

Otomycoses' Treatment in Sub-Saharan Africa: Experience of the Sédhiou ENT Service in the South of Senegal

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Abstract

Introduction: Otomycosis is a fungal infection mainly affecting the external ear. When the commensal flora of the skin of the external auditory canal is attacked, otomycosis occurs. Scientific literature reports a variable prevalence depending on the geographic areas. The aim of our study was to show our experience in the otomycoses' treatment at the ATBRHC of Sédhiou, in a semi-rural environment. **Method:** This was a transversal study carried out in the service of Oto-Rhino-Laryngology and Cervico-Facial Surgery of the AM-ADOU Tidiane Ba Regional Hospital Center of Sédhiou over a period of 24 months, from January 1, 2022 to December 31, 2024. We included in the study all the patients who presented oto-microscopy. The parameters studied were epidemiological, clinical and therapeutic and evolutionary. **Results:** Otomycosis represented 5% of consultations and 68.18% of external ear infections. The median age of our patients was 33 years with extremes of 1 year and 87 years. The most represented age group was that of 21 - 40 years. Cleaning the cotton swab (56%), the atrial instillation of antibiotics + corticosteroids (52%), oils and plants (4%) were the harmful attitudes observed in our patients. The fungal aspects found at Otoscopy were: the microfilaments of blackish spores (41.33%), whitish (38.66%), yellowish (32%), wet blotting paper (18.66%). Treatment included local care and the use of local and systemic antifungal agents. The evolution was good in 66.67% of patients. Treatment resistance was found in 8 patients (10.66%) and recurrence in 6 patients (8%). **Conclusion:** Otomycosis is a frequent pathology in our hospital environment. Otoscopic examination must be meticulous to recognize its typical aspects. Treatment is usually based on local care; hygiene measures and antifungal ear drops.

Keywords

Otomycoses' Treatment, ENT Service, Sédhiou, Senegal

1. Introduction

Otomycosis is a fungal infection mainly affecting the external ear. The external auditory duct is made up of the skin which is protected by cerumen and a commensal flora. When this skin is attacked by external agents, otomycosis occurs. It can occur either as a primary infection or secondary to the use of local antibiotics for bacterial infections [1] [2]. Ear surgery can be one of the risk factors due to skin wounds and maceration of the external auditory canal (EAC) [3]. Scientific literature reports a global prevalence of otomycoses between 9% and 30% of all external ear infections. This prevalence varies depending on the geographic region. It is higher in humid tropical and subtropical climates. Dieng T *et al.* [4] in Dakar, brought in a prevalence of 43.4%. The diagnosis of the condition is confirmed by a mycological examination which highlights the pathogen. However, not all hospitals in our country have a mycology in their laboratories. This is the case of the Amadou Tidiane Ba Regional Hospital Center in Sédhiou (ATBRHC), in southern Senegal. In this context, the diagnosis will then be based on anamnesis and clinical signs of the disease [3]. At Attock Military Hospital in Pakistan, authors focused their study on the clinic [5]. We set out to illustrate our experience of managing otomycosis in our ENT department in a rural environment.

2. Material and Methods

This is a retrospective cross-sectional study conducted in the service of Oto-Rhino-Laryngology and Cervico-Facial Surgery of the Amadou Tidiane Ba Regional Hospital Center of Sédhiou over a period of 24 months, from January 1, 2022 to December 31, 2024. The study population consisted of all patients who consulted our department for an ear infection. We included in the study all patients whose otoscopic and microscopic examination revealed typical features of otomycosis: fungal debris, microfilaments with blackish, whitish, or yellowish spores, and an appearance resembling wet blotting paper. Data were collected from complete patient records. Patients with incomplete records were excluded from the study. Similarly, patients with suspected but atypical forms of otomycosis were also excluded. An electric wall otoscope, an otoscope video, an otomicroscope of KAPS brand consultation and the OTO-Endoscope 0° Ackermann were used for the careful realization of the Otoscopy. The diagnosis of otomycosis was made on the basis of the characteristic appearance of fungal debris. Aspiration micro-canules and a suction device integrated into our consultation console were used for the realization of local care. The inaugural management was systematically local care with oxygenated water and an aspiration of the fungal debris of the external auditory canal. In our context, patients were treated as follows: all pa-

