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Original Research Article

Superficial Mycosis at the Avicenne Military Hospital in Marrakesh: 5-Years Review

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Abstract

Superficial mycosis were diagnosed in 1231 cases, a prevalence of 62.07%. The average age of the patients was 45 years, the sex ratio M/F was 1.19. The majority of the patients were followed as outpatients (96.99%). Of all superficial mycosis, onychomycosis was the most frequent with a rate of 52.32%, followed by epidermomycosis (37.44%), scalp mycosis (8.37%), oral mycosis (1.71%) and genital mycosis (0.16%). Dermatophytes were the most isolated (85.05%), followed by yeasts (13.65%), molds (1.30%). The main dermatophytic species were represented by *Trichophyton rubrum* (80.99%), followed by *Trichophyton mentagrophytes var. interdigitale* (8.88%) and *Microsporum canis* (6.59%). The most common yeasts found were *Candida albicans* (67.86%), followed by *Malassezia furfur* (22.02%). *Scopulariopsis brevicaulis* was the most isolated mold (68.75%). At the end of this study we conclude that mycological examination is essential in the management of patients with superficial mycoses; which must also include the elimination of favourable factors in order to avoid recurrence.

Keywords: Superficial Mycosis, outpatients, *Trichophyton rubrum*, Dermatophytes.

INTRODUCTION

Superficial mycosis are very frequent infectious diseases of the skin, phanera and mucous membranes due to microscopic fungi [1]; developing in the stratum corneum of the epidermis as well as in the keratinized structures of the hair and nails [2].

Nowadays, the presence of many factors in our country, such as the climate, the low level of socio-economic development, the lack of hygiene, the increase of immune deficiencies in infectious, therapeutic or physiological order, the increasing use of skin depigmenting products, the increased number of cases of diabetes, certain risky activities, and the increasingly important practice of sports by the population, would have considerably increased the rate of dermatology patients suffering from mycosis [3].

The objective of our study is:

- To trace the epidemiological profile of superficial mycosis diagnosed in the parasitology-mycology laboratory of the Avicenne Military Hospital in Marrakech.

MATERIELS AND METHODS

This is a retrospective study on 1983 superficial mycological samples taken in the Parasitology-Mycology laboratory of the Avicenne Military Hospital in Marrakech over a period of 5 years from January 1, 2016 to December 31, 2020. Of those samples, 1231 were positive.

We included patients referred to the parasitology-mycology laboratory during the study period (hospitalized or outpatients), for sampling and mycological diagnosis for suspected fungal disease. Only samples with a positive culture were included in the epidemiological study.

Clinical and mycological data were collected from the laboratory's mycology records. These documents allowed us to list all cases of superficial mycoses diagnosed in the laboratory from 2016 to 2020.

- **Direct examination:** After collection of the scales, they are placed on a slide and covered with 2 to 3 drops of 30% potassium befor covering them with

a clean coverslip in order to soften them to facilitate direct examination, while the sample from the swabs is supplemented with 2 to 3 drops of sterile physiological water. Microscopic observation of the preparation under the microscope is made after 15 minutes of action of the clarifying liquid, at low and high magnification (x20 and then x40 objectives). If positive, fungal elements (mycelial filaments, spores or budding yeasts) can be identified and, depending on their appearance, the diagnosis can be directed towards the pathogenic agent (dermatophytes, yeasts, molds or pseudodermatophytes).

- **Culture:** The culture of the biological material collected is done on Sabouraud plates, 3 tubes are inoculated; simple Sabouraud, Sabouraud with chloramphenicol (inhibitor of bacterial growth) and the third associated with Actidione® (cycloheximide: inhibitor of the growth of saprophytic molds as well as certain yeasts), using a platinum loop. Then the tubes are incubated for 1 to 4 weeks in the oven at 27°C and 37°C. The cultures are examined every two days and are considered negative only after one month of incubation. Yeast colonies are identifiable in 24 to 48 hours, molds in 48 hours and dermatophytes in 4 to 5 days or even 1 month.

