

A REVIEW OF THE CURRENT STATUS OF TINEA VERSICOLOR IN SOME PARTS OF NIGERIA

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ABSTRACT

Tinea versicolor (i.e. Pityriasis versicolor) is a common superficial fungal infection. Patients with this disorder often show symptoms of hypopigmented, hyperpigmented, or erythematous macules on the trunk and proximal upper extremities. Unlike other disorders utilizing the term *Tinea* (e.g., *Tinea pedis*, *Tinea capitis*), *Tinea Versicolor* is a very common infection which is very difficult to cure but yet mostly ignored. *Tinea versicolor* is caused by the dimorphic, lipophilic organisms in the genus *Malassezia*, formerly known as *Pityrosporum*. The yeast causing the infection very often lives harmlessly in the skin of most adults. Among the symptoms of *Tinea* is a mild form of eczema that produces mild, patchy lightening of the face, shoulders, or torso. Its distribution is normally parallel to that of the sebaceous glands, with higher occurrence on the thorax, back and face. The infection has worldwide occurrence, its frequency is variable and depends on different climatic, occupational and socio-economic conditions. *Tinea versicolor* responds well to medical therapy, but recurrence is common and long-term prophylactic therapy may be necessary. The pathophysiology, clinical features, diagnosis, and management as well as prevention of *Tinea versicolor* were reviewed in this paper.

Keywords; Infection, pathophysiology, diagnosis, prevalent, treatment

INTRODUCTION

Tinea versicolor also known as dermatomycosis furfuracea, *Pityriasis versicolor* and *Tinea flava* [1] is a condition characterized by a skin eruption on the trunk and proximal extremities. Recent research has shown that the majority of *Tinea versicolor* is caused by the *Malassezia globosa* fungus, although *Malassezia furfur* is also responsible for a small number of cases [2]. These yeasts are normally found on the human skin and only become troublesome under certain circumstances, such as a warm and humid environment, although the exact conditions that cause initiation of the disease process are poorly understood [3]. The condition Pityriasis versicolor was first identified in 1846 [4]. Versicolor comes from the Latin word “versāre” to change colour.

Skin infections are very common in childhood worldwide and between 49 - 80.4% of African school children are affected [5]. It has been observed to be common in adolescent and young adult males in hot climates [6]. The prevalence of fungal skin infection is about 20% among the American populations at any given time in addition to Ethiopia, 49.2% and Taiwan, 28.2% [7]. Skin infections have been reported to be a major problem in Tanzania where about 34.7% of the

rural populations have skin diseases [8],[9]. In Nigeria, the prevalence rate is about 40.4% among pupils in primary schools [10]. Clinical investigations have shown that, dermatophytosis of *Tinea versicolor* and *Tinea corporis* are responsible for more than 15% of all skin infections in Nigeria [11]. An increase in the prevalence of *T. versicolor*, among others, was once recorded in the University College Hospital (UCH), Ibadan, between 1994 and 1998 [11]. Poor socio-economic status was identified as the major cause of skin infections in the developing countries [12]. *T. versicolor* (Synonym - *Pityriasis versicolor*) is a common, innocuous and chronic fungal infection of the stratum corneum caused by the dimorphic yeast *Malassezia furfur*. The synonyms *Pityrosporum ovale* and *P. orbiculare* were used previously to identify the causal organism. The common sites for the appearance of symptoms on the human body include the chest, neck, back, upper and lower arms. The infection is associated with persistent patches of discoloured skin portions, sharp edges, fine scales and sometimes accompanied by body itching. The predisposing factors to infection include a warm, humid environment, excessive sweating, occlusion, high plasma cortisol levels, immunosuppression, malnourishment and genetically determined susceptibility [13]. Most infections of dermatophytosis are usually treated with drugs e.g. Clotrimazole, Ketoconazole, Fluconazole, Itraconazole, etc.[14]. These drugs are relatively expensive and mostly unaffordable by people with low socio-economic status, who invariably form the bulk of people with skin infections. Both rural and urban residents in the tropical regions, with pronounced *Tinea* infections, usually resort to herbal remedies that are sourced locally from their native environments. Herbal preparations such as poultices, ointments and soaps have been applied by 65% of patients with eczema, seborrheic dermatitis, impetigo, *T. capitis* and scabies before attending orthodox hospitals [15]. [16] and [17] reported that leaf juice and decoctions of *S. alata* are used in the treatment of ringworm and other skin diseases in many parts of Nigeria. Among several plant species used in the treatment of skin infection locally without any reported risk or allergic reaction is *S. alata* (L) Roxb-Caesalpinaceae (formally - Leguminosae). *Pityriasis versicolor* (PV), also known as *Tinea versicolor*, is one of the most common superficial fungal infections worldwide, particularly in tropical climates. PV is difficult to cure and the chances for relapse or recurrent infections are high due to the presence of *Malassezia* in the normal skin flora. This review focuses on the clinical evidence, treatment and contemporary status of *Tinea versicolor* in some countries. The aim of this study is to review the status of *Tinea versicolor* in some parts of the world.

