

# Prevalence, Clinical Profile and Seasonal Variation of Otomycosis in Pakistan

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## ABSTRACT

**Objective;** To assess prevalence, clinical profile and seasonal variation of otomycosis in Pakistan.

**Study design, place & duration;** Observational study. It was carried out from January 2019 to December 2019 at CMH Mardan, Rawalpindi, Lahore, Karachi and Quetta.

**Material & Methods:** The cases with symptoms including itching, pain, decreased hearing, ear blockage, tinnitus and otoscopic findings showing hyphae, spores or curdlike white, grey or black debris/discharge in external auditory meatus of the patient confirmed with fungal culture or presence of fungal elements in 10% potassium hydroxide (KOH) – methylene blue preparation were included. In case of children below 5 years, symptoms including irritability, restlessness, reaching for ear or touching ear repeatedly, less response to audible sounds, unable to turn head to the sound stimulus in previously normal hearing child with otoscopic findings of hyphae, spores or curd-like whitish, greyish or black debris or discharge in ears were assessed. Informed consent was taken from patients. Permission was taken from ethical review board for subject research. All the data including age, gender, symptoms, number of diagnosed cases of otomycosis, month wise and city wise, were recorded. The data was analyzed by SPSS 21 (statistical package for social science). Chi square was used to compare qualitative variables while independent T test was used to assess quantitative variables. P value less than 0.05 was considered as significant.

**Results;** Total 22350 cases of otomycosis were diagnosed in 2019. The age range was from 2 years to 85 years with mean age  $35.3 \pm 7.51$  years. There were 9875 (44.2%) males and 12475 (55.8%) females. We calculated prevalence of otomycosis by dividing total number of reported cases in population dependent on these hospitals. The estimated population dependent on these hospitals is 20 lacs (individuals residing in cantonments plus security forces personnel). Prevalence came out to be 1.1%. Most of otomycosis cases were reported from Rawalpindi i.e. 10597(47.4%), followed by Lahore 6161 (27.6%) cases, Karachi 3464(15.5%) cases, Mardan 1067(4.8%) cases and Quetta 1061(4.7%) cases. Majority of cases were seen in month of September i.e. 3749(16.8%) cases, followed by 3447 cases (15.4%) in August and 2997 (13.4%) cases in October.

**Conclusion;** Otomycosis is a common ear disease which affects all ages and both genders. Otomycosis is prevalent throughout the country and throughout the year but majority of cases occur during hot and humid weather of summers and in rainy season.

**Keywords;** Otomycosis, prevalence

## Introduction

Otomycosis is a commonly encountered disease in ENT outpatient departments. It is superficial fungal infection of external auditory meatus, auricle and even ear drum (1). In few cases, otomycosis can also involve middle ear or mastoid cavities if tympanic membrane is perforated or after mastoid surgery (2).

Clinical features of otomycosis include pruritis, itching, pain, ear blockage, otorrhoea, tinnitus and decreased hearing. Otoscopy usually reveals greyish white or black curdlike cheese like debris or fungal hyphae(3,4). Otomycosis can be associated with bacterial infection of external ear as well. On clinical examination, patient may have tenderness and metal swelling.

There are more than 50 species of fungi involved in otomycosis including *Penicillium* spp., *Fusarium* spp., *Mucoraceae*, *Candida* spp., etc<sup>(5,6)</sup>. However *Aspergillus*

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niger and *Candida albicans* are reported to be the commonest species of fungi causing otomycosis<sup>(5,7,8,9)</sup>. Otomycosis is prevalent throughout the world especially in tropics and subtropics<sup>(9)</sup>. Fungi grow in hot and humid conditions. Thus hot humid seasons favor growth of fungus in ears resulting in hike in cases of otomycosis during months of summer and humid season. Various predisposing factors leading to otomycosis include moisture, humidity, swimming, ear trauma, instrumentation, excessive use of topical antibiotics & corticosteroid preparations, hearing aids etc<sup>(9,10,11)</sup>.

Otomycosis affects all ages and both genders. Majority of cases are young patients with predominance of females<sup>(3,8)</sup>. Weather of Pakistan is very diverse. Majority of areas are hot with varying degree of humidity during summer season i.e. from July to September usually. Incidence and prevalence of otomycosis of Pakistan is not yet known. This study has been performed to search the prevalence, clinical properties and seasonal variation of otomycosis in Pakistan.

## **Material & Methods**

The research has been carried in Pakistan. All the cases who were clinically diagnosed otomycosis and confirmed by laboratory examination, were included. The study was carried out in CMH Mardan, CMH Quetta, CMH Malir Karachi, CMH Lahore and CMH Rawalpindi. The diagnostic criteria for otomycosis was following;

1. Symptoms including itching, pain, decreased hearing, ear blockage, tinnitus and otoscopic findings showing hyphae, spores or curdlike white, grey or black debris or discharge in external auditory meatus of the patient
2. Presence of fungal elements in 10% potassium hydroxide (KOH) - methylene blue preparation
3. Positive culture of fungal material (discharge, mould etc).