tients have benefited from probabilistic treatment based on nystatin (Auricularum® Powder) or 1% naftifine (Exoderil Solution®) for 15 days. The choice of the galenic form of local treatment (powder or solution) depended on a few factors; If Otomycosis had occurred on a recently operated earlier field (recent ear surgery) or on an ear with tympanic perforation, a nystatin powdering was privileged Patient follow-up was done routinely until healing. Patients who received naftifine were reviewed on D15 of treatment. As for those who received nystatin, they were reviewed at M1 of treatment. All our patients had good tolerance for these drugs. In case of resistance or recurrence, treatment was renewed for 15 days (Figure 1). Healing was defined as the resolution of all signs of fungal infection after initial treatment. Resistance was defined as the persistence of signs of fungal infection after an initial well-led 15-day treatment. Recurrence was defined as a reappearance of the same ear infection in patients who had been declared healed. For each patient included, we have analyzed the following data: age, sex, consultation period, predisposing factors, reasons for consultation, clinical signs, administered treatment and evolution (healing period, therapeutic resistance, recurrence deadlines). Statistical data analysis was carried out using Excel 2021 software. The confidentiality of each patient was respected. All patient confidentiality was maintained, and informed consent was obtained in accordance with ethical guidelines.

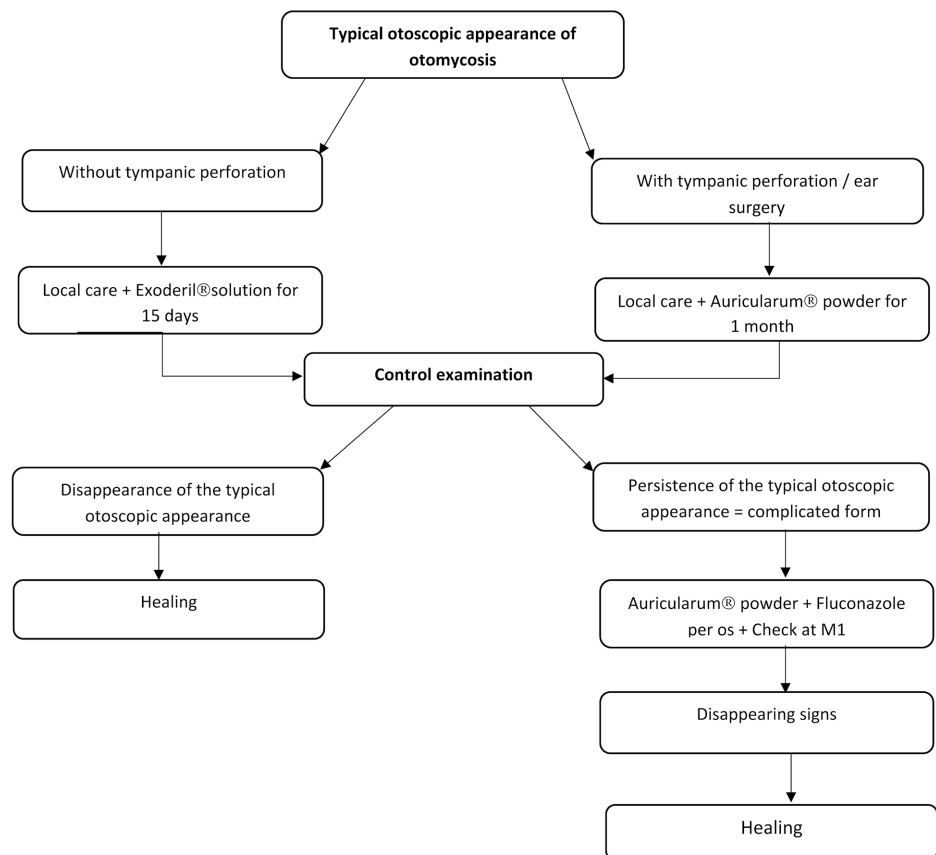


Figure 1. Otomycosis management algorithm at ATBRHC.

3. Results

During the study period, 75 cases of otomycolosis were recorded out of a total of 1499 patients, representing a hospital frequency of 5%. They represented 73.52% of otitis externa (N = 102). The extremes of age were 1 year and 85 years (Table 1). The median age was 33 years.

Table 1. Distribution by age groups.

