



## Prevalence and Characteristics of Otomycosis in HIV-Positive Patients Diagnosed in the North West of Algeria

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### KEYWORDS

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### ABSTRACT:

**Introduction:** This study aimed to investigate the prevalence and characteristics of otomycosis in HIV-positive patients presenting with clinical otitis.

**Objectives:** Our retrospective study aimed to evaluate the prevalence of otomycosis among HIV-positive individuals and identify the fungal species responsible for this pathology.

**Methods:** A total of 44 HIV-positive patients were examined for fungal presence in ear infections. Filamentous fungi were diagnosed on macroscopic and microscopic features, while yeasts were identified based on biochemical characteristics with Auxacolor (Bio-Rad) kits.

**Results:** Fungal presence was detected in 16 patients (36.36%), with males being more frequently affected (68.8%). The most affected age group was 40-50 years. Urban residents and individuals wearing veils were also more likely to be diagnosed with fungal otitis. Ear fullness was the most common clinical sign. *Candida parapsilosis* (31.3%) was the most prevalent fungal isolate, followed by *Candida albicans* (18.8%).

**Conclusions:** The study highlights the significant burden of otomycosis in HIV-positive individuals and the need for mycological diagnostic and treatment strategies.

### 1. Introduction

HIV-related otological manifestations include external ear seborrhea, otitis externa with fungal infection, middle ear effusion, sensorineural hearing loss, and vertigo [1]. Otomycosis or fungal otitis externa has typically described as fungal infection of the external canal, is a superficial fungal infection of the ear that may include the pinna, external auditory canal,

tympanic membrane and the auricle [2,3]. Chronic immunodeficiency predisposes individuals to persistent otitis. Furthermore, a higher incidence of otitis has been observed in HIV-infected patients with CD4+ T-cell counts below 200 cells/ $\mu$ L [4].

Approximately 35% of individuals with HIV do not begin antiretroviral treatment before they are diagnosed with AIDS [5]. Otomycosis risk factors include



humid/hot environments, earwax impaction, ear canal manipulation, and excessive use of topical antibiotics/steroids [6-8]. Autoinoculation from another site must be considered [9]. *Candida* and *Aspergillus* are the most frequent genus isolated in patients with otomycosis [10].

Therefore, this study aims to evaluate the prevalence, associated risk factors, and fungal species involved in otomycosis among HIV-positive patients, in order to improve diagnosis and treatment strategies in this vulnerable population.

## 2. Methods

A cross-sectional study from 2010 to 2015, in the "HassaniAbdelkader" teaching hospital of Sidi-Bel-Abbès, Algeria. The study included patients of all age group and either sex with known HIV and otological signs.

The patients who were already on treatment for otomycosis were excluded from study. A total of 44 cases of the clinically diagnosed otomycosis presenting to the above mentioned department were subjected to mycological examination. Suitable samples were taken using two sterile cotton swabs. In addition, ear scraping, the masses of debris and the cerumen were also collected for examination. all specimen recovered were inoculated on surfaces of Sabouraud dextrose agar and Malt extract agar, then incubated at 27°C Cultures were examined daily for fungal colonies for three or four weeks. Fungal isolates were identified by a combination of their macroscopic and microscopic criteria, biochemical Auxcolor© (Biorad) tests were used to identify yeasts that failed to produce filaments in plasma or serum. Statistical results were analyzed using SPSS software version 17 (SPSS Inc., Chicago, IL, USA).

## 3. Results

Of the 44 HIV patients with clinical otitis 16 were positive to fungi presence, the specific prevalence was 36.36%. Males were more frequently affected than females, with 11 out of 16 cases (68.8%) occurring in males and 5 cases (31.3%) in females. The age of participants in this study ranged from 18 to 70 years with a mean of 41.5 (SD 1.87) years. The two most affected age groups were 40-50 years (6 cases, 37.5%) and 18-30 years (5 cases, 31.3%). 12 cases out of 16

(75.1%) came from urban areas. Among the positive cases of otomycosis, 4 (25%) were wearing a veil. All the characteristics of the individuals involved in this study are depicted in table 1.