RESULTS

During the study period, we performed 1983 mycological examinations. The diagnosis of superficial mycoses was retained in 1231 patients with a positive culture, means a frequency of 62.07%.

The male sex was the most affected with 669 cases (54.35%) against 562 cases (45.65%) for the female sex, means a sex ratio M/F of 1.19.

The average age was 45 years with extremes ranging from 1 to 87 years. Of the 1231 patients with superficial mycosis, 1194 were outpatients (96.99%) and 37 were hospitalized (3.01%)

In this study, superficial mycosis were divided according to location into 5 clinical groups: onychomycosis was the most frequent with 644 cases (52.32%), followed by epidermomycosis with 461 cases (37.44%), mycosis of the scalp with 103 cases (8.37%) and finally oral mycosis (21 cases) and genital mycosis (2 cases).

Direct examination was positive for 1888 samples, with a percentage of 95.21%. In our series, 54 cases had a negative direct examination with positive culture (Table I)

Table I: Distribution according to crop positivity

Direct examination	Culture	Number of sampling	Percentages
Positive	**Positive**	**1177**	**59,35%**
Positive	Négative/ Contaminated	711	35,85%
Negative	**Positive**	**54**	**2,72%**
Negative	Negative/ Contaminated	41	2,07%
Total		1983	100%

Dermatophytes were isolated in 1047 samples with a positive culture, means 85.05% of all superficial mycoses, followed by yeasts in 168 samples (13.65%), then molds in 16 samples (1.30%)

For dermatophytes, *Trichophyton rubrum* was the most incriminated dermatophyte. This species was found in 848 cases, means 80.99% of all dermatophytes isolated, followed by *Trichophyton mentagrophytes var. interdigitale* (8.88%) and *Microsporum canis* (6.59%). Table 2.

Table II: Distribution of isolated dermatophyte species.

Dermatophytes	Numbre	Percentage
Trichophyton rubrum	848	80,99%
Trichophyton mentagrophytes var. interdigitale	93	8,88%
Microsprorum canis	69	6,59%
Trichophyton violaceum	24	2,29%
Trichophyton mentagrophytes var. mentagrophytes	7	0,67%
Microsorum.audouinii	4	0,38%
Trichophyton.tonsurans	2	0,19%

Concerning yeasts, *Candida albicans was* predominant with 114 cases, means 67.86%, followed by *Malassezia furfur* with 22.02% (37 cases) and *Candida spp* which represented a rate of 9.52% (16 cases) of all the yeasts isolted (Table III).

Among the 16 cases of *Candida spp* that were isolated, we found : 6 cases of *C. non albicans*, 3 cases of *C. famata*, 3 cases of *C. guilliermondii*, 2 cases of *C. parapsilosis*, 1 case of *C. glabrata*, 1 case of *C. tropicalis*.

Table III: Distribution of isolated yeast species

	Number	Percentage
Candida albicans	114	67.86%
Candida sp.	16	9.52%
Malassezia furfur	37	22.02%
Trichosporon asahii	1	0,60%

For molds, they were the least incriminated. Scopulariopsis brevicaulis was the most common genus found with 11 cases (Table IV).

Table IV: Distribution of isolated mold species

Moisissures	Number	Percentage
Scopulariopsis brevicaulis	11	68,75%
Aspergillus flavus	3	18,75%
Aspergillus niger	2	12,50%
Total	16	100,00%

DISCUSSION

Superficial mycosis represent one of the most common infections and affects up to 25% of the world population [4]. During the period of our study, 1231 cases of superficial mycosis were diagnosed, representing a frequency of 62.07%. Significant prevalences have also been reported by other studies, particularly in Rabat (54.48%), Tunisia (59.60%), France (63.10%) and Turkey (70%) [5, 6-8]. On the other hand, other studies reported lower prevalences, notably in Rome (40.3%), Krakow (38.3%) and Malta (32%) [9-11]. The distribution of superficial mycoses varies from one country to another depending on the ecology of the fungi [12].