Pathophysiology

Tinea versicolor is caused by the dimorphic, lipophilic organisms in the genus *Malassezia*, formerly known as *Pityrosporum*. Eleven species are recognized within this classification of yeasts, of which *Malassezia globosa* and *Malassezia furfur* are the predominant species isolated in *Tinea versicolor* [18],[19]. *Malassezia* is extremely difficult to propagate in laboratory culture and is culturable only in media enriched with C12- to C14-sized fatty acids. *Malassezia* is naturally found on the skin surfaces of many animals, including humans. Indeed, it can be isolated in 18% of infants and 90-100% of adults. The organism can be found on healthy skin and on skin regions demonstrating cutaneous disease. In patients with clinical disease, the organism is found in both the yeast (spore) stage and the filamentous (hyphal) form. Factors that lead to the conversion of the saprophytic yeast to the parasitic, mycelial morphologic form includes genetic predisposition; Warm, humid environments, immunosuppression, malnutrition

and Cushing syndrome. Human peptide cathelicidin LL-37 plays a role in skin defence against this organism.

Even though *Malassezia* is a component of the normal flora, it can also be an opportunistic pathogen. The organism is considered to be a factor in other cutaneous diseases, including *Pityrosporum* folliculitis, confluent and reticulate papillomatosis, seborrheic dermatitis, and some forms of atopic dermatitis. *Malassezia* species have also been shown to be a pulmonary pathogen in patients with immunosuppression due to stem cell transplantation [20].

Causes of Tinea versicolor

Tinea versicolor is caused by yeast called *Malassezia furfur* that normally live on the skin of most adults without causing problems. It exists in two forms, one of which can cause patches of discoloured slightly scaly skin. Factors that induce the disease are poorly understood, but high humidity and immune changes may play roles [20]. Most people with this condition are perfectly healthy. Because the Tinea versicolor fungus is part of the normal adult skin flora, this condition is not contagious. It often recurs after treatment, but usually not right away, so that treatment may need to be repeated only every year or two. Tinea versicolor patches that are brown or reddish-brown go right away after treatment. This fungus produces a chemical, which seems to inhibit the normal production of pigment in the skin resulting in areas of lighter skin. It may take several months for overall colour to even out. It always eventually does. Tinea versicolor does not leave permanent skin discoloration. *M. furfur* is now the most commonly accepted name for the organism causing Tinea versicolor. Thus, *P. orbiculare*, *P. ovale* and *M. ovalis* are synonyms for *M. furfur*. Despite disagreement about the names, Tinea versicolor results from a shift in the relationship between a human and a resident yeast flora.