The majority of otomycosis cases occurred during the warm months, with 12 cases (37.51%) in spring and 21 cases (43.8%) in summer (Table 2). Results summarized in Table 3 revealed that ear fullness sensation was the most common clinical sign in HIV patients with proven otomycosis, occurring in 37.5% of cases. The clinical manifestations were unilateral in all patients.

The mycological isolates consisted of yeasts (75%) and molds (25%). *Candida parapsilosis* was the most prevalent, accounting for 5 cases (31.3%), followed by *Candida albicans* with 3 cases (18.8%). One case of *Trichophyton mentagrophytes* (6.3%) was isolated. The remaining results are summarized in Table 4.

Table 1. Distribution of otomycosis according to the socio-epidemiological characteristics of HIV patients.

Characteristic	Fungi-	Fungi+
<b>Gender</b>		
Female	10 (35.7%)	5 (31.3%)
Male	18 (64.3%)	11 (68.8%)
<b>Age</b>		
[18-30[	5 (17.9%)	5 (31.3%)
[30-40[	7 (32.1%)	3(18.8%)
[40-50[	7 (10.7%)	6 (37.5%)
50et+	9 (32.1%)	2 (12.5%)
<b>Residence</b>		
Urban	16 (57.1%)	12 (75.1%)
Rural	12 (42.9%)	4 (25%)
<b>Head</b>		
Nothing	16 (57.1%)	12 (75%)
Viel	9 (32.1%)	4 (25%)
Scarf	3 (10.7%)	0



Table 2. Seasonal distribution of otomycosis among HIV patients.

Season	Fungi-	Fungi+	Total	%
Winter	1	2	3	12,5%
Spring	6	6	12	37,5%
Summer	14	7	21	43,8%
Automne	7	1	8	6,3%
Total	28	16	44	100,0%

Table 3. Clinical signs in HIV patients with positive ear fungal culture.

Clinical signs	Fungi+	%
Ear fullness	6	37.50
Pruritus	4	25.00
Otalgia	2	12.50
Tinnitus	1	6.25
Otorrhea	1	6.25
Pruritus + ear fullness	1	6.25
Other*	1	6.25
Total	16	100.0

\*burning sensation

Table 4. Distribution of the species isolated from otitis externa in HIV patients.

Species	n	%
<i>Candidaparapsilosis</i>	5	31.25
<i>Candidaalbicans</i>	3	18.75
<i>Aspergillusniger</i>	1	6.25
<i>Microsporumcanis</i>	1	6.25
<i>Trichophytonmentagrophytes</i>	1	6.25
<i>Rhodotorulasp</i>	1	6.25
<i>Penicilliumsp</i>	1	6.25
<i>Malasseziasp</i>	1	6.25
<i>Cryptococcusneoformans</i>	1	6.25

<i>Candidatropicalis</i>	1	6.25
Total	16	100.0

#### 4. Discussion

HIV is a major predisposing factor for many fungal diseases, causing oral infections, low respiratory tract infections, and genito-urinary infections. Otomycosis is primarily a localized infection but can be inoculated from other affected sites in the body, such as the feet or nails [1,9,11-13]. Otomycosis is reported more frequently in immunocompromised patients compared to immunocompetent individuals [14]. A study conducted in India, revealed 32 cases of otomycosis associated with diabetes mellitus and 12 cases associated with HIV [15]. Various studies have demonstrated a higher prevalence of otomycosis within the third decade of life. This increased incidence in young adults may be linked to their greater exposure to environmental fungi compared to individuals in the very young or elderly age groups [16]. Furthermore, the life expectancy of HIV-positive people is probably reduced in Africa, due to taboos and/or reduced access to treatment; this may explain why otomycosis is found in this category of individuals.