Age groups (years)	Workforce	Percentage (%)
[1 - 20]	21	28
]20 - 40]	34	45.33
]40 - 60]	12	16
]60 - 80]	7	9.33
]80 - 85]	1	1.34
Total	75	100

There was a slight male predominance. Fifty-two percent (52%) of patients were male (n = 39) and 48% female sex (n = 36). Sex ratio was 1.08.

The average consultation time was more than a month (46.5 days).

The history of ear infections was the most found 29.33% (n = 22) (Figure 2).

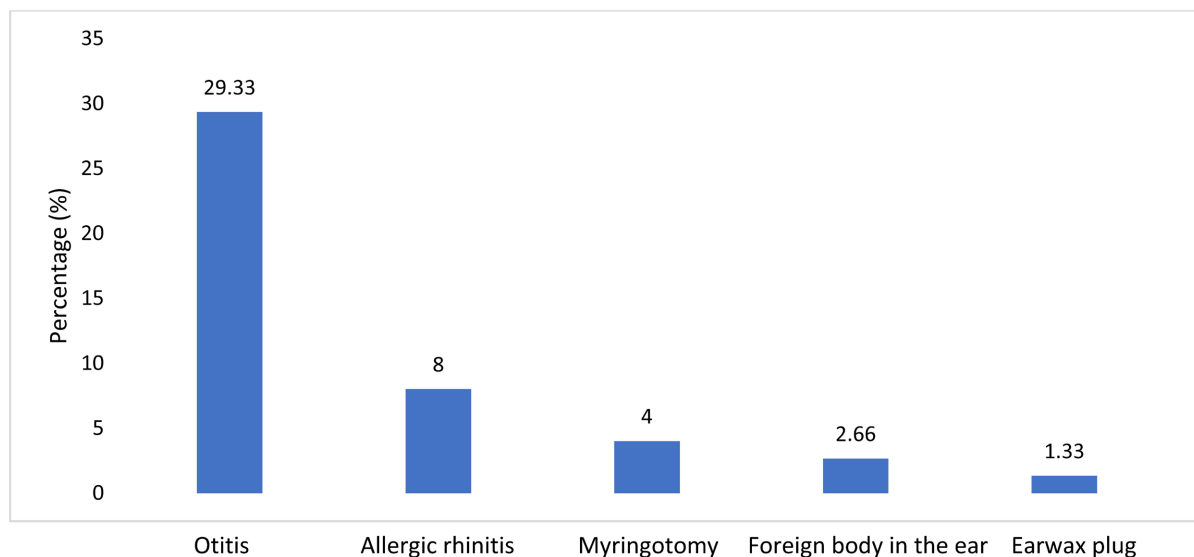


Figure 2. History.

The practices most frequently reported as harmful to ear health were the regular use of cotton buds to clean the ear and self-medication with ear drops. Other practices included the use of vegetable oils (Figure 3).

More than half of the patients complained of otalgia, atrial pruritus was felt by

29.33% (n = 22) of patients and a drop in hearing was also reported in 16% (n = 12) of patients (Figure 4). The average consultation period during our study was 46.5 days.

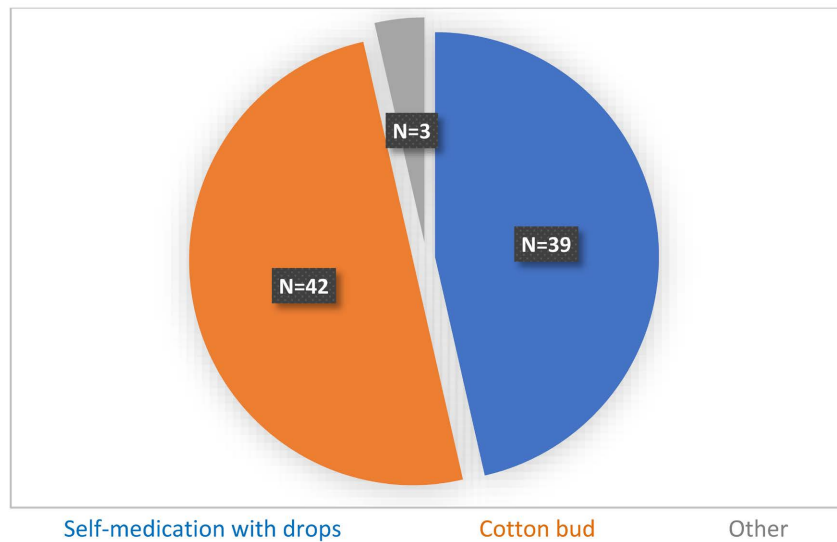


Figure 3. Harmful auricular practices.