Yeasts of the genus *Malassezia* are known to be members of the skin microflora of human and other warm-blooded vertebrates [21],[22]. These lipophilic yeasts are associated with various human diseases, especially *Pityriasis versicolor*, a chronic superficial scaling dermatomycosis [23]. The genus of *Malassezia* has undergone several taxonomic revisions [24]. Later, [25] discovered that there were indeed multiple species which they reclassified and named the genus as *Malassezia* with several distinct species. Currently there are 11 recognised species viz:

1. *M. furfur*, [18],[26]
2. *M. pachydermatis*,
3. *M. sympodialis* [27]
4. *M. globosa* [28],[29],[30],[31][22]
5. *M. obtuse*
6. *M. restricta*
7. *M. slooffiae* [25]
8. *M. dermatis*
9. *M. equi*
10. *M. nana* [32],[33]
11. *M. japonica*[32]

Signs and symptoms

Acidic bleach from the growing yeast causes areas of skin to be a different colour than the skin around them. These can be individual spots or patches. Specific signs and symptoms of the infection include: Patches that may be white, pink, red, or brown and can be lighter darker than the skin around the spots that do not tan the way the rest of the skin does.

Spots that may occur anywhere on the body but are most commonly seen on the neck, chest, back, and arms. The spots may disappear during cool weather and get worse during warm and humid weather. They may be dry and scaly and may itch or hurt, although this is not common. (Retrieved from <http://www.webmd.com/skin-problems-and-treatments/tinea-versicolor-cause-symptoms-treatments> at 24th/11/2015).

Other conditions that resemble *Tinea versicolor*

The following conditions are sometimes indistinguishable from *Tinea versicolor* on simple inspection:

Pityriasis alba: This is a mild form of eczema (seen in young people) that produces mild, patchy lightening of the face, shoulders, or torso.

Vitiligo: This condition results in a permanent loss of pigment. Vitiligo is more likely to affect the skin around the eyes and lips or the ankles and joints. Spots are porcelain white and, unlike those of *Tinea versicolor*, are permanent without therapy.

Aetiology and pathogenesis

Tinea versicolor is caused by *Malassezia furfur*, which may appear in two forms: oval *Pityrosporum ovale*, often in the scalp, and cylindrical – *Pityrosporum orbiculare* generally on the trunk. These fungi require the addition of lipid substances in the middle of culture, like olive oil. They grow better on average in 32-37°C environments. Filaments normally seen in areas of the skin affected by infection grow when the yeasts are incubated in stratum corneum. *P. orbiculare* and *P. ovale* are similar in macro morphology, but differ in micromorphology. Observations show that the two forms are produced by the same organism, with the transformation of one into another possibly taking place; some antigenic similarities have also been reported. Three distinct forms of *Malassezia furfur* and their denominated serotypes A, B and C, which differ morphologically, physiologically and serologically, with distinct cellular membrane antigens were recently described by [19]. A recent study did not describe any difference between the distributions of serotypes in affected skin when compared to the control group. The organism is found in normal flora conditions, in percentages varying from 90 to 100% of individuals. It appears to be opportunistic, though the factors that increase susceptibility have not been completely defined yet. In some cases however, skin lesion cultures show much higher amounts of *P. orbiculare* in comparison of non-lesional skin with the skin of healthy volunteers. *Tinea versicolor* occurs when yeasts are converted by the micellar form due to certain predisposed factors, which may be classified as endogenic or exogenic. The exogenous factors include heat and humidity, contributing to higher disease prevalence in the tropics and during the summer in temperate climates. Other exogenous factor may be skin occlusion by clothing or cosmetics, resulting in an increase of carbon dioxide concentration and leading to microflora and pH changes. The infection has

