

Original Article

Prevalence of Tinea Versicolor among Dormitory Students

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Abstract

Background: Tinea versicolor is a common cutaneous fungal infection of the skin caused by a part of the resident flora of skin known as *Malassezia* species. This infection is recognized by pigmentation disturbance in the form of lesions and superficial scaling in the skin.

Materials and Methods: This study was conducted on 350 students between the ages of 18-25 years who lived in a school dormitory and were suspected of clinical diagnosis of Tinea versicolor. The Scotch tape method was used to take samples from the infected skin of students, and methylene blue staining was used to prepare smears.

Results: After mycological examinations, among the 350 suspected students, 30 cases tested positive for Tinea versicolor, including 17 males and 13 females. 43.3% (n: 13) of patients had hypopigmentation followed by hyperpigmentation (33.3%, n:10) and erythematous (23.3%, n:7).

Conclusion: This study demonstrated a significant prevalence of Tinea versicolor among the students located in the dormitories, with a higher rate among male students. Different infection periods and lesions were observed in the cases, but no severe lesion was seen.

Keywords: Tinea versicolor, Prevalence

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Introduction

Tinea versicolor (TV) is a very common fungal infection of the skin worldwide/globally¹. It is a widespread infection with a prevalence of 0.5% in temperate climates and about 18% in tropical climates². This cutaneous infection is a mild and chronic condition caused by a part of the resident flora of skin known as *Malassezia* sp.³. TV is normally characterized by pigmentation disturbance and superficial skin scaling. The lesions can appear as hypopigmented or hyperpigmented macules or patches common on the trunk and upper arms⁴. TV is

a prevalent infection around the world. The prevalence of TV in Iran ranges from 4.4-57.7% depending on the country's climate in different reports⁵. While the tropical and subtropical location of Iran can increase the risk of TV, the exact prevalence of this infection among students of Tehran dormitories is unclear and must be manifested.

Additionally, poor personal hygiene is characterized as an important risk factor in the occurrence of TV⁶. Therefore, it is important to review the students' hygiene in dormitories. This study aims to reveal the prevalence of TV in the medical dormitories of Shahid Beheshti of Tehran.

Methods

A total number of 350 students between the ages of 18-25 years were used for this study between September 2022 to September 2023. All the students were suspected of having a clinical diagnosis of TV in a school dormitory. Affected students filled out a questionnaire that included age, gender, disease duration, type of lesion, involved area, and history of living in dorms. Students were forbidden to bathe for 2-3 days and use any topical/oral anti-fungal drugs for at least 7-10 days before sampling. Their sampling and mycological examinations were performed in the medical mycology laboratory of the School of Medicine at Shahid Beheshti University of Medical Sciences, Iran. Scotch tape was used to take samples from the infected skin of students, and methylene blue staining was used to prepare smears. The smears were examined microscopically by an optical microscope (Olympus, Germany) for the presence of fungal elements (clusters of yeasts, budding cells, short and curved pseudohyphae) (Figure 1). The analysis was performed by SPSS (Ver.21 SPSS Inc., Chicago, IL). P value $0 < 0.05$ was considered statistically significant.

The project received approval from the Ethics Committee of Shahid Beheshti University of Medical Sciences (code: IR.SBMU.MSP.REC.1403.156).

Results

After mycological examinations, among the 350 suspected cases, 30 (8.6%) cases were confirmed as

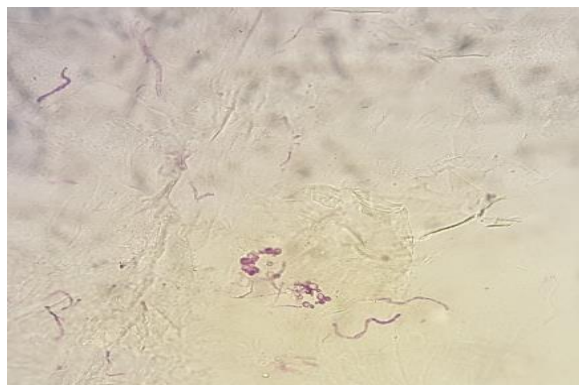


Figure 1. clusters of yeasts, budding cells, short and curved pseudohyphae of *Malassezia*. sp (methylene blue staining, $\times 40$).

Table 1. Distribution of the location of TV on the patient body.

	Male (No; %)	Female (No; %)	Total (No; %)
Neck	(1; 3.3)	(1; 3.3)	(2; 6.6)
Arm	(1; 3.3)	(1; 3.3)	(2; 6.6)
Face	(2; 6.6)	(1; 3.3)	(3; 10)
Chest	(3; 10)	(2; 6.6)	(5; 16.6)
Upper trunk	(10; 33.3)	(8; 26.6)	(18; 60)
Total	(17; 56.6)	(13; 43.3)	(30; 100)

having TV, including 17 (56.7%) males and 13 (43.3%) females, and the male/female ratio was 1.3. The patients ranged from 18 to 25 years, with a mean age of 22 ± 1 . The duration of the TV varies between 6 months and two years, with a mean of 15 months. Herein, 43.3% (n: 13) of patients had hypopigmentation followed by hyperpigmentation (33.3%, n:10) and erythematous (23.3%, n:7). About lesion type, 62.8%, and 37.2% were detected with mild and moderate lesions, respectively. No severe lesions were observed. The most involved area was the upper trunk (60%), followed by the chest (16.66%) (Table 1).