The case was diagnosed as otomycosis if first criteria along with any one of second or third criteria was fulfilled. In case of children, symptoms were asked from parents. Eotalgia or pruritis and documents accordingly. Parents were asked whether child feels pain in ears or pruritis to itching in ears, however hearing loss could not be assessed in children below 5 years of age. For children under 5 years of age, diagnostic criteria was;

1. Irritable, restlessness, reaching for ear or touching ear repeatedly, less response to audible sounds,

unable to turn head to the sound stimulus in previously normal hearing child with otoscopic findings of hyphae, spores or curd-like whitish, greyish or black debris or discharge in ears

2. Presence of fungal hyphae in 10% potassium hydroxide (KOH) - methylene blue preparation
3. Positive fungal culture of material (discharge, debris of ear etc)

The case was diagnosed as otomycosis if first criteria along with one of second or third was met. The patients who were immuno-compromised i.e. cases of HIV, diabetes mellitus, chronic renal failure, liver failure were excluded from the study. The study was carried out in 5 hospitals of Pakistan, representing all four provinces. CMH Mardan in Khyber Pkhtunkhwa, CMH Quetta in Baluchistan, CMH Malir, Karachi in Sindh, CMH Lahore & Rawalpindi in Punjab. The duration of study was one year, from January 2019 to December 2019. Ear swab was taken from external auditory meatus carefully by rotating moist swab in external ear, avoiding touching concha or pinna. Then swab was carefully placed in a sterile test tube and sent to laboratory immediately.

Informed consent was taken from patients for inclusion in study. Permission was taken from ethical review board for subject research. All the data including age, gender, symptoms, seasonal variation (month wise) and city wise cases were recorded. The data was analyzed by SPSS 21 (statistical package for social science). Chi square was used to compare qualitative variables while independent T test was used to assess quantitative variables. P value less than 0.05 was considered as significant.

## **Results**

Total 22350 cases of otomycosis were diagnosed at 5 hospitals (CMH Mardan, CMH Rawalpindi, CMH Lahore, CMH Karachi, CMH Quetta) in 2019. The age range was from 2 years to 85 years with mean age  $35.3 \pm 7.51$  years. There were 9875 (44.2%) males and 12475 (55.8%) females. Majority of otomycosis cases were reported from July to October 2019 (Table 1).

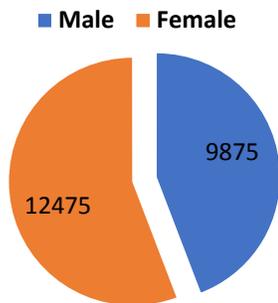


Fig. 1 Gender distribution

Total 22350 cases of otomycosis were diagnosed at 5 hospitals (CMH Mardan, CMH Rawalpindi, CMH Lahore, CMH Karachi, CMH Quetta) in 2019. The age range was from 2 years to 85 years with mean age 35.3 ± 7.51 years. There were 9875 (44.2%) males and 12475 (55.8%) females. Majority of otomycosis cases were reported from July to October 2019 (Table 1)

Prevalence represents number of cases with a disease in certain population<sup>(12)</sup>. We calculated prevalence of otomycosis by dividing total number of reported cases in population dependent on these hospitals. The estimated population dependent on these hospitals is 20lacs (individuals residing in cantonments plus security forces personnel). Prevalence came out to be 1.1%.

Prevalence of otomycosis =  $22350/2000000 \times 100 = 1.1\%$ .

Table 1. Cases of otomycosis, cities and month wise distribution

Months	Cities					Total
	Mardan	Rawalpindi	Lahore	Quetta	Karachi	
Jan	25	245	215	44	205	734 (3.3%)
Feb	44	281	288	49	270	932 (7.5%)
Mar	59	414	461	60	282	1276 (5.7%)
Apr	66	730	489	76	220	1581 (7.1%)
May	52	759	530	81	236	1658 (7.4%)
Jun	60	822	515	93	260	1750 (7.8%)
Jul	126	1256	692	110	280	2464 (11%)
Aug	274	1863	815	147	348	3447 (15.4%)
Sep	231	1975	1004	183	356	3749 (16.8%)
Oct	65	1611	736	85	500	2997 (13.4%)
Nov	44	412	225	74	172	927 (4.1%)
Dec	21	229	191	59	335	835 (3.7%)
Total	1067 (4.8%)	10597 (47.4%)	6161 (27.6%)	1061 (4.7%)	3464 (15.5%)	22350

Most of otomycosis cases were reported from Rawalpindi i.e 10597(47.4%), followed by Lahore 6161 (27.6%) cases, Karachi 3464(15.5%) cases, Mardan 1067(4.8%) cases and Quetta 1061(4.7%) cases. Majority of cases were seen in month of September i.e 3749(16.8%) cases, followed by 3447 cases (15.4%) in August and 2997 (13.4%) cases in October. Table 1 and Fig shows city wise and month wise distribution of otomycosis cases.