been experimentally induced by occlusive clothing. On the other hand, endogenic factors³¹⁻³³ are responsible due to disease prevalence in temperate climates, including seborrheic dermatitis, Cushing's syndrome, treatment with immunosuppressor, malnutrition and (particularly flexural) hyperhidrosis. Hereditary factors appear to perform a certain role in the disease. Positive familial history was noted in various studies, while conjugal cases are less commonly reported. *Malassezia furfur* has been associated to folliculitis by *Pityrosporum*, reticular and confluent papilloma (Gougerot-Carteaud), seborrheic dermatitis and septicemic onychomycosis. In both the pathogenic and opportunist forms, the fungus resides inside of the stratum corneum and hair follicles, where it is fed by free fatty acids, sebum triglycerides and keratinized epidermis. A possible factor in the development of *Tinea versicolor* is depressed cellular immunity. The lymphocytes of *Tinea versicolor*-carriers appear to produce a lower leucocyte migration factor when stimulated with *P. orbiculare* stratum. In one study of a patient with *Tinea versicolor* and carrying the visceral leishmaniasis, a depressed cellular immunity disease, there was improvement in mycosis after treatment of the leishmaniasis. It has been suggested that the lipoperoxidation process produced by *Pityrosporum* could be responsible for the clinical hypopigmented appearance of lesioned skin. Culture strata containing dicarboxylic acids, like azelaic acid, has shown strong inhibition in the in vitro dopa-tirasinase reaction. Ultrastructural studies point to severe damage in the melanocytes, varying from melanossomas and altered mitochondria up to degeneration. These dicarboxylic acids may be causing the cytotoxic effects. The damage to melanocytes explains why re-pigmentation may require periods varying from months to years. Another explanation is the fact that the *Tinea versicolor* scales prevent re-pigmentation. Soon after treatment, the area affected was still hypopigmented for a variable period of time. The pathogenesis of hyperpigmentation in *Tinea versicolor* is not entirely understood. Two theories have been presented:

- I. thickening of the keratine layer; and
- II. Presence of intense cellular inflamed infiltrate, which acts like a stimulus for melanocytes to produce more pigment, leading to an increase in the size of melanosomes and distribution changes in the epidermis.

Clinical Features

Tinea versicolor patients generally show multiple lesions on the trunk, with intercalated regions of normal skin. The lesions may also erupt on the throat and proximal upper extremities. Its distribution is normally parallel to that of the sebaceous glands, with higher occurrence on the thorax, back and face. However, the lesions are found in a higher number on the back. Those located on the face are more common in children (including newborns and infants) than in adults. A study revealed face lesions in children of *Tinea versicolor* carriers in approximately 32% of cases, usually seen in the margins of the scalp, like achromic or hypopigmented, squamous and small macules [34]. These lesions rarely remain limited to the lower limbs, were popliteal cavity, forearm, underarm, penis/genital, or in the area of radiotherapy. The distribution also occurs in areas normally covered by clothing, calling attention to the theory in which the occlusion of glands plays a role in this disease. The lesions may be hypo- or hyperpigmented thematous or

dark-brown; justifying the versicolor name. In the surface of lesions, a fine scaling is found, as evidenced by the stretched skin, a birthmark named after Zileri. Although at times mild pruritus occurs, patients' complaints are related to skin color changes more than to any other symptom. *Tinea versicolor* as well as folliculitis by *Pityrosporum* may occur in AIDS-patients. The disease then acquired an extended appearance, but does not differ clinically from *Tinea versicolor* in non-HIV patients.

Lesion characteristics

- Lesions occur in a variety of colours and shapes, as the name implies (“versi” means several).
- Lesions are either macules or very superficial papules with fine scale that may not be evident except on close examination.
- Even when scale is not apparent, when the skin is wiped with a wet cloth and scraped for examination, it will yield a surprising amount of dirty brown keratin. If not, the areas of dyschromia may represent residual effects of previously treated *T. versicolor*.
- Occasionally, it is difficult to determine whether the lighter or darker skin is affected.
- Lesions have relatively sharp margins and may be lighter or darker than the normal skin colour. The lesions are frequently a light orange or tan colour in light-skinned individuals.
- Small lesions are usually circular or oval.
- Lesions are usually asymptomatic but may be mildly pruritic. The pruritus is more intense when the patient is excessively warm.
- Residual hypopigmentation, without overlying scale, may remain for many months following effective treatment. These areas may become more apparent following sun exposure, causing the patient to suspect incorrectly that the infection has recurred[34].