Discussion

TV is considered one of the most common fungal infections in the world. After mycological examinations, among the 350 suspected cases, 30 (8.6%) cases were confirmed as having TV, including 17 (56.7%) males and 13 (43.3%) females, with a male/female ratio of 1.3. In a study carried out by Falahati et al. (2003), the occurrence of dermatophytes in an area in Tehran was investigated; a prevalence of 13.5 % was reported for superficial fungal infections⁷, and Rostami et al. in Lorestan reported 15.8 % for the infection⁸, and Rahmati et al. reported 16 % as well⁹. However, Gholamreza Irajian et al. reported a 33.3% disease frequency among infected individuals in Semnan¹⁰, and Ebrahimzadeh reported 42.5%¹¹, higher than our study. This disease seems more prevalent in the country's south and can be related to air temperature and humidity. Due to the improvement in health levels, the prevalence of this disease is decreasing¹². In our study majority of patients were male, the same as in some other studies, which can be because of the high level of Dihydrotestosterone in the skin of adolescents^{7,13}. However, Ebrahimzadeh et al.'s study in

Zahedan did not show meaningful communication between genders¹¹. On the other hand, the prevalence of TV has shown higher rates in females in some reports¹⁴.

In this study, our patients ranged from 18 to 25 years, while Rostami et al.'s study reported a 20-22 range⁸, and the highest risk was reported in 21-year-old patients by Tabasi et al.¹⁵, and Pappas PG et al.'s study has been matched to our data as well¹⁶. These findings indicate that the age of the prevalence of TV is related to the time when the secretion of the pilosebaceous glands is at its maximum limit. Also, due to more physical activity at this time, increased sweating occurs, which is one of the main risk factors for TV¹⁷. It should be mentioned that Salahi-Moghaddam et al. declared the maximum prevalence age to be 28-32¹⁸. We found that the duration of TV varied between 6 months and two years, with a mean of 15 months. According to our examinations, most of the lesions were hypopigmented, and 43.3% of the patients were affected. In other studies, this result has been demonstrated as well^{8,19,20}. Followed by 33.3% of patients who had hyperpigmented lesions and 23.3% who had erythematous lesions. The exact order has been reported in previous studies⁵. Also, Rostami et al. reported that 50% of their cases had hyperpigmentation followed by hypopigmentation (36.2%) and erythematous lesions (13.8%)⁸. Some authors suggest the important role of fungus metabolites with toxic effects, such as dicarboxylic acids and lipid peroxidase, on melanocytes, in explaining the dominance of hypopigmentation of lesions. Most recently, a Tryptophan-dependent

metabolite of *M. furfur* has been described, which, under ultraviolet light, demonstrates yellow-green fluorescence²¹. Hypopigmented lesions seen in TV are caused by damage to melanocytes and inhibition of tyrosinase dicarboxylic acid produced by the fungus, melanosomes, and lipid-like materials that block ultraviolet light. Hyperpigmented lesions, on the other hand, may result due to some reasons such as from a hyperemic inflammatory response to *Malassezia* sp., more, a thicker stratum corneum, and large melanosomes. *Malassezia* sp. produces keratinase which causes the loosening of the stratum corneum and the formation of subsequent scale⁶.

In our study, the most common type of lesions was mild, with 62.8%, whereas 37.2% had moderate-type lesions. However, none of our cases had severe lesions, which contrasts with other studies as severe lesions are reported in other regions of Iran with different groups of people⁵.

According to our findings, the most potent areas of infection were the upper trunk (73.3%) and secondly the chest (26.7%). The involvement of these two areas is also very probable according to other studies, although involvement of the neck is also common^{11,22}. A variety of anti-fungal drugs are proven to be effective against TV if used appropriately with a proper follow-up. The most common topical treatment has been 2.5% selenium sulfide shampoo. The shampoo is applied once a day, usually after showering over the affected area, and it should be washed off after about 10 minutes. Systemic drugs such as ketoconazole, fluconazole, and itraconazole have also shown promising results²³. As for prevention, the best approach seems to be good

Table 2. Prevalence of Tinea Versicolor; Epidemiological aspects.

Author (reference)	Number of positive cases/Total cases	The most common location	The highest range of age	Male to female ratio	Sampling method
Zarei (5)	153/500	Neck	6-66	1.63	Sellotape method
Hamedifard (22)	334/916	Foot	<10-<90	1.69	Scraping and scotch tape method
Rostami (8)	115/NA	Back	18-27	2.02	Scraping, scotch tape, and wood lamp method
Eftekarjo (25)	360/1441	Groin	18-30	All male	Scraping and wood lamp method
Irajian (10)	17/110	Groin	18-28	All male	Slide culture method
Tabasi (15)	95/704	Foot	18-30	0.35	Scraping and scotch tape method

personal hygiene and showering after doing physical activities²⁴.

The limitations of this study include the non-cooperation of students in collecting samples and the non-disclosure of students' information, especially the ones with positive results. Table 2 shows other studies on the prevalence of TV among other dormitory students in Iran.

Conclusion

Overall, our study demonstrated a significant TV prevalence in students in the dormitories. The infection occurred in both genders, with a higher rate in male students. While the duration of TV potentially varies in different cases as well as the type of lesions, we detected a mean of 15 months for the period of the infection and all three forms of pigmentations in our patients. Although we did not detect any severe type of lesion, it is highly recommended that students realize the importance of personal hygiene due to the considerable prevalence of TV in dormitories.

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Conflict of interest

The authors further declare that they have no conflict of interest.

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