

Study on Pityriasis versicolor in Patients Referred to Clinics in Tabriz

Abdolhassan Kazemi ¹, Seyed-Amin Ayatollahi-Mousavi ^{2,*}, Abbas Ali Jafari ³, Ali Zarei Mahmoudabadi ⁴, Hossein Alikhah ⁵

¹Infectious and Tropical Research Center, Tabriz University of Medical Sciences, Tabriz, Iran

²Department of Medical Mycology and Parasitology, Faculty of Medicine, Kerman University of Medical Sciences, Kerman, IR Iran

³Department of Medical Mycology and Parasitology, Medical School, Shahid Sadougi University of Yazd Medical Sciences, Yazd, IR Iran

⁴Health Research Institute, Infectious and Tropical Diseases Research Centre, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, IR Iran

⁵Department of Medical Mycology and Parasitology, Tabriz University of Medical Sciences, Tabriz, IR Iran

*Corresponding author: Seyed-Amin Ayatollahi-Mousavi, Faculty of Medicine, Kerman University of Medical Sciences, Kerman, IR Iran, Tel.: +98-411-3373745, Fax: +98-4113373745, E-mail: aminayatollahi@yahoo.co.uk.

Received: July 11, 2012; Revised: September 19, 2012; Accepted: October 22, 2012

Background: Tinea versicolor is a superficial mycosis caused by *Malassezia furfur*, and is exclusively localized in the corneal layer of adults epidermis.

Objectives: To evaluate the epidemiological features of tinea versicolor, including its incidence among different age groups, genders and other personal status.

Materials and methods: The study was conducted between 2009 and 2011 on 1023 patients who presented skin disease suspected to tinea versicolor. Of all patients; 671 females (66%) and 352 males (34%) were studied for this mycosis and the fungal distribution from the view point of age and anatomical region of mycosis were analyzed.

Results: The disease was more prevalent in 21-40 years old age group in both genders. The most infected anatomical regions were posterior surface, the body trunk (shoulder, supra scapula and lumbar region), anterior thorax and abdomen, respectively. The number of female cases was significantly more than males; this probably reflects the concern of females about their skin health.

Conclusions: Patients who regularly use the local saunas had poor personal hygiene and greasy skin, and were more suspected to tinea versicolor infection.

Keywords: Tinea versicolor; *Malassezia furfur*; *Malassezia globosa*; Mycosis

1. Background

Malassezia Sp. and particularly *M. globosa* and *M. furfur* are a part of the normal skin flora and recognized as the etiologic agents of tinea versicolor. This fungus has also been associated with a variety of mycoses with different clinical demonstrations (1-3). Tinea versicolor (pityriasis versicolor, tinea flava, liver spot, body posty, panu, etc.) is a superficial mycosis which is caused by *M. globosa* and *M. furfur* (*Pityrosporum orbicular*), and is exclusively localized in the coronal layer of the epidermis (4). Fungus is a lipophilic and dimorphic microorganism which is considered as saprophytes on human skin (5).

According to the recent study about the genotype of this dimorph yeast, some authors have divided *Malassezia* genus into two or three morphological variants. Recently, others verified that this genus presenting three typical morphologies that could be separated into seven species according to its physiological and genetic features (6-9).

M. globosa and *M. furfur* have been related to a variety of superficial, cutaneous and disseminated mycoses or

diseases like onychomycosis, folliculitis, seborrheic dermatitis, atopic dermatitis, neonatal sepsis, psoriasis and catheter-related systemic infection particularly in infants. However, the role of *M. globosa* and *M. furfur* in the seborrheic dermatitis is uncertain (10-14). *M. globosa* and *M. furfur* are generally localized on the upper back or on the chest, shoulders, neck, face, abdomen, groin, or upper arms and occasionally in the lower body such as legs, and hardly often, on the throat, chin, cheeks and the hair covered skin and the palms (13, 15, 16).

Usually lesions are observing in different parts of the body. The causative fungus being found mainly in the seborrheic areas of the body plays a major role in the pathogenesis of psoriasis to excite immunological reactions (15, 17). Tinea versicolor presents with various morphological patterns such as chromic, papular and erythematous lesions and also a combination of these patterns; therefore lesions are pigmented in various colors including red, brown, white or yellowish. They are often slightly scaling, papular, and nummular or they may

Implication for health policy/practice/research/medical education:

Results of the current survey could be useful for improving public health and help health care managers' decision making in order to control and eliminate the tinea versicolor infections and decreasing its prevalence.

