JASIUK, Adrianna, WIEKIERA, Mateusz, MADEJA, Natalia, KOZIEJ, Sylwia, NIEMCZUK, Martyna and KOWALCZYK, Emilia. Diagnosis and Treatment of Pityriasis Versicolor: A Review of Current Methods and Research Findings. Quality in Sport. **2025;44:62963. eISSN 2450-3118.**
https://doi.org/10.12775/QS.2025.44.62963
https://apcz.umk.pl/QS/article/view/62963

The journal has been awarded 20 points in the parametric evaluation by the Ministry of Higher Education and Science of Poland. This is according to the Annex to the announcement of the Minister of Higher Education and Science dated 05.01.2024, No. 32553. The journal has a Unique Identifier: 201398. Scientific disciplines assigned: Economics and Finance (Field of Social Sciences); Management and Quality Sciences (Field of Social Sciences).
Punkty Ministerialne z 2019 - aktualny rok 20 punktów. Załącznik do komunikatu Ministra Szkolnictwa Wyższego i Nauki z dnia 05.01.2024 l.p. 32553. Posiada Unikatowy Identyfikator Czasopisma: 201398. Przypisane dyscypliny naukowe: Ekonomia i finanse (Dziedzina nauk społecznych); Nauki o zarządzaniu i jakości (Dziedzina nauk społecznych).
The authors declare that there is no conflict of interest regarding the publication of this paper.
Received: 26.06.2025. Revised: 21.07.2025. Accepted: 06.08.2025. Published: 10.08.2025.

Diagnosis and Treatment of Pityriasis Versicolor: A Review of Current Methods and Research Findings

Adrianna Jasiuk:
Medical University of Łódź
ada.jasiuk@gmail.com https://orcid.org/0009-0001-4829-3768

Mateusz Wiekiera:
Medical University of Łódź
mateuszwiekiera10@gmail.com https://orcid.org/0009-0003-9236-2913

Natalia Madeja
Military Institute of Medicine- National Research Institute
nataliaamadeja@gmail.com https://orcid.org/0009-0004-0921-8003

Sylwia Koziej:
Stefan Cardial Wyszynski Provincial Hospital SPZOZ Lublin
skoziej152@gmail.com https://orcid.org/0009-0002-9607-6693

Martyna Niemczuk:
University Clinical Hospital, Bialystok
martynaniemczuk@gmail.com https://orcid.org/0009-0006-5877-6356

Emilia Kowalczyk
Provincial Hospital in Kielce
emilia.kowalczyk99@gmail.com https://orcid.org/0000-0001-7687-8870

Corresponding author:
Adrianna Jasiuk ada.jasiuk@gmail.com

Abstract

Pityriasis versicolor is a common, mild skin disease caused by a yeast-like fungus from the Malassezia genus. This fungus naturally inhabits the skin of healthy individuals, but under certain conditions, such as increased sebum production or immunocompromised states, it can lead to the formation of scaly patches that are hypo or hyperpigmented, and sometimes they can be discolored. These lesions typically appear on the torso, neck, or shoulders and vary in size. Over time, they may enlarge. Diagnosis involves a physical examination, mycological testing, and examination under a Wood's lamp. Treatment consists of topical or systemic antifungal medications. The condition is recurrent. Personal hygiene plays an important role in prevention.

The article is a comprehensive review of the available scientific literature on the pathogenesis, clinical picture, diagnosis and treatment of pityriasis versicolor.

Keywords: pityriasis versicolor, Malassezia

Introduction

Pityriasis versicolor also known as tinea versicolor is a common, benign and recurrent skin condition caused by fungi from the Malassezia genus [1][2]. The patient most often consults a doctor due to the appearance of hypo- or hyperpigmented lesions, which vary in size, have an oval shape, and are typically located on the torso, neck, and shoulders [3]. The diagnosis is usually made based on the clinical presentation, which is quite characteristic. In unclear cases, the doctor may examine the patient using a Wood's lamp or order mycological tests [2][4]. Topical preparations are used in treatment, and if they prove ineffective, oral therapy can also be suggested to the patient. However, it is important to remember that this disease may recur, which is why prevention is crucial, as it can help reduce the likelihood of the condition returning [5].

Etiology

Lipophilic fungi of the genus *Malassezia* also known as *Pityrosporum* naturally reside on the skin of humans as well as other warm-blooded animals. They are the most common type of fungi inhabiting healthy skin. Malassezia requires the host's lipids for survival, as it doesn’t produce the genes necessary for fatty acid synthesis. For this reason, the main habitats of this microorganism are areas naturally rich in sebaceous glands, such as the face, head, and chest. They have the ability to metabolize lipids that are part of sebum. Under normal conditions, they do not cause any disease symptoms. However, in specific situations such as reduced immunity, glucocorticosteroid therapy, excessive sebum production, or individual sensitivity, the fungus can multiply excessively, leading to the appearance of disease symptoms [6] [7].