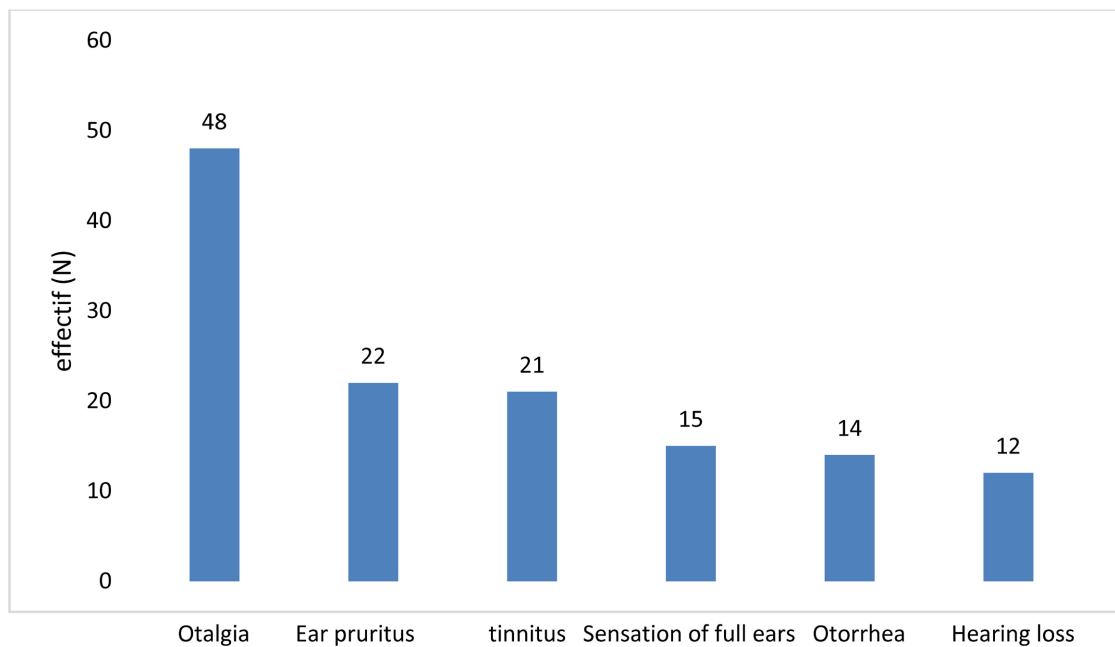


Figure 4. Consultation reasons.

At oto-microscopy, an aspect of blackish spore microfilaments was found in the majority of patients followed by a whitish appearance in 38.66% of patients (n = 29) (Figure 5).

Other otoscopic aspects such as otorrhea and inflammation of the external auditory Canal (EAC) were also found (Figure 6).