Lesion distribution

- The upper trunk is affected most commonly, but spread to the upper arms, antecubital fossae, neck, abdomen, and popliteal fossae often occur.
- Lesions in the axillae, groin, thighs, and genitalia may occur but are less common.
- Facial, scalp, and palmar lesions occur in the tropics but rarely in temperate zones.
- In some patients, *T. versicolor* primarily affects the flexural regions, the face, or isolated areas of the extremities. This unusual pattern of *T. versicolor* is seen more often in immunocompromised hosts and can be confused with candidiasis, seborrheic dermatitis, psoriasis, and erythema or dermatophyte infections.
- Lesions that are imperceptible or doubtful are more visible using a wood lamp in a darkened room.

The white spots of *Tinea versicolor* tends to linger even after successful treatment. This persistent discoloration often leads people to think that the condition is still present long after it has been eradicated. It may take months for skin colour to blend and look normal, but it always does. The red or brown variety of rash, on the other hand, clears up much sooner. It is, therefore, a good idea to have the condition treated as soon as new spots appear so that any discoloration

lasts as short a time as possible. Recurrence of the rash is common, though it won't recur necessarily every year. Applying selenium sulphide or ketoconazole shampoo on affected areas once a week may slow the onset of recurrence but is cumbersome and often not worth the effort, since the condition may not come back for a long time anyway [34]. Questioning the patient about skin or systemic diseases, current therapy and drug allergies provides guidance in selecting an appropriate therapy[35]. Topical therapy alone is indicated for most patients [36]. Systemic treatment is indicated with extensive involvement, recurrent infections or when topical therapy has failed [23]. Because treatment is relatively easy and recurrence is common, it is imperative that therapy be as safe, inexpensive and convenient as possible. A plan for prophylactic therapy should be discussed with all patients to reduce the high rate of recurrence, [23].

Modes of infection

Tinea versicolor occur worldwide and more frequently in areas with higher temperatures and higher relative humidity [37]. Although *Pityriasis versicolor* has worldwide occurrence, its frequency is variable and depends on different climatic, occupational and socio-economic conditions [38],[39]. This disease is prevalent in Iran, in which almost 6% of all dermatosis and approximately 30% of dermatomycoses are due to these lipophilic yeasts [38]. Hereditary factor play the role in transmission of the disease [37].

Diagnosis

Although diagnosis of *Tinea versicolor* can be made based on appearance alone, there are several diagnostic tests available to make a definitive diagnosis. The test that has proven to be most useful is a potassium hydroxide preparation of exfoliated skin cells from the *Tinea versicolor* lesions [39]. The affected skin is gently scraped with a blade or glass slide to collect a sample of scale on a microscope slide, but transparent tape can also be used to strip off the scales. Treatment of the specimen with potassium hydroxide will reveal a characteristic "spaghetti and meatballs" appearance upon microscopic examination. If there is doubt of the diagnosis the skin scraping can be sent for fungal culture. A skin biopsy may also be performed. This will show short hyphae and spores in the stratum corneum. Staining the biopsy with periodic acid-Schiff or methanamine silver has been proven to be helpful in the diagnosis of *Tinea versicolor*[40]. "A Wood's light", a portable quartz lamp emitting low frequency UV light at 365 nm-is used to confirm the diagnosis and detect subclinical patches of fungi. [40].

Control/Treatment

There are many antifungal agents available to apply to the skin for the treatment of *Tinea versicolor*. Over-the-counter (OTC) remedies include clotrimazole (Lotrimin, Mycelex) and miconazole (Lotrimin). These should be applied twice a day for 10-14 days but come in small tubes and are hard to apply to large areas. Another OTC option is selenium sulphide shampoo 1% (Selsun Blue) or 1% ketoconazole shampoo (Nizoral). Some doctors recommend applying these for 15 minutes twice a week for two to four weeks [40].