Copyright © 2013, Ahvaz Jundishapur University of Medical Sciences; Published by Kowsar Corp. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

coalesce to effect large areas of the body. In susceptible patients, lesions are sometimes surrounded by a slight erythema and inflammatory. Macule and papule may rarely be observed on the lesion surroundings. Lesions vary in size, from a pinhead sized region to large areas of different irregular shapes such as annular or discoid, and are rarely round or ring-shaped. Lesions are often slightly scaly and they sometimes coalescent to cover most of the body trunk with only small areas of normally pigmented skin, usually, early lesions are pigmented (red or brown), nevertheless they later become depigmented. Mostly, in people with dark skin color, the lesions have a dark appearance and are sometimes semi-dark. The name "versicolor" is due to this variation in skin color in infected people (18-22).

This infection is a wide spread ones that is found all over the world, but the incidence, varies extremely in different populations, countries and etc. Its incidence depends on the climate status and is more common in tropical regions rather than temperate or cold climates (3, 19, 22-25). When the patients are warm and sweating, itching is more common. Lesions in the affected skin show a yellow fluorescence under ultraviolet light cast by 'Wood's light'. This subject is useful for diagnosing infections and clinical follow up (26).

2. Objectives

In this study, we described our findings on the epidemiological features of tinea versicolor in the mentioned geographical region. The study included the incidence of the infection and its occurrence among different age groups, genders and other personal status.

3. Materials and Methods

The descriptive study was conducted between 2009 and 2011 on 1023 patients who presented skin disease suspected to tinea versicolor. The patients, referred to Dermatology department and also Infectious and tropical diseases department, School of Medicine, Tabriz University of Medical Sciences were enrolled in the study. Patients were comprised of 352 males (34%) and 671 females (66%), in the age range of 1- 80 years.

Clinical and mycological follow-up observations were carried out:

1- To complete the epidemiological picture, all the patient's data of (age, gender, personal health status, job, immunological status, and avoidance of bathing or showering a few days prior to the examination, and etc.) were recorded with informed consent of the patients.

2- Clinical diagnosing was carried out by questioning the history of infection, itching, probable recent treatments, results of initial treatments, etc.

Paraclinical examinations using Wood's light, direct examinations of scalp skin were carried out prior to the following paraclinical procedures:

1- Direct microscopy examination of the scalped skin using scotch tape. The tape is pressed firmly against the infected skin, brushed carefully, and consequently a thin layer of epidermis containing the fungus was obtained. Then, the tape is stained with 1% methylene blue for one minute, mounted on slide and placed under the microscope. Examination by this method has a certainly valid result.

The round budding cells with a tight cell wall, or newly germinating buds, which usually form clusters of 10-20 elements that are rarely observed as single elements with a diameter of 4 to 8 microns. Hyaline, septate, short, straight, curved or angular hyphae can also be easily identified alongside the budding cells (spaghetti with meat balls).

2- Culture from samples was carried out in plates with Glucose- Neopepton-Yeast extract medium (pH 6.2) with additional olive oil (20 mL.L⁻¹), Tween 80 (2mL.L⁻¹), and Glycerol monostearate (2.5 mL.L⁻¹) in them.

Plates were incubated at 37°C for a week and usually optimal growth and typical colonies of *M. furfur* could be observed after 4-7 days. Moucoid colonies gradually rose with irregular edges, white to creamy color and a 3-6 micron diameter. The number of colonies is significantly higher in patients with tinea versicolor. In this study, the patients were from different cities, towns, and villages of the north-west area of Iran.

Descriptive statistical methods, chi square test, t-test, and correlation were applied for data analysis using SPSS-15 software. The P value less than 0.05 was considered to be statistically significant.

4. Results

The collected data was analyzed from various points of views. First of all, it was notable that some samples were positive using direct microscopic examinations, but showed negative culture results. only 76 cases (10%) were positive in direct examinations but had negative culture. By repeating culture in those patients, 53 cases showed positive results and only 23 cases (3%) remained negative. In contrast, 734 patients (97%) were positive in both direct microscopic examinations and cultures but, 23 cases had positive results in direct examinations despite being negative in cultured samples.