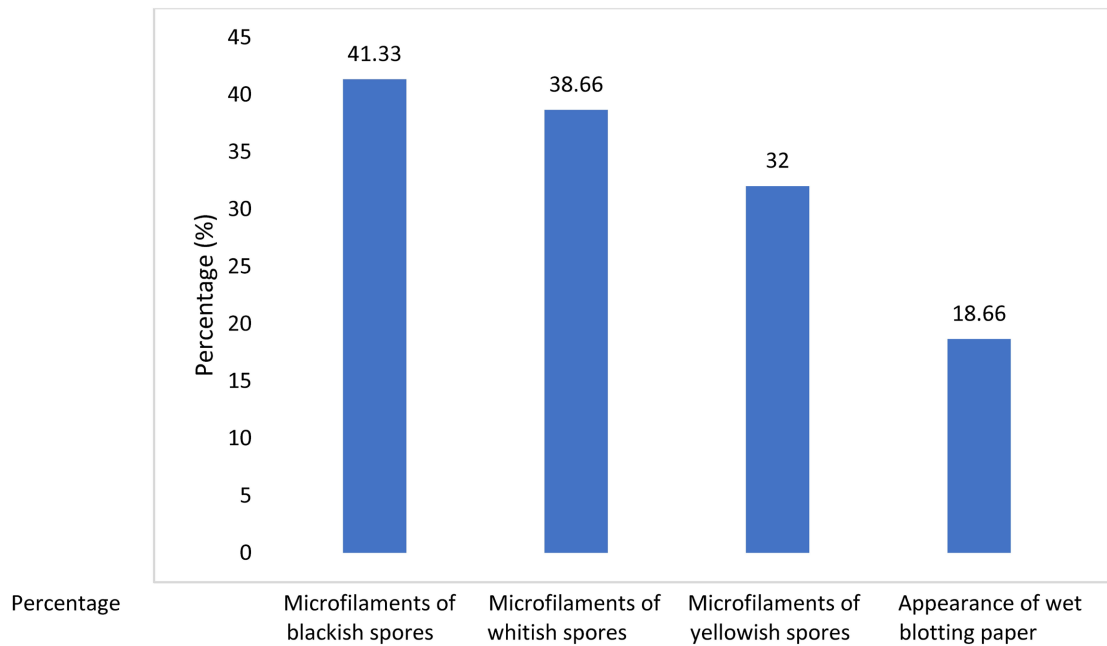


Figure 5. Typical otoscopic appearance.

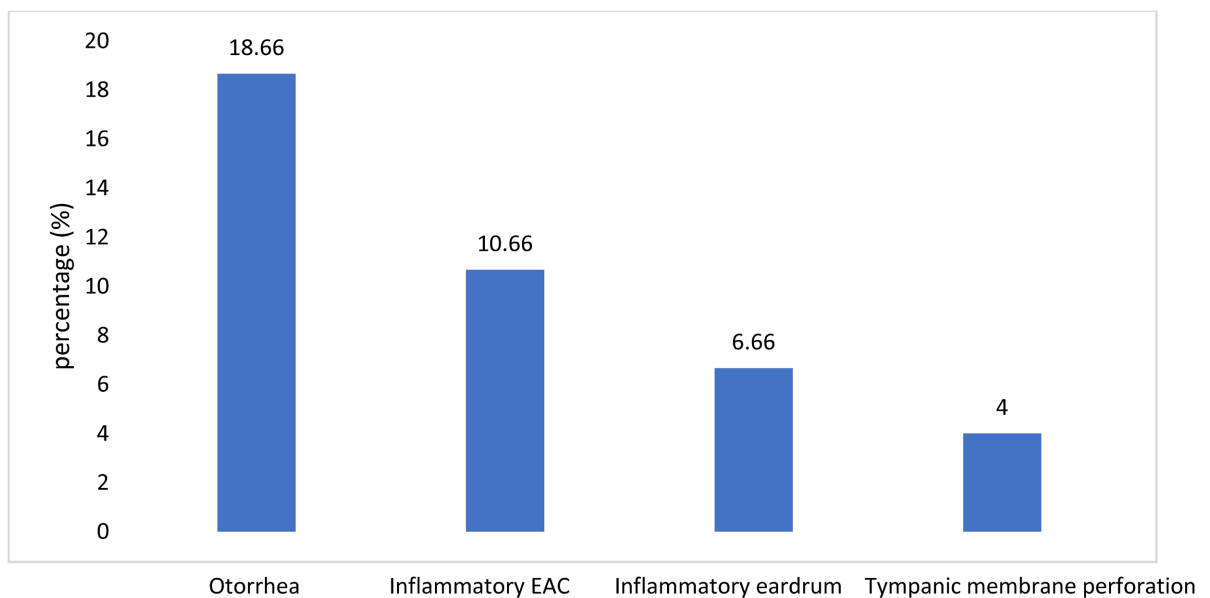


Figure 6. Associated otoscopic observations.

All patients had received local care (clearing of the external auditory canal). Locally, the most commonly used antifungal agent was Exodéril solution in 64% of patients (N = 48) (**Figure 7**). Twenty-eight percent of patients (N = 21) required analgesics (**Figure 8**).

The evolution was good in 50 patients (66.67%). Treatment resistance was found in 8 patients (10.66%) (**Figure 9**). The average healing time was 25 days. The recurrence occurred after 135 days on average.