Epidemiology

No studies have shown that a specific gender or ethnic origin predisposes individuals to pityriasis versicolor [8]. When it comes to age, the disease most commonly affects teenagers due to significantly higher sebum production during this period. Certain conditions, such as diabetes, obesity, HIV, and cancer, also predispose individuals to the condition. Interestingly, pityriasis versicolor is more frequent among physically active people due to increased sebaceous gland activity during exercise. This disease is common worldwide, but especially in areas with warm and humid climates. The prevalence in tropical countries can reach up to 50%, while in Scandinavian countries, it is only 1.1%. [2][4]

Pathophisiology

Malassezia causes pityriasis versicolor only after converting to its hyphal form. Factors that promote this process include various genetic predispositions, the use of medications such as corticosteroids or oral contraceptives, as well as conditions and disorders like cancer, immunosuppressive states, endocrine and autoimmune diseases, and excessive sweating or pregnancy. Unfavorable factors also include exposure to hot and humid climates, wearing protective face masks, and using cosmetics rich in oily emollients [2]

The exact mechanism of the disease caused by Malassezia is often not fully understood due to the complex interactions of this yeast with the skin. However, it is certain that under physiological conditions, this fungus lives on the skin without causing disease symptoms. When there is an imbalance caused by the aforementioned factors, the yeast modifies the expression of certain enzymes required for energy production, specifically lipases and phosphatases. At the same time, the synthesis of bioactive indoles occurs, acting through the aryl hydrocarbon receptor [9].

As previously mentioned, fungi of the genus *Malassezia* are entirely dependent on exogenous lipids, as they lack the genes necessary for the synthesis of myristic acid, which serves as a precursor for long-chain fatty acids. However, they compensate for this deficiency by producing hydrolase enzymes, such as lipases. During the hydrolysis process, *Malassezia* breaks down lipids into fatty acids, which are then incorporated into the fungal cell membrane. The high lipid content in the membrane protects the fungus from phagocytosis and the host's immune response. Additionally, *Malassezia* has the ability to convert tryptophan into indole

alkaloids, which are potent ligands for the aryl hydrocarbon receptor. This interaction induces melanocyte apoptosis and inhibits neutrophil activity in host cells [10]. Importantly, these yeasts could produce reactive oxygen species (ROS), which play a role in the pathogenesis of pityriasis versicolor. ROS lead to cell destruction through a cytotoxic mechanism mediated by lipid peroxidation and the oxidation of enzymes and proteins [11]. Studies have also shown that patients with pityriasis versicolor exhibit higher levels of lipoxygenase compared to healthy individuals. Lipoxygenase is a dioxygenase enzyme that catalyzes the conversion of unsaturated fatty acids into hydrogen peroxide. Many antifungal agents work by inhibiting the formation of lipoxygenase metabolites. *Malassezia* also has the ability to produce melanin in reaction with L-3,4-dihydroxyphenylalanine (L-DOPA). The negative charge and hydrophobicity of melanin make it a virulence factor of the fungus. It inhibits phagocytosis and reduces nitric oxide production, thereby decreasing the host's oxidative capacity. One of the most important virulence factors of *Malassezia* is its ability to produce hyphae. The fungus transitions to the hyphal form upon contact with L-DOPA, which, in a lipid-rich environment, is oxidized into quinolone and kojic acid. In the case of pityriasis versicolor, it has been observed that the hyphal form of *Malassezia* is consistently seen in samples taken from lesions characteristic of pityriasis versicolor. An interesting fact is that, despite the high fungal load in the skin lesions, no visible inflammatory response is observed. This may be due to the production of indoles, which are capable of inhibiting the inflammatory response [12].

Histopathology

Most often, a typical clinical presentation of the patient is sufficient for diagnosis. If a skin biopsy is performed, the specimen may show hyperkeratosis, acanthosis, and a superficial inflammatory infiltrate in the dermis. In potassium hydroxide examination under the microscope, short hyphae and fungal cells can be observed. A higher number of hyphae is present in hyperpigmented lesions compared to hypopigmented ones [4] [13].

Clinical presentation

Pityriasis versicolor, from a clinical perspective, is characterized by the presence of hypo- or hyperpigmented oval-shaped spots with surface scaling. The skin lesions may merge to form larger patches. The disease typically affects the back, chest, neck, and shoulders, and sometimes the thighs and abdomen, while in children, it may also involve the face[14]. Skin lesions can appear in colors such as pale yellow, yellow-brown, dark brown, and sometimes pink or red. In individuals with a fair complexion, lesions with features of hyperpigmentation most often have a light brown hue. In patients with darker skin, hyperpigmented lesions range from dark brown to grayish black. Within a single affected area of the body, lesions can appear in various shades. A characteristic feature of this condition is the "evoked scale sign," which refers to the scale that only becomes apparent after scraping or stretching the skin [15]. Studies have shown that if a patient applies a cream to the skin before the examination, the scales may be less visible or even completely absent. The disease often runs asymptomatically