From a total of 1023 patients during the two years of the study, certain microscopic investigations in 757 patients (74%), who were suspected for tinea versicolor, was carried out. Of the 757 subjects affected by tinea versicolor, 248 patients (23%) had local tinea versicolor in one region, and 509 patients (67%) had separated infections in different parts of their body. Separated tinea versicolor is seen more in the 31-50 years patients.

Tables 1 - 3 present in-depth analysis, considering the various results in relation to the various age groups and gender.

As shown before, out of 483 positive female cases, 319 subjects (66%) are within the 11-30 age range, however, the frequency of the infection among male group, was within the 21-40 age range. [172 (62.77%) from a total of 274 positive males].

This phenomenon is significantly different ($P < 0.05$), because positive results amongst males were 78% meanwhile this amount in females, was 64% of the total positive subjects (Table 1). This is extremely important from an epidemiological point of view and on the other hand from social and individual health manners.

A different presentation of this phenomenon is provided in comparison with the number of suspected patients and positive results regarding their gender especially in 11-30 age group. In addition, Table 2 shows that the preva-

lence of these infections increased in adults, according to a main concentration on suspected patients and positive results of two genders with an age range of 11-40 years.

In particular, the prevalence of tinea versicolor on the upper body trunk was significantly more than the other anatomical regions of the body. In 582 patients (77%), the distribution of tinea versicolor symptoms was detected on the upper body trunk and other anatomical regions of the body. According to the history of these infections and clinical investigations, the infections originated from the upper body trunk and were then distributed to other anatomical regions. In this study, we found out that the highest risk of being infected was due to regular visits to the local saunas, poor personal health and high activity resulted to greasy skin.

Table 1. Positive and Negative Cases with regards to Patients' Gender

Total patients, n = 1023	Gender, No. (%)	Positive Cases, No. (%)	Negative Cases, No. (%)
Females	671 (66%)	483 (72%)	188 (28%)
Males	352 (34%)	274 (78%)	78 (22%)

Table 2. Number of Suspected Cases of tinea versicolor in North West Area of Iran with respect to Age and Gender Group

Age, y	Female, No.	Male, No.
1-10	24	9
11-20	197	74
21-30	229	121
31-40	128	91
41-50	65	43
51-60	18	10
61-70	7	3
71-80	3	1
Total	671	325

Table 3. Number and Percentage of Results with Regards to Gender and Age

Age, y	Female, No.		Male, No.	
	Positive	Negative	Positive	Negative
1-10	16	8	2	7
11-20	147	50	61	13
21-30	172	57	95	26
31-40	87	41	77	14
41-50	51	14	35	8
51-60	7	11	4	6
61-70	2	5	0	3
71-80	1	2	0	1
Total, No. (%)	483 (64%)	188	274 (78%)	78

5. Discussion

We studied on the patients with tinea versicolor dermatologic manifestations referred to Dermatology and Infectious diseases Clinics. There were 319 female cases (66%), age ranged: 11-30 years, but the main frequency of the infection among male patients was in 21-40 years age group. this difference is possibly caused by the different adult ages and marriage age among males and females in the studied region. The difference observed in the results may be due to the higher attentiveness of females toward their skin health and beauty during the 11-30 years old. In particular, the prevalence of tinea versicolor on the upper body trunk was significantly more than the other anatomical regions of the body.

During the pathogenesis of tinea versicolor, changes in skin color is a common symptom (27, 28). Epidemiological studies about this mycosis, showed different results in different areas of the world but, it is commonly seen in patients living in tropical and subtropical areas (3, 20, 24). Tinea versicolor is more frequent among young people (23, 24, 29) and the results of this study showed similar data (23, 25, 27) (Table 2). Although the number of infected females in our study was more, but some other studies conducted in different parts of the world showed a predominance in males (4, 14, 28, 29).

In general 74% (757 cases) of 1023 cases suspected to tinea versicolor, proved to be infected. This rate is slightly higher than those reported by other authors (1, 20, 28), because our study had emphasized on clinically suspected cases. However, *M. furfur* was found on the skin of more than 90% of the surveyed adults.