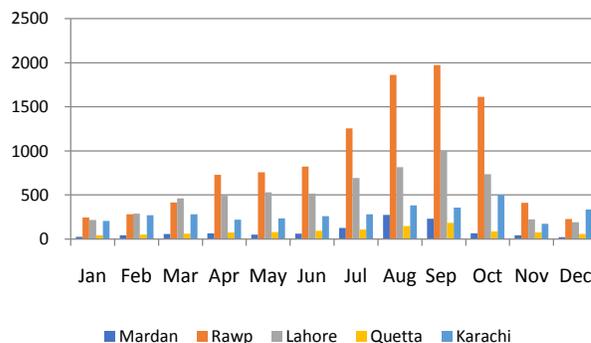


Fig. 2. Monthly distribution of cases

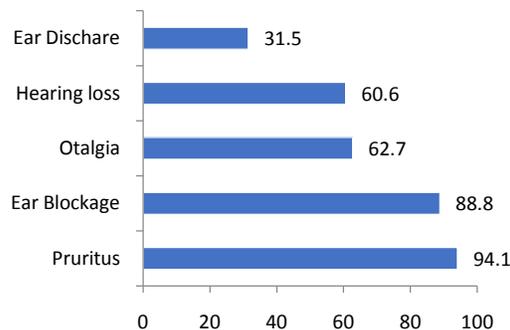


Fig. 3 Frequency of symptoms of otomycosis

Pruritus was the most frequent symptom of otomycosis, reported by 94.1% of individuals, followed by ear blockage in 88.8%, otalgia in 62.7%, hearing loss in 60.6% and ear discharge in 31.5% as shown in Fig 3.

## Discussion

Ear diseases are major health public health problem in majority of developing countries and are of paramount significant<sup>(13)</sup>. Otomycosis is an important and challenging ear disease. It is a chronic fungal infection which is frustrating for physicians and patients alike. There was female predominance in our study. It correlates with other studies by Saki N and

Navaanethan N et al (11,14). However, Anwar K et al have shown a male majority cases in their study (8).

The prevalence of otomycosis has been reported to comprise 10 to 20% cases of otitis externa (15). According to Paulose KO et al, otomycosis accounted for 6% of cases of otitis externa in 1989 (16). Anwar K had reported that prevalence of otomycosis was 7% among patients who reported with symptoms of otitis externa (8). Prevalence in our study came out to be 1.1%. We calculated prevalence from number of otomycosis and total dependent population & clientele on these hospitals. No such previous study has reported prevalence of otomycosis in our country, based on reported cases and dependent population. Previously prevalence of otomycosis had been reported as percentage of otitis externa cases (8,16).

In our study, chief complain of otomycosis cases was pruritus as seen by Haja and Nandyal(17,18). However, Prasanna V et al showed otalgia as the most common symptom (19). Anwar K et al reported hearing loss as commonest presentation (8).

Prevalence of otomycosis is determined by environmental factors like humidity, temperature, season and geographical location i.e. tropical or subtropical. Otomycosis is more common in hot, humid, tropical or subtropical areas (15). Otomycosis causes inflammation in external auditory meatal epithelium, exfoliation producing debris/mass of hyphae with suppuration and otalgia(13). Majority of cases in our study were seen in summer when temperature is high and humidity level is also more because of rains.

Majority of cases were seen in Rawalpindi and surroundings because of hot summers, high clientele and excessive rains. Atmosphere of Lahore is hot in summers with high humidity levels during rains and latter part of summers and early winters, causing hike in otomycosis cases in that weather. Karachi is a sea coast. Humidity level is high in coastal areas. The cases of otomycosis reported from Karachi were more comparable to dependent population/clientele on CMH Karachi. Mardan is second largest city of Khyber Pkhtunkhwa with quite hot and humid summers resulting in increased number of otomycosis cases. Quetta is capital of Baluchistan with cold and dry weather most of the time of year, thus otomycosis is less frequent as compared to other parts of country already mentioned.

## Conclusion

Otomycosis is a common ear disease which affects all ages and both genders. Otomycosis is prevalent throughout the country and throughout the year but majority of cases occur during hot and humid weather of summers and in rainy season.

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**CONTRIBUTION OF AUTHORS:**

- Muhammad Ahmed Khan conceived the idea and collected data.
- Sumera Akram wrote the script and analyzed the data.
- FaizUl Hassan Nawaz, Khurshid Anwar, Attique Ahmad, Muhammad Khan and Abdul Hakim helped in collection of data for subject research.