Adult male are more likely to develop otomycosis [16-18], which may be attributed to their involvement in manual labour and outdoor activities. Interestingly, our country has a hot climate, which is a risk factor for otomycosis among all individuals [6,8]. Highest prevalence of otomycosis in summer has been reported by previous studies [13,19,20]. Some cultural practices, such as the traditional head scarf and hijab commonly worn by Muslim women, may contribute to the development of otomycosis [21], which seems to be in agreement with our results. Many individuals with HIV in Africa, particularly those with limited access to healthcare and sanitation, may face challenges with proper hygiene. This can contribute to conditions like cerumen impaction, which can create a moist environment that favours fungal growth. However, the exact role of earwax in fungal ear infections is not fully understood. Some studies suggest it might promote fungal growth, while others indicate it could have a protective effect [6,19,22]. In addition, malnutrition and immunosuppressed states which are prevalent among



HIV patients can also create an environment conducive to fungal growth in the auditory canal [17]. The clinical presentation of outer and middle ear conditions in individuals with AIDS is heterogeneous, with common ear infections and opportunistic infections [23].

A high degree of clinical suspicion is essential for the accurate diagnosis of otomycosis, considering that otalgia and otorrhea are common presenting signs of several ear pathologies [16]. Typically, unilateral, the infection manifests as otalgia, scaling, and inflammatory pruritis [6,24], in accordance with our findings. A wide range of fungi may be implicated in HIV patients [25], and various microorganisms are isolated in advanced HIV infection. In individuals with HIV, a mycological examination of the auditory canal is crucial, even in the presence of only moderate clinical signs such as a feeling of ear blockage or itching [6].

Accurate diagnosis necessitates heightened clinical vigilance due to the non-specific nature of these symptoms. Precise identification of the specific fungal species is crucial for timely diagnosis and effective treatment, minimizing the need for unnecessary antibiotics and potentially reducing hospital stays, especially in HIV patients [26]. *Aspergillus* and *Candida* species are the most commonly identified fungal pathogens in otomycosis [6]. *Candida albicans* and *Candida parapsilosis* are frequently identified as causative agents of otomycosis, particularly in European populations [9], and particularly in HIV patients [17,25]. *Candida parapsilosis* is one of the most common agents of otomycosis in Morocco [27], which is consistent with our results, and previous local studies [28,29], probably because we share the same climate and the same traditions as our neighbours. Importantly, *Candida* otitis can be more difficult to diagnose clinically due to its lack of characteristic features, unlike *aspergillus* and may present as recalcitrant otorrhea [6,30]. Otomycosis caused by yeasts such as *Cryptococcus*, *Rhodotorula*, and *Geotrichum candidum* has also been sporadically reported [9], which supports our results.

The *Aspergillus* genus is a very common fungi that can thrive even in environments with very few nutrients [17]. We report 2 cases (12,6%) of dermatophytosis caused by *Trichophyton mentagrophytes* and *Microsporium canis* [3,9,11], dermatophytes rarely

cause otomycosis, however, some reports showed that *Microsporium Canis* Complex [3], *Trichophyton rubrum* complex, *Trichophyton mentagrophytes* complex, and *Epidermophyton floccosum* were isolated from otomycosis [2,10,31,32]. These fungi can easily be inoculated into the ear from other infected sites on the body [9].

Skin dermatophytosis is common in HIV-positive and AIDS patients, but the degree of immunosuppression does not seem to correlate with increased risk of this fungal infection [33].

## Conclusion

The prevalence of otomycosis is significant among HIV-positive patients, commonly caused by yeasts such as *Candida parapsilosis* and *Candida albicans*. This study underscores the importance of considering this pathology among HIV individuals, even in cases with mild signs like ear fullness.

## Ethic statement

Ethical review and approval were not mandated for this study on human participants, as per local legislation and institutional requirements. All the patients gave their written informed consent to participate in the study.

## Author Contributions

All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

## Conflict of Interest

The authors state that the research was carried out without any commercial or financial relationships that could be seen as potential conflicts of interest.

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