Zarei Mahmoudabadi et al. in Ahvaz (Iran) reported

a high prevalence of 30.6% for tinea versicolor in their studied population including 500 subjects suspected to pityriasis versicolor (30). Shams et al. in a study in Tehran (Iran), identified 138 patients with pityriasis versicolor including 52.2% male and 47.8% female. Results of direct microscopy and culture were positive in 94.4% and 63% of the patients, respectively. They identified 91 isolates of *Malassezia* belonging to four different species, *M. globosa* (66 isolates), *M. furfur* (18 isolates), *M. obtusa* (5 isolates) and *M. sympodialis* (2 isolates) (31).

78% of the results were positive by using both direct microscopic examinations and culture of clinical samples collected from male patients. However this rate was 64% among females. Also this survey showed a significant increase in adulthood and marriage ones. We suggest that, it may be due to: A) The effect of adult age on increasing Sebum excretion (Pre-puberty and puberty). B) The increasing attention towards beauty and make up, skin health during marriage age especially between females.

In most cases the appearance of tinea versicolor infected regions are small and limited, but in time, infection spreads to other parts of the body. However, in some cases it remains limited. Based on these considerations and some other studies the data has emphasized the role of age, gender, skin grease, personal health and visiting public (local) saunas on the development of tinea versicolor (5, 10, 11, 13, 15-17, 21). Finally, it should be noted that sometimes a combination of different causes such as race, endocrine abnormality, pregnancy had a role on the development of tinea versicolor (26, 29).

In conclusion, as already found in the tinea versicolor, it has been clearly established that, concerning the natural presence of *M. globosa* and *M. furfur* as a member of the normal human cutaneous flora in adults, occurrence of the disease depends on complex situations. For further investigations, we recommend researchers to concern the significant role of different factors responsible in causing tinea versicolor such as age, gender, genetics, health condition, environmental conditions and hormonal balance.

Acknowledgements

None declared.

Authors' Contribution

None declared.

Financial Disclosure

There was not any potential conflict of interest for authors.

Funding/Support

None declared.