In our series the male sex is dominant with 54.35%, against 45.65% of female sex with a sex ratio of 1.19, which matches with a study done in Côte d'Ivoire [13], and some studies that have objectified a greater frequency in males compared to females [14-16], Thus another study carried out in Abidjan has revealed an approximately equal M/F sex ratio (of 0.99) [29].

The age of the patients in our study varied from 1 to 87 years with an average age of 45 years. The most affected age group was older adults (between 46 and 60 years) with 32.37% of all superficial mycoses diagnosed. This result is similar to the one obtained in Rabat where 34.39% of the patients were elderly adults and the one observed in Dakar with 39.30% in the same age group [6, 18]. While a study conducted in Côte d'Ivoire showed a peak frequency in young adults (between 20 and 40 years) with a rate of 52.80% [13]. Our series showed a relationship between age and the occurrence of superficial mycoses, which increase from the age of 16 years and regress after the age of 60 years.

In our series, the most frequent clinical forms of superficial mycosis were onychomycosis (52.32%), followed by epidermomycosis (37.44%), scalp mycosis (8.37%), and mucosal involvement (1.87%). This matches with the study done at Avicenne Hospital in Rabat in 2020 and to the one done at Med IV University Hospital in Oujda in 2019 [6,19]. In Tunisia, a study had also observed a predominance of onychomycosis (67.50%), followed by ringworm of the scalp (13.2%) [7]. At the Pasteur Institute of Côte d'Ivoire, the most frequent clinical forms were hairless skin infections (32.6%), followed by mucosal infections (23.7%) and onychomycosis (16.4%) [13]. In Mali, a study conducted in 2018, noted that 54.08% of superficial mycoses were collected from the scalp, 17.35% from the glabrous skin, and 8.16% from the nails [20]. This variability of clinical data is related to a diversity of climatic, socio-economic and cultural factors of the population.

The direct examination in our series was positive in 95.21% of cases versus only 4.79% negative. This agrees with a study done in Tunisia which reported a positivity rate of 86% [21]. On the other hand, a study in Ivory Coast found a low sensitivity of direct examination compared to culture with 63.50% of negative direct examinations against only 36.50% positive [13].The negativity of the direct examination could be explained by the non-observance by patients of the recommendations before the sampling. In this case, the recommendation to abstain from any antifungal treatment before the mycological examination or to stop the treatment for 15 days in case of ongoing treatment. Also in case of pauci-infestation the direct microscopic examination can be negative.

The fungi most often incriminated in superficial mycosis are dermatophytes and yeasts, to which are added to a less often molds and pseudodermatophytes [22].

At the end of our study, we could confirm that dermatophytes were the most represented with a prevalence of 85.05%, then yeasts at 13.65% and finally molds 1.30%. This predominance of dermatophytes is also found in other work done in Marrakech [23] in

2016, Rabat [6] 2020, Dakar [22] in 2017, Cotonou [24] in 2016, Madagascar [25] in 2020, Eastern Slovakia [26] in 2018, and Chile [27] in 2011. Therefore, regardless of the geographical area and climate, these agents of superficial mycosis are always in this order [5, 28].

On the other hand, some studies have noted a predominance of the yeast group compared to dermatophytes [13, 17, 29]. This profile may not be considered because yeasts live commensally on the orifices of living beings. They become pathogenic when there is an immune imbalance.

In cases of association of dermatophytes and yeasts, the dermatophytes would probably be at the origin of the lesions which would be superinfected by opportunistic yeasts because certain species of the genus Candida and Trichosporon are commensals of the skin for humans [30].

CONCLUSION

Superficial mycosis are among the neglected diseases according to the WHO. They are a frequent reason for consultation in routine medical practice.

