were students and 14% were labourers.

Further it was reported that most common predisposing factor was use of cotton swabs or other objects to clean the ear wax (36%), followed by history of ear infection (18%), use of antimicrobial ear preparations (14%), swimming (6%), history of ear trauma (2%), use of hearing aids (2%), use of mineral oil (10%) and 12% patient doesn't had any predisposing factors. Similarly, Kadar AMA (2007), found that predisposing factor Chronic suppurative otitis media with & without ear drops was reported in 30% patients, swimming was noted in 15%, 11% were using the ear drops, 9% had history of previous ear infection, 7% had history of diabetes mellitus, 5% were post mastoidectomy, 2% were using hearing aids, 0.6% had ear syringing, 0.6% were HIV infected and 18% study subjects doesn't report any predisposing factor.

In another study conducted by Gupta S, et al. (2015) showed that 12.37% study participants reported various systemic illnesses. Similarly, Omran MS, et al. (2018), reported that 69.3% used cotton swabs, 10.2% used matchwood, 18.3% uses both cotton swabs and matchwood and 2% patients used other objects to clean the ear wax.

Observations found that 94% of the patients had otalgia, 84% patients had itchiness, otorrhoea was in 66%, 46% patients complained about headache, 34% had ear fullness and 4% patients had tinnitus. In similar study conducted by Omran MS, et al. (2018), found that 77.8% patients had pain in ear, 57.8% reported swelling, 84.4% had itching, 86.7% had secretions and 95.6% had hearing loss. In another study conducted by Anwar K et al. (2014), observed that 77.7% study subjects had hearing loss, 68.8% had pruritis, 40% had otalgia, 32% had otorrhoea and 5.5% had tinnitus.

It was observed that most common causative agent was *Aspergillus flavus* (34%), followed by *Aspergillus niger* (30%), *Aspergillus terreus* (10%), *Aspergillus fumigates* (6%), *Aspergillus glaucus* (4%), *Candida parapsilosis* (4%), *Penicillium* (4%) and *Aspergillus glaucus*, *Candida parapsilosis*, *Rhizopus* spp. 1% each respectively and majority (62%) of the patients received clotrimazole preparation in collaboration with other drug therapies and 38% had monotherapy (clotrimazole).

Findings are consistent with the study conducted by Prasad CS, et al. (2014), observed that the most common causative agent was *Aspergillus* in 80% of the study subjects. *A. niger* complex was the commonest (38%) followed by *A. fumigatus* complex (27%) and *A. flavus* complex (15%). *Penicillium* species (8%), *Candida albicans* (4%), *Rhizopus* spp. (1%), and *Chrysosporium* spp. (1%) were the other fungi. And 23% patients were on monotherapy and 77% patients were treated with combined antifungal and antibiotic preparations.

In another study conducted by Aremu SK, et al. (2020), reported that the most common causative agent was was *Aspergillus Niger* in 56% patients followed by *Aspergillus Fumigatus* in 19.3% and *Aspergillus Flavus* in 16%, *Candida* in 13.8%, *Mucor* in 1.8%, *Penicillium* in 1.1% and *Trichophyton Mentagrophyte* in 0.72%, *Staphylococcus aureus* seen in 58%, *Pseudomonas aeruginosa* in 23.9% and *Klebsiella* spp. in 14.2% study subjects. Similarly, Ankale N, et al. (2019), reported that *Aspergillus flavor* was reported in 35.95%, *Aspergillus fumigates* in 7.86%, *Candida* in 2.24% and *Mucor* in 1.12% study subjects.

Conclusion

Otomycosis is the fungal ear infection generally affects the population living in the hot and humid climate and generally the patients show the clinical manifestations,

i.e., otalgia, itching, otorrhoea, etc. Patients with low socio-economic status and poor personal hygiene were mostly affected. It was observed that the commonest causative agent was *Aspergillus*. The otomycosis is treated by local antifungal treatment.

Reference

1. Sampath Chandra Prasad, Subbannayya Kotigadde, Manisha Shekhar, et al. Primary Otomycosis in the Indian Subcontinent: Predisposing Factors, Microbiology, and Classification. *International J of Micr.*, 2014; 636493:1-9.
2. T. Mugliston and G. O'Donoghue, "Otomycosis—a continuing problem," *Journal of Laryngology and Otology*, vol. 99, no. 4, pp. 327–333, 1985.
3. Z. B. V. D. S. Pontes, A. D. F. Silva, E. D. O. Lima et al., "Otomycosis: a retrospective study," *Brazilian Journal of Otorhinolaryngology*, vol. 75, no. 3, pp. 367–370, 2009.
4. J. Fasunla, T. Ibekwe, and P. Onakoya, "Otomycosis in western Nigeria," *Mycoses*, vol. 51, no. 1, pp. 67–70, 2008.
5. B. Pradhan, N. Ratna Tuladhar, and R. Man Amatya, "Prevalence of otomycosis in outpatient department of otolaryngology in Tribhuvan University Teaching Hospital, Kathmandu, Nepal," *Annals of Otology, Rhinology and Laryngology*, vol. 112, no. 4, pp. 384–387, 2003.
6. R. Munguia and S. J. Daniel, "Ototopical antifungals and otomycosis: a review," *International Journal of Pediatric Otorhinolaryngology*, vol. 72, no. 4, pp. 453–459, 2008.
7. J. C. Stern and F. E. Lucente, "Otomycosis," *Ear, Nose and Throat Journal*, vol. 67, no. 11, pp. 804–810, 1988.
8. Dr Laurence Knott. Fungal ear infection. 2016. Available at: <https://patient.info/doctor/fungal-ear-infection-otomycosis>.
9. Ankale N, Nagmoti JM, Anand U. Mycological Profile in Otomycosis Patients: A Cross Sectional Hospital Based Study in Tertiary Care Centre. *BJOHNS [Internet]*. 2019;27(3):193-7.
10. Collee JG, Miles RS, Watt B. Tests for identification of bacteria. Mackie and McCartney practical medical microbiology, 1996; 14: 131-149.
11. Aremu SK, Ade woye KR, Ibrahim T. a prospective analysis of otomycosis in a tertiary care hospital. *Int J Trop Dis.*, 2020, 3:029.
12. Anwar K, Gohar MS. Otomycosis; clinical features, predisposing factors and treatment implications. *Pak J Med Sci.* 2014;30(3):564-567.
13. Suharshi Gupta, Dr. Bella Mahajan. Prevalance and Demographical Profile of Patients Presenting with Otomycosis. *JK Science*, 2015; 17(3): 138-142.
14. Prasanna V, V M Hemlata katiyar, I. Kannan. Study of Etiological factors, mycological profile and treatment outcome of Otomycosis. *Int J Med Res Rev*, 2014;2(4):355- 360.
15. Mahdavi Omran S, Yousefzade Z, Khafri S, Taghizadeh-Armaki M, Kiakojuri K. Effect of combination therapy with ceftizoxime and clotrimazole in the treatment of otomycosis. *Curr Med Mycol.* 2018;4(1):18-23.
16. Kadar AMA (2007). A study of otomycosis, Master of surgery (Otorhinolaryngology) dissertation. Available at: <http://repository-tnmgrmu.ac.in/1177/1/220400307> m