References

- Gaitanis G, Magiatis P, Hantschke M, Bassukas ID, Velegraki A. The *Malassezia* genus in skin and systemic diseases. *Clin Microbiol Rev*. 2012;**25**(1):106-41.
- Shams Ghahfarokhi M., Razzaghi M. Rapid identification of *Malassezia furfur* from other *Malassezia* species: A major causative agent of pityriasis versicolor. *IJMS*. 2004;**29**(1).
- Giusiano G, Sosa Mde L, Rojas F, Vanacore ST, Mangiaterra M. Prevalence of *Malassezia* species in pityriasis versicolor lesions in northeast Argentina. *Rev Iberoam Micol*. 2010;**27**(2):71-4.
- Hu SW, Bigby M. Pityriasis versicolor: a systematic review of interventions. *Arch Dermatol*. 2010;**146**(10):1132-40.
- Crespo Erchiga V, Ojeda Martos AA, Vera Casano A, Crespo Erchiga A, Sanchez Fajardo F. [Isolation and identification of *Malassezia* spp. in pityriasis versicolor, seborrheic dermatitis and healthy skin.]. *Rev Iberoam Micol*. 1999;**16**(S):S16-21.
- Aspiroz MC, Moreno LA, Rubio MC. [Taxonomy of *Malassezia furfur*: state of the art]. *Rev Iberoam Micol*. 1997;**14**(4):147-9.
- Camilo MA, de Oliveira FA, Saldaña JC, Junior Rde S, Vinaud MC, Dos Reis MA, et al. Morphometric characteristics of *Malassezia* sp. stained with picosirius. *Rev Iberoam Micol*. 2007;**24**(1):82-3.
- Canteros CE, Rivas MC, Lee W, Perrotta D, Bosco-Borgeat ME, Davel G. [Concordance between phenotypical features and PCR-REA for the identification of *Malassezia* spp]. *Rev Iberoam Micol*. 2007;**24**(4):278-82.
- Crespo-Erchiga V, Gomez-Moyano E, Crespo M. [Pityriasis versicolor and the yeasts of genus *Malassezia*]. *Actas Dermosifiliogr*. 2008;**99**(10):764-71.
- Difonzo EM, Faggi E. Skin diseases associated with *Malassezia* species in humans. Clinical features and diagnostic criteria. *Parassitologia*. 2008;**50**(1-2):69-71.
- Escobar ML, Carmona-Fonseca J, Santamaria L. [Onychomycosis due to *Malassezia*]. *Rev Iberoam Micol*. 1999;**16**(4):225-9.
- Gonzalez-Cuevas A, Alayeto J, Juncosa T, Garcia-Fructuoso MT, Moreno J, Latorre C. [Neonatal sepsis by *Malassezia furfur*]. *Rev Iberoam Micol*. 1999;**16**(3):158-60.
- Hernandez Hernandez F, Mendez Tovar LJ, Bazan Mora E, Arevalo Lopez A, Valera Bermejo A, Lopez Martinez R. [Species of *Malassezia* associated with various dermatoses and healthy skin in the Mexican population]. *Rev Iberoam Micol*. 2003;**20**(4):141-4.
- Isa-Isa R, Cruz AC, Arenas R, Duarte Y, Linares CM, Bogaert H. [Pityriasis versicolor in infants under one year of age. A report of 92 cases]. *Rev Iberoam Micol*. 2001;**18**(3):109-12.
- Aljabre SH. Sparing of the upper axillary area in pityriasis versicolor. *Rev Iberoam Micol*. 2005;**22**(3):167-8.
- Hort W, Mayer P. *Malassezia* virulence determinants. *Curr Opin Infect Dis*. 2010;**24**(2):100-5.
- Hay RJ. *Malassezia*, dandruff and seborrheic dermatitis: an overview. *Br J Dermatol*. 2011;**165** Suppl 2:2-8.
- Acosta Quintero ME, Cazorla Perfetti DJ. [Clinical-epidemiological aspects of pityriasis versicolor (PV) in a fishing community of the semiarid region in Falcon State, Venezuela]. *Rev Iberoam Micol*. 2004;**21**(4):191-4.
- Ashbee HR, Evans EG. Immunology of diseases associated with *Malassezia* species. *Clin Microbiol Rev*. 2002;**15**(1):21-57.
- Gupta AK, Bluhm R, Summerbell R. Pityriasis versicolor. *J Eur Acad Dermatol Venereol*. 2002;**16**(1):19-33.
- Haisley-Royster C. Cutaneous infestations and infections. *Adolesc Med State Art Rev*. 2011;**22**(1):129-45.
- Tarazooie B, Kordbacheh P, Zaini F, Zomorodian K, Saadat F, Zeraati H, et al. Study of the distribution of *Malassezia* species in patients with pityriasis versicolor and healthy individuals in Tehran, Iran. *BMC Dermatol*. 2004;**4**:5.
- Arenas R, Isa-Isa R, Cruz AC. [Pityriasis versicolor in Santo Domingo, Dominican Republic. In vivo morphological data of *Malassezia* spp. in 100 cases]. *Rev Iberoam Micol*. 2001;**18**(1):29-32.
- Komba Ewaldo V, Mgonda Yassin M. The spectrum of dermatological disorders among primary school children in Dar es Salaam. *BMC Public Health*. 2010;**10**(1):765.
- Rasi A, Naderi R, Behzadi AH, Falahati M, Farehyar S, Honar-

- bakhsh Y, et al. Malassezia yeast species isolated from Iranian patients with pityriasis versicolor in a prospective study. *Mycoses*. 2009;**53**(4):350-5.
26. Faergemann J, Larko O. The effect of UV-light on human skin microorganisms. *Acta Derm Venereol*. 1987;**67**(1):69-72.
27. Aljabre SH, Alzayir AA, Abdulghani M, Osman OO. Pigmentary changes of tinea versicolor in dark-skinned patients. *Int J Dermatol*. 2001;**40**(4):273-275.
28. Giusiano GE. [Malassezia. Current knowledge and study perspectives]. *Rev Argent Microbiol*. 2006;**38**(1):41-8.
29. Chaudhary R, Singh S, Banerjee T, Tilak R. Prevalence of different Malassezia species in pityriasis versicolor in central India. *Indian J Dermatol Venereol Leprol*. 2010;**76**(2):159-64.
30. Zarei Mahmoudabadi A, Mossavi Z, Zarrin M. Pityriasis versicolor in Ahvaz, Iran. *Jundishapur J Microbiol*. 2009;**2**(3):92-96.
31. Shams Ghahfarokhi M, Rasaee MJ, Moosavi M, Razzaghi M. Identification of Malassezia species in patients with pityriasis versicolor submitted to the Razi Hospital in Tehran. *Iranian Biomed J*. 2001;**5**(4):121-126.