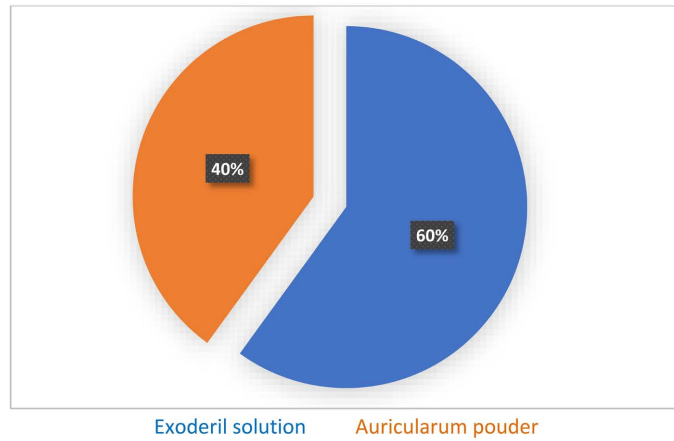


Figure 7. Local treatment.

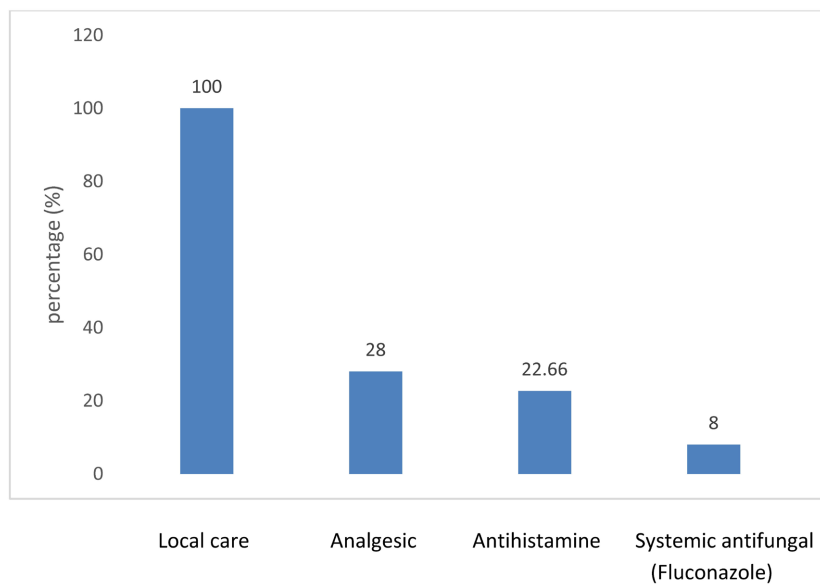


Figure 8. Adjuvant treatments.

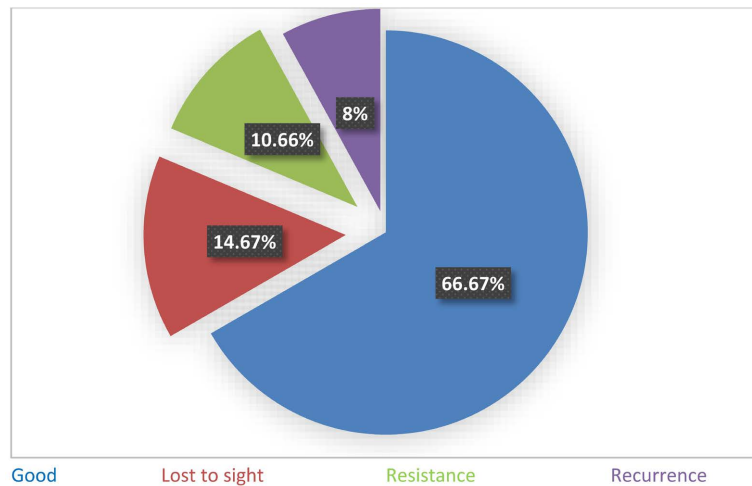


Figure 9. Evolution of otomycosis after treatment.

4. Discussion

Otomycosis is a frequent pathology with a high prevalence in subtropical and tropical countries. In our study, it represented a high hospital prevalence of 73.52% among external ear infections. Several authors have also reported high prevalences of otomycosis among otitis externa: 43.4% for the study by Dieng T *et al.* in Senegal [4], 49% for HOUARI MOUNA in Morocco [6], 51.3% for Maral Gharaghani [7] in Iran; the heat and humidity of these regions of the world are factors conducive to the development of fungi.