Superficial cutaneous mycosis, by their frequency, their chronic and hopelessly recurrent character, are a real concern for physicians confronted with the management of their patients; and for mycologists whose essential task is to ensure the etiological diagnosis.

REFERENCES

1. Kamil N. (2015). Les mycoses superficielles selon une série de l'hôpital Ibn Sina de Rabat (3ans, 2085 cas) [Thèse]. Faculté de Médecine et de Pharmacie de Rabat.
2. Zagnoli, A., Chevalier, B., & Sassolas, B. (2005). Dermatophyties et dermatophyte. EMC, Pédiatrie, 2, 96-115.
3. Chabasse, D., Bouchra, J. P., De Gentile, L., Brun, S., Cimon, B., & Penn, P. (2004). Les dermatophytes. Bioforma, Paris, P 159.
4. Shen, J., Jemec, G., Arendrup, M. C., & Saunte, M. L. (2020). Photodynamic therapy treatment of superficial fungal infections: A systematic review. *Photodiagnosis and Photodynamic Therapy*, 31(101774).
5. Faure-Cognet, O., Fricker-Hidalgo, H., Pelloux, H., & Leccia, M. T. (2016). Superficial fungal infections in a French Teaching Hospital in Grenoble Area: retrospective study on 5470 samples from 2001 to 2011. *Micropathological*, 181(1-2), 59-66.
6. Errachdy, N. (2020). Les mycoses superficieLLes diagnostiquees à l'hôpital Ibn Sina de rabat : A propos de 1288 cas (2016-2019) [Thèse]. Faculté de Médecine et de Pharmacie de Rabat.
7. Jaouadi, T., Fakhfakh, N., & Kallel, A. (2014). Aspects épidémiologiques des mycoses superficielles observées dans la région de Tunis. *Journal de Mycologie Médicale*, 24(3), 128-129.
8. Koksal, F., E. E., & Samasti, M. (2009). Causative agents of superficial mycoses in Istanbul, Turkey: retrospective study. *Mycopathologia*, 168(1), 117-123.
9. Panasiti, V., Devirgiliis, V., Borroni, R. G., Mancini, M., Curzio, M., Rossi, M., ... & Calvieri, S. (2007). Epidemiology of dermatophytic infections in Rome, Italy: a retrospective study from 2002 to 2004. *Medical mycology*, *45*(1), 57-60.
10. Andres, M., Jaworek, A., Stec-Polak, M., Radzimowska, J., & Wojas-Pelc, A. (2015). Superficial mycoses--analysis of mycological examinations from Mycology Laboratory in Krakow in years 2010-2014. *Przeglad lekarski*, *72*(5), 253-256.
11. Vella Zahra, L., Gatt, P., Boffa, M. J., Borg, E., Mifsud, E., Scerri, L., ... & Pace, J. L. (2003). Characteristics of superficial mycoses in Malta. *International journal of dermatology*, *42*(4), 265-271.
12. Guarro, J., Gené, J., & Stchigel, A. M. (1999). Développements dans la taxonomie fongique. *Clin Microbio Rev*, 12(3), 454-500.
13. Kone, E. G. (2015). Aspects épidémiologiques des mycoses superficielles chez les patients reçus à l'Institut Pasteur de Côte d'Ivoire (1990-2009), These de pharmacie, Universite Felix Houphouët-Boigny, Cote d'Ivoire.
14. Flores, J. M., Castillo, V. B., Franco, F. C., & Huata, A. B. (2009). Superficial fungal infections: clinical and epidemiological study in adolescents from marginal districts of Lima and Callao, Peru. *The Journal of infection in developing countries*, *3*(04), 313-317.
15. Bouchekoua, M., Aloui, D., Trabelsi, S., Cheikhrouhou, S., & Khaled, S. (2015). Les dermatomycoses de l'enfant à l'hôpital Charles Nicolle de Tunis (Tunisie): profil épidémiologique, clinique et mycologique. *Journal de Mycologie Médicale*, *25*(3), 242.
16. Hicham, M. (2014). Les mycoses superficielles à l'hôpital militaire des instructions Mohamed V de Rabat [Thèse de pharmacie].
17. Diomande, A. (2007). Bilan de dix années d'activités de l'unité de mycologie de l'Institut Pasteur de Côte d'Ivoire (1996-2005) [thèse]. UFR SPB, Abidjan.
18. Diongue, K., Diallo, M. A., Ndiaye, M., Badiane, A. S., Seck, M. C., Diop, A., ... & Ndiaye, D. (2016). Champignons agents de mycoses superficielles isolés à Dakar (Sénégal): une étude rétrospective de 2011 à 2015. *Journal de Mycologie Médicale*, *26*(4), 368-376.
19. Bouayadi, O., Lyagoubi, A., Farih, S., Elmalki, J., & Hami, A. (2019). Retrospective study of