There are also many prescription-strength antifungal creams that can treat *Tinea versicolor*, as well as a stronger form of selenium sulfide (2.5%) and prescription-strength ketoconazole shampoo (2%). However, these pose the same application problems as their OTC counterparts. Oral treatment for *Tinea versicolor* has the advantage of simplicity. Two doses of fluconazole (Nizoral) prescribed by a physician can clear most cases of this infection. Some common medications such as alprazolam (Xanax) and montelukast (Singulair) may interact with fluconazole, so the physician will need to know what other medications are being taken before treating *Tinea versicolor* orally. Food and drugs administration (FDA) approved medications for *Pityriasis versicolor* Include: ketoconazole (35%), selenium sulphide (18%), clotrimazole (9%), miconazole (4%), and econazole (4%). Medications not approved by the FDA for treatment of *Pityriasis versicolor* Include: a variety of antibiotics, corticosteroids, anti-viral medications, and pain medications. Topical treatments are generally preferred for *Tinea versicolor*, especially when treating children. Oral drugs such as ketoconazole, fluconazole, and itraconazole have sometimes been used, with cure rates as high as 97% [41].

[Topical Treatments

Selenium sulphide 2.5% is one possible topical treatment. It is applied for 7 days and then applied on the first and third days of every month for six months. It should be left on for 5-10 minutes before being washed off. Sodium thiosulphate 25% with salicylic acid 1%, propylene glycol 50% in water twice daily for 2 weeks, zinc pyrithione shampoo left in place for 5 min daily for 2 weeks, and ciclopirox 0.1% solution daily for 4 weeks have all been found to be as effective as selenium. Topical azoles such as clotrimazole 1%, bifonazole 1%, and ketoconazole 2% are also effective forms of treatment. For children a daily 3-week regimen of a shampoo containing 1% bifonazole daily for 3-weeks is beneficial.

Systemic Medications

Ketoconazole, Itraconazole, and fluconazole: however; azoles have rare but serious side effects and therefore should be used with caution.

Ketoconazole can either be given as 200 mg/day for 7-10 days or as one 400 mg dose.

Itraconazole can be given with a total dose of as little as 1000 mg, given as 200 mg/day for 5-7 days.

Fluconazole can be given as one oral dose of 400 mg.

Combination

Various regimens use both topical and oral therapies. The most common is varying regimens of selenium sulphide shampoo or lotion and oral therapy with ketoconazole [42].

Table 1: Common antifungal regimen used in the treatment of *T. versicolor*

Shampoos	and	Topical Creams	Oral	Maintenance
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Washes	and Lotions	Antifungals	Regimens
Ketoconazole 2% shampoo applied daily for 5 minutes, 3 days in a row	Ketoconazole 2% lotion daily	Ketoconazole 400 mg PO once weekly for 2 weeks	Ketoconazole 2% cream once weekly
Selenium sulfide 2.5% lotion applied daily for 10 minutes, 10 days in a row	Econazole nitrate 1% cream daily	Fluconazole 300 mg PO once weekly for 2 weeks	Ketoconazole 2% shampoo 2-3 times weekly
	Ciotrimazole 1% cream daily	Itraconazole 200 mg PO daily for 7 days	Selenium sulfide 2.5% lotion used as a shampoo and body wash once weekly
	Miconazole 2% cream once or twice daily		Itraconazole 400 mg once monthly
	Ciclopiroxolamine 1% solution daily		Fluconazole 200 mg once monthly
	Terbinafine 1% cream twice daily		

Key: PO= per oral

Disadvantages of topical medications

Although topical drugs can provide immediate reductions in infectivity, are free of systemic adverse effects. These drugs have some disadvantages e.g. the time needed and difficult application of the drug over large affected areas, especially on the trunk, cannot use in

broken/open skin as well as the unpleasant odour of certain agents. For these reasons, patient adhesion is inadequate, which increases the rate of recurrence. Effectiveness of topical agents is lower, and rate of recurrence varies from 60 to 80% [43]. It is found difficult to continue treatment or to know where to apply the cream, once the inflammatory signs have settled. Topical drugs may be difficult to use in certain areas e.g. on the hair, nails, nipples and in some more sensitive areas. Along with this some adverse reactions are most common such as increase in hypersensitivity and irritation occurs, mild dryness of the skin and itching etc. [23].