Regarding age and sex, disparities exist worldwide. In Morocco, the most represented age group was over 60 years (32.69%) with a female predominance (35F/17M) [8]. In contrast, a study in France reported an average age of 49 years with a male predominance (1.6M/1F) [9]. In India, a study found a much younger age group, 15 - 35 years (66.3%), with a male predominance (sex ratio 1.31) [2]. Our observation suggests that age and sex are not major factors in the occurrence of otomycosis. This infection can affect individuals of any age, both male and female [2].

The factors promoting the occurrence of otomycosis in our study were primarily bacterial otitis (29.33%). The literature reports that otomycosis is sometimes associated with bacterial infection as an opportunistic condition. However, there is controversy regarding whether fungi are true infectious agents or merely colonizers following local immune compromise secondary to bacterial infection [10]. In our context, harmful ear care practices were highly prevalent, including cleaning of the external auditory canal with cotton swabs (56%), self-medication with ear drops containing antibiotics and corticosteroids (52%), and instillation of oils and plant extracts into the ears (20%). These factors constitute significant risks for the development of otomycosis and have been reported in the scientific literature [11] [12]. Similar practices, such as the instillation of oils and plant extracts, have been documented in Algeria and India, as well as in Sédhiou, southern Senegal [13] [14]. Popular beliefs and unregulated traditional medicine further reinforce these practices. In addition, other factors that we have not found in our context, would increase the risk of the occurrence of otomycoses. W. YAVO and AL note that repeated swimming or swimming increased by 3 times the risk of contracting otomycosis in their patients. The repetitive contact of the CAE with water contributes to the decrease in the acidity of the skin of the CAE and to the alteration of the ceruminous protective film [15]. Immunosuppression is also a main factor in the frequent occurrence of fungal affections of the ear. This immunosuppression can be secondary either to taking immunosuppressants, chemotherapy, diabetes or viro-induced (HIV) [9] [16].

The average consultation time during our study was about 1 and a half months. In a Cotonou, the average period during a study was 15 days [17] while an average period of 03 months, was found during a study in Ouagadougou [18]. Although variable, these long consultation delays underscore the need to raise patient awareness about early care and to develop community outreach in remote villages,

which would facilitate guiding the population to appropriate services for prompt treatment.

Moreover, the complications of otomycoses such as osteitis or tympanic perforations have been highlighted by a few authors. Some of them stipulate that these entities were considered complications when they were either in initial presentation of the disease or when they occurred during treatment [19].

The symptomatology found during otomycosis is varied. The variety of symptoms felt by patients and communes to several other ear pathologies invites practitioners to carry out a careful otoscopy, see using magnification. During our study, 69% of our patients consulted for otalgia and 29.33% for atrial pruritus while atrial pruritus (50%) and the feeling of full ear (45.5%) dominated the symptoms during the study of Ulugbek S. Khasanov *et al.* [20]. Ismail MT *et al.* brought back Otorrhea (98.66%) and otalgia (18.06%) in the foreground [1]; Khurshid Anwar *et al.*, hypoacusis (77.7%) and pruritus (68.8%) [5].

The diagnosis of otomycosis was made under the basis of characteristic aspects of fungal debris under microscopy [19] [20] of fungal aspects of blackish, whitish, yellowish spores or an appearance of wet blotting paper 18.66% sign the diagnosis in our study. These aspects are described in the literature and make it possible to make the diagnosis of otomycosis [3] [5] [7].

However, there are cases where there is no typical Otoscopy presentation. Otomycosis will be wrongly taken, for a bacterial infection and most often treated as such. Any persistent external otitis despite a well-conducted local antibiotic treatment must evoke a mycotic infection. Mycology becomes necessary in these cases [3].

Most studies in Senegal and Africa are oriented towards the search for pathogens [21]-[23]. *Aspergillus Niger*, *Fumigatus* and *Candida Albicans* are the most found fungal agents. There would be a correlation between the color (yellowish, whitish, blackish) of the presentation and the germ in question. During the study of Maral Gharaghani, fluffy white flows were present when *C. Albicans* and *Aspergillus Fumigatus* are the etiological agents, while *A. Niger* produces black colonies [7].

Mycology is important in the management of otomycoses. The implementation of good antifungal treatment is essential to prevent the development of complications.