superficial mycoses at Mohammed VI University Hospital in Oujda. *Clinica Chimica Acta*, *493*, S536.
20. Kone, I. (2018). Etude des mycoses superficielles cliniquement diagnostiquées au centre national d'appui à la lutte contre a maladie de Bamako. [Thèse]
21. EL Euch, D., Ben Ammar, F., & Ben Sassi, M. (2006). Les mycoses superficielles : étude épidémio-clinique et mycologique sur trois ans. *Tunisie Médicale*, 84(7), 407-410.
22. Ndiaye, M., Diongue, K., & Sadikh Badiane, A. (2017). Profil épidémiologique des mycoses superficielles isoles à Dakar. Étude rétrospective de 2011 à 2015. *Journal de Mycologie Médicale*, 27(3), 35.
23. Baino, A., Hocar, O., Akhdari, N., & Amal, S. (2016, April). P 02: Aspects épidémiologiques des mycoses superficielles en dehors de l'atteinte unguéale observées en consultation de dermatologie, CHU Med VI, Marrakech. In *Annales de Dermatologie et de Vénéréologie* (Vol. 143, No. 4, p. S37). Elsevier Masson.
24. Dégboé, B., Atadokpede, F., Adégbidi, H., Koudoukpo, C., Hassane, I., Yedomon, G. H., & do Ango-Padonou, F. (2016, April). CO 10: Mycoses superficielles: aspects épidémiologiques et cliniques en milieu hospitalier à Cotonou de 2005 à 2014. In *Annales de Dermatologie et de Vénéréologie*, 143(4), p. S24). Elsevier Masson.
25. Mahazoa, F. (2020). Profils épidémio-mycologiques des mycoses superficielles au laboratoire parasitologie-mycologie de l'hôpital universitaire Joseph Ravoahangy Andrianavalona de 2005 à 2015. [Thèse]
26. Baranová, Z., Kampe, T., Dorko, E., & Rimárová, K. (2018). Epidemiological and clinical aspects of dermatophytoses in Eastern Slovakia: A retrospective three-year study. *Central European journal of public health*, *26*, S72-S75.
27. Ponce, E. E., Calderón, R. L., Delgado, V. N., Vieille, O. P., & Piontelli, L. E. (2011). Superficial mycoses in the city of Valparaiso, Chile: period 2007-2009. *Revista chilena de infectologia: organo oficial de la Sociedad Chilena de Infectologia*, *28*(5), 404-409.
28. Chabassse, D., Baran, R., & Feuillade, M. (2000). Les onychomycoses I - épidémiologie-étiologie. *J Mycol Méd*, 10(4), 177-190.
29. Kamga, M. E. (2003). Bilan des mycoses rencontrées dans le service de parasitologie et mycologie de l'UFR des sciences médicales d'Abidjan de janvier 1997 à décembre 2001 [Thèse]. UFR des Sciences Médicales Abidjan; 2003.
30. Denieul, A., & Faure, S. (2009). Dermatomycoses. *Actualités pharmaceutiques*, 484, (48), 10-13.