Disadvantages of systemic medications

Drugs taken orally affect both diseased and normal tissues, thus increasing the chance of side effects. In spite of short term treatment they bring lot of side effects. Some drugs shows hypersensitivity and therefore are not recommended for children. Others show side effects such as nausea, headache, vomiting. Hepatotoxicity may be associated with some oral antifungal medications [39]. Conventional skin disease treatments such as the drugs ketoconazole, ciclopirox, naftifine and tolnaftate can irritate the skin, causing stinging, itching, redness, drying or allergic reactions [36].

Future aspect

The existing treatments have lot of limitations and hence prove to be less effective. The factors contributing to its ineffectiveness are lengthy treatment, costly drugs and sometimes inability to cure the disease. This spawns the need of deriving an appropriate technology. The stepwise study using proper diagnosis is to be carried out. Effects of essential oils of various herbs are to be categorically studied on various factors such as sex, age, group, natural inhabitants, geographical conditions etc. Pathogenicity of dermatophytes is also to be studied. The above factors need a concurrent study and reasons for infections, remedies and effectiveness of the drugs are to be evaluated.

Now a days the importance of herbal drugs is reinstated and the world is turning towards safer drugs with no side effects. Thus the exploration of newer drugs from plants is most sought after, which will prove to be cheaper, safer and more effective. Historically, essential oils have been used for therapeutic purposes. In recent years, much research has been devoted to investigate such plant extracts, their active components, modes of action and synergistic effects with other antimicrobial compounds [44],[45],[46],[47],[48],[49]. These findings of researchers stimulate the exploration of other plant products, which could be used as effective antifungal treatment, especially against *T. versicolor*.

Prevalence of Tinea versicolor

Morbidity results primarily from the discolouration. The adverse cosmetic effect of lesions may lead to significant emotional distress, particularly in adolescents. Tinea versicolor frequently recurs despite adequate initial therapy. Even with adequate therapy, residual pigmentary changes may take several weeks to resolve. Although Tinea versicolor usually is more apparent in darker-skinned individuals, the incidence of Tinea versicolor appears to be the same in all races. The role of sex in propensity to development of *T. versicolor* is still unclear. Some studies found that Pityriasis versicolor (PV) is more common in men than women [50], [28], [51], while others

indicated that the incidence of this infection is higher in women [52]. No differences in development of PV among both sexes are also reported [50], [28], [23]. *T. versicolor* becomes more noticeable with a suntan and is more common in teenagers and young adults than in older people [53]. However, children are not excluded from suffering this fungal infection [54], [55], [23], [56]. Similar to other investigations the highest prevalence of PV was observed in 20-30 year old group, suggesting that the peak of the infection is coincided with ages when the sebum production is in the highest level [31], [36], [22]. Very few cases of PV in children with age, less than 10 years are found. Moreover, it is rarely seen in older adults [57].