Different authors have reported their PEC protocols from Otomycoses. The common basics emerge: cleaning the CAE of fungal debris, the use of local antifungals in the event of simple otomycoses associated with systemic antifungals for severe forms. Priyanka Debta *et al.* which have proceeded to a wide review on otomycoses reveal that the evacuation of mycotic debris by suction is the first step in treatment. Treatment with antifungal auricular drops is then set up [13]. The resistance of fungal agents to antifungals and the low range of otological galenic forms makes molecules difficult. Our patients were treated with naftifine in the form of a solution and to powder nystatin. Vodouhe *et al.* in Benin treated their

patients like us based on naftifine [17]. The use of cream ketoconazole has often been reported by authors [24] [25]. Local treatments based on resorcinol, salicylic acid of alcohol, acetate cresyl, propylene glycol was also reported [5] [13] [18]. Among these treatments, many are ototoxic and others can be irritating to the CAE, poorly supported by patients. It is therefore advisable to be meticulous in the choice of local treatment to both treat and protect the ear. This local treatment is sometimes associated with an enteral treatment according to the patient's clinical condition as was the case for six of our patients (8%).

In several series, the evolution was favorable between 7 and 15 days of treatment. In the event of failure to the initial treatment, the treatment was led for 3 weeks. The treatment was carried out for 3 weeks in cases of resistance. Treatment was considered to be effective when signs of fungal infection at otoscopy-microscopy disappeared. Therapeutic resistance was defined as a failure to treatment of initial choice. Recurrence was defined as the occurrence of the condition in patients after resolution following initial treatment, has the same ear at a later date. In an American study, 83% (n = 149) of patients had a favorable response to the initial treatment established. 27 patients (16%) were lost in mind after initial treatment and therapeutic failure occurred in 31 patients (17%). In another series of cases, 70% of patients had a favorable response to the initial treatment often in less than 2 weeks [5] [19].

In our study, more than half of the patients had also had a favorable development (50 patients, 66.67%) after initial treatment. We noted therapeutic resistance in 8 patients (10.66%). 6 patients (8%) had had a recurrence. Our results prove that the treatment that we have introduced is effective in the majority of cases. Therapeutics according to the molecules available in our context. Loss to follow-up in our study in was primarily influenced by geographic and logistical challenges. Many patients live in remote villages with limited access to health facilities, and transportation difficulties, financial constraints, and reliance on traditional medicine further hindered regular follow-up [26]. These factors are characteristic of the local context and highlight the importance of considering social and infrastructural barriers when interpreting the study findings.

5. Limits and Perspectives

The limitations of this study include potential selection bias, as it was retrospective in nature. Patients lost to follow-up may have received more thorough management. A particular aspect of this study was its focus on managing the pathology without mycological confirmation, given our rural context. The diagnosis of otomycosis was primarily based on otoscopic evaluation due to limited access to mycological confirmation; consequently, a diagnostic margin of error may exist in atypical cases; however, in classical presentations, otomicroscopy allows for a straightforward diagnosis, as consistently supported in the scientific literature and discussed in our study. Future studies in the same setting would benefit from a comparative approach when mycological analysis is available. Additionally, further re-

search could clarify the role of mycology in the management of this pathology in Sedhiou. Collectively, these studies will contribute to more effective and practical management of otomycosis in our region.

6. Conclusions

Otomycosis is a frequent pathology in our context. The mycology being nonexistent, the diagnosis is mainly made to the clinic thanks to an otoscopic and microscopic examination meticulous in order to recognize its typical aspects. It should nevertheless be remembered that in front of any persistent external otitis that does not respond to antibacterial treatment, it is necessary to think in the first place of an otomycosis. The realization of mycology can then be necessary. Treatment is usually based on local care, hygiene measures and antifungal particular drops. Multiple risk factors, resistance to treatments and recurrence sometimes constitute a source of frustration for the patient and for the practitioner.

ICONOGRAPHY (Patients of the ENT service at the Amadou Tidiane Ba Regional Hospital Center) An iconographic section has been incorporated into this study to enabled readers to objectively evaluate the diverse clinical presentations of otomycosis observed in our patients (**Figures 10-13**).



Figure 10. Otoscopic appearance of whitish spore microfilaments.



Figure 11. Otomycosis on tympanic trans aerator.



Figure 12. Otoscopic appearance of microfilaments of whitish spores on a earwax plug.



Figure 13. Otoscopic appearance after treatment.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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