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Prevalence of cutaneous mycoses among workers

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Aim: The aim of present study was to determine the prevalence of cutaneous mycoses in workers employed in different areas of the Ahvaz Jundishapur University of Medical Sciences.

Materials and methods: In the present study 128 employees who held different positions (gardeners, lab cleaners, sanitary workers, repair workers, dishwashers, and cooks) at the Ahvaz Jundishapur University of Medical Sciences were studied. All workers were visited by a physician and 34 (26.6%) were suspected of having cutaneous fungal diseases. Several skin scraping and nail clipping samples were collected from the study participants. In addition, the Scotch Tape method was used for sampling in cases of pityriasis versicolour.

Results: The prevalence of cutaneous mycosis among the workers was 10.2%. Out of 34 workers sampled 13 (38.2%) had different types of cutaneous mycosis. Of the sampled workers who had cutaneous mycosis 6 (46.1%) were gardeners, 4 (30.8%) were sanitary workers, and the final 3 (23.1%) were dishwashers and a cook. Pityriasis versicolour (6 cases) was the most common type of cutaneous mycosis followed by candidiasis (3 cases), erythrasma (2 cases), tinea ungium (1 case), and onychomycosis (1 case).

Conclusion: Cutaneous mycosis among the workers at the Ahvaz University of Medical Sciences was less prevalent than that we had expected, and it indicates that the fungal disease was well managed.

Key words: Cutaneous mycosis, dermatophytosis, pityriasis versicolour, erythrasma

Introduction

Cutaneous mycosis describes a wide spectrum of fungal infections caused by dermatophytes (dermatophytosis), *Candida* (candidiasis), and *Malassezia* (pityriasis versicolor) species. In addition, some bacterial infections such as *Corynebacterium minutissimum* (erythrasma) are considered cutaneous mycoses. Zoophilic species of dermatophytes, such as *Microsporum canis*, *Trichophyton verrucosum,* and *T. mentagrophytes* are associated with wild and domestic animals (1,2). These species of dermatophytes are the most common causative agents of tinea in rural areas of Iran (3-5). Geophilic species, such as *M. gypseum*, inhabit the soil. Several reports from Iran show that dermatophytosis is still a common dermatological problem (1,2,6,7).

Cutaneous candidiasis usually occurs in warm, moist, and creased areas, such as the inguinal or intergluteal areas. It is a fairly common opportunistic disease and is usually caused by maceration and trauma to the skin (8,9). Intertriginous candidiasis is most commonly seen in the axillae, groin, intergluteal folds, and interdigital spaces. Moisture, heat, friction, and maceration of the skin are the principle predisposing factors in the normal patient (10).

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Tinea versicolour is a common, benign, and superficial cutaneous mycosis. The disease is characterized by hypopigmented or hyperpigmented macules. Temperature and humidity are 2 important factors in the occurrence of the disease. Accordingly, tropical areas can have a prevalence as high as 40%, and the frequency is higher during the summer months in temperate climates (11). Several species of *Malassezia*, especially *M. globosa*, cause pityriasis versicolour. Erythrasma is a bacterial infection that affects the skin folds, primarily under the arms, in the groin area, and between the toes. Erythrasma can infect anyone, but is particularly prevalent in diabetics and people who live in warm climates.

Potential sources of dermatophytes include pets, farm animals, and wild animals. Farmers, gardeners, and cleaners are believed to be at risk for dermatophytoses because they are in regular contact with these animals. In addition, opportunistic fungal diseases (candidiasis) are usually caused by maceration and trauma to the skin and nails and regular contact with etiologic agents. Working outdoors under moist and temperate conditions is favourable for the development of pityriasis versicolor. The aim of this study was to investigate the prevalence of cutaneous mycoses and their etiologic agents in workers at the Ahvaz Jundishapur University of Medical Sciences in Ahvaz.

Materials and methods

In the present study 128 workers (gardeners, lab cleaners, sanitary workers, repair workers, dishwashers, and cooks) were examined for cutaneous mycosis. All parts of the body especially the neck, nails, feet, toe webs, hands, and inguinal spaces were carefully examined for fungal infections. Samples were taken from the 34 workers suspected of having cutaneous mycosis. The samples consisted of skin scrapings and nail clippings. Scotch Tape was also used for sampling in cases of pityriasis versicolour. All samples were collected in sampling pockets and transferred to the medical mycology laboratory at the Ahvaz Jundishapur University of Medical Sciences. Direct microscopy slides were prepared with KOH for skin scrapings and nail clippings. In addition, skin samples were stained with methylene blue when erythrasma was suspected. Scotch Tape was also stained using the methylene blue technique.

Samples were cultured on Mycobiotic Agar (Merck, Germany) and Sabouraud's dextrose agar (Merck, Germany) slant tubes and incubated at 25-30 °C for 4 weeks. Isolates (dermatophytes and saprophytic fungi) were identified based on morphology and microscopic features. In addition, *T. mentagrophytes* were identified on the basis of their macro and microscopic features, hair perforation, urease, and cornmeal agar tests. All *Candida albicans* isolates were identified by standard methods, which included identification based on the germ tube test, the production of chlamydoconidia on cornmeal agar (Difco, UK), and the CHROMagar Candida screening test (CHROMagar Candida Company, Paris, France).