Pityriasis versicolor, a worldwide skin disease, has its frequency and occurrence depending on various climatic and socio-economic state. The frequency and density of colonization of *Malassezia* species in healthy human skin are related to the subject age and to sebaceous gland activity in the studied area. In a study by [51], the highest prevalence of Pityriasis versicolor was observed in 17-28 year age group (70.6%). The peak of *Tinea versicolor* is coincided with age. This possibly is due to hormonal changes and increases in sebaceous gland activity. In the study, 5.9% of patients were under 12 years old. Susceptibility of children was more common than initially we expected. *Tinea versicolor* is a rare disease in children [23]. [58] found only one patient of Pityriasis versicolor in age less than 10 year in Tehran. Distribution of the patches of Pityriasis versicolor in children is various, and hence there is a discussion whether this difference is due to clinical or microscopic appearance. Significant differences in prevalence of Pityriasis versicolor were found between both sexes. 62.1% of patients were male and 37.9% were female. Therefore, the male/female ratio was 1.64:1. Many studies show dissimilar male to female ratios, however, they emerge to be almost equal in both sexes [28]. [59] believe that the role of sex in susceptibility to disease and its development is still unclear. In this study, the most affected areas were neck with 34.6%, which is followed by trunk (17%) and chest (16.3%). Distribution of the patches usually parallels the density of sebaceous secretion distribution, with higher incidences on chest, back, and face. Patches of the face are more prevalent in children than adults [54]. [29] found *M. restricta* associated particularly with scalp skin, *M. sympodialis* with the back, while *M. globosa* was evenly distributed on scalp, forehead, and trunk. Ahvaz is located in subtropical region with hot and humid conditions from April to October. Several reports showed that hot and humid conditions, and hygiene are susceptible factors for presenting Pityriasis versicolor [59]. However [50] believe that good or poor hygiene of the clothing had no significant influence on the prevalence of Pityriasis versicolor. The lesions of *Tinea versicolor* can be hyperpigmented, hypopigmented, leukodermal, erythematous or dark brown. In the study by [51], 50% of cases had hyperpigmentation followed by hypopigmentation (36.2%) and erythematous lesion (13.8%). 30.6% of studied population was positive for *Tinea versicolor* which implies a high prevalence for this disease [60]. Therefore, a way to control this disease must be found.

Table 1: Distribution of locations of *Tinea versicolor* on patient body

Neck & arm	Head & face	Forearm & Trunk	Chest	Neck	Neck & Total chest
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Male	10 (6.5%)	3 (2.0%)	7 (4.6%)	15 (9.8%)	12 (7.8%)	39 (25.5%)	9 (5.9%)	95 (62.1%)
Female	4 (2.6%)	5 (3.3%)	4 (2.6%)	11 (7.2%)	13 (8.5%)	14 (9.2%)	7 (4.6%)	58 (37.9%)
Total	14 (9.2%)	8 (5.2%)	11 (7.2%)	26 (17.0%)	25 (16.3%)	53 (34.6%)	16 (10.5%)	153 (100%)

Source: Jundishapur Journal of Microbiology (2009); 2(3): 92-96

Conclusion

Tinea infection is an obstinate disease which bothered dermatologists a lot. The prime task of dermatologist is to precisely diagnose the underlying agent causing the disease. Once this is done, selection of a most favourable antifungal drug can be carried out effectively. Its spectrum of activity which covers the infecting microorganism can prove to be a potent treatment. Last decade showed some noteworthy progress in the evolution of effective and safe drugs for *T. versicolor*, but could not fulfil the expectations due to their negative aspects such as adverse reactions, expensiveness and lengthy treatment. Effective therapy demands oral suspension along with the topical drugs. But benefits of these drugs are outshined by the fact that they are having a lot of side effects, such as nausea, headache, vomiting, while less common adverse reactions are abdominal discomfort, transient rash, urticaria, diarrhoea and photosensitivity etc. Diagnostic methodology and fungal susceptibility testing lag behind therapeutic advances. We should turn our attention to these problems by seeking the solutions through the essential oils of medicinal plants. Essential oils are the rich resource of drugs for traditional, folk, synthetic and modern medicines; nutraceuticals and food supplements. Due to presence of numerous chemical compounds, plants of this family possess biological activity including antibacterial, antiviral, antifungal and anti-inflammatory.

Recommendations

If *Tinea versicolor* is mild, one may be able to treat it him/herself. There are antifungal products that you can buy without a prescription but all these practices are not recommended. The following recommendations are therefore made;

Consult medical doctors

Stop using skin care products that are oily. Use products that say non-oily or non-comedogenic.

Wear loose clothes. Nothing should feel tight.

Protect your skin from the sun. A tan makes *Tinea versicolor* easier to see.

Do not use a tanning bed or sun lamp. Again, a tan makes *Tinea versicolor* easier to see.

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