Results

The 128 workers who participated in the study ranged in age from 20 to 40 years old. Among the study subjects 101 (78.9%) were male and 27 (21.1%) were female. Out of the 34 sampled workers 13 (38.2%) had different types of cutaneous mycosis: 6 (46.1%) were gardeners, 4 (30.8%) were sanitary workers, and the final 3 (23.1%) were dishwashers and a cook. Pityriasis versicolour was diagnosed in 6 cases (46.1%), candidiasis in 3 cases (23.1%), erythrasma in 2 cases (15.4%), tinea ungium in 1 case (7.7%), and onychomycosis in 1 case (7.7%). The Table shows the sex and age range of those diagnosed with cutaneous mycosis. In the present study only 2 females had cutaneous mycosis: 1 had pityriasis versicolour and 1had candidiasis. The most common fungal disease among men was pityriasis versicolour (5 cases) followed by candidiasis (2 cases), erythrasma (2 cases), and tinea ungium and onychomycosis (1 case each).

In the present study 6 cases of pityriasis versicolour were diagnosed; 5 cases involved the neck and 1 case the leg. The second most common fungal disease among workers was interdigital candidiasis due to *C. albicans*; 2 cases presented in the feet and 1 case in the hands. Two cases of onychomycosis were detected in the toe nails; 1 case was caused by *Aspergillus* and 1 by *T. mentagrophytes*. In the present study 2 cases of erythrasma were also detected in the toe webs.

Table. Age range and sex of workers with cutaneous mycosis.

Age range	Male (%)	Female (%)	Total (%)
20-30	8 (61.5)	1 (7.7)	9 (69.2)
31-40	3 (23.1)	1 (7.7)	4 (30.8)
Total	11 (84.6)	2 (15.4)	13 (100)

Discussion

Fungal nail infections are usually caused by dermatophytes (tinea ungium), saprophytic fungi (onychomycosis), and yeasts (onychia). In our study 1 case of tinea ungium due to *T. mentagrophytes*, and 1 case of onychomycosis due to *Aspergillus flavus* were detected in 2 gardeners. Tinea ungium has been extensively investigated in the general population (12,13), and the disease prevalence was found to be around 0.2% (13). Tinea ungium is usually considered a chronic infection of the nails in adults (14). A study in Brazil found that 72.25% of onychomycosis cases were female (15), whereas Charles thinks that the disease is more prevalent in men (16). The clinical picture in onychomycosis due to *A. flavus* was distal-lateral subungual form. Several authors have reported cases of onychomycosis due to exposure to the *Aspergillus* species (17,18). Gardeners are a group of workers who are routinely exposed to saprophytic fungi in the soil. In addition, trauma to the nails, which can cause onychomycosis, is common in this group (15).

Cutaneous candidiasis is usually a secondary infection of the skin (body folds) and nails in predisposed patients. In our study 3 cases of interdigital candidiasis due to *C. albicans* were detected. Maceration, with the loss of the protective keratin barrier of the epidermis, leads to traumatic skin lesions. Yazdanfar et al. found that cutaneous candidiasis is more prevalent in women (19). In the present study 2 cutaneous candidiasis patients were male, only 1 was female, and all of them were exposed to humidity during the day. Shahin et al. found that the wearing of rubber shoes and nylon socks by forestry workers and farmers may be the most important factor in the development of superficial mycosis (20).

In the present study 6 cases of pityriasis versicolour were detected among the workers (5 male and 1 female). The disease is a superficial infection of the stratum corneum caused by the *Malassezia* species and is common among members of both sexes who have poor access to health care. The incidence of pityriasis versicolour in tropical regions is 30%-40% (21). Several authors have reported pityriasis versicolour in Iran (22,23). In the present study 5 cases of pityriasis versicolour presented in the neck and 1 in the leg. The causative agents are the normal flora of the human body (24). Our patients worked both outdoors in the garden and indoors. In the present study 2 cases of interdigital erythrasma were detected. Both patients were outdoor gardeners. Interdigital erythrasma is a common condition and can be easily confused with tinea pedis or interdigital candidiasis. It persists if not treated appropriately.

Parts of Iran have a subtropical climate. This study was performed in Ahvaz, a city in southwest Iran. Located 12 m above sea level, Ahvaz is warm and humid. Temperature and humidity are 2 important predisposing factors for cutaneous mycosis, especially pityriasis versicolour.

Conclusion

In the present study the prevalence of cutaneous mycosis, especially pityriasis versicolour, among Ahvaz Jundishapur University of Medical Sciences workers was lower than that we had expected. This indicates that the disease was well managed, although the climactic conditions in Ahvaz are suitable for cutaneous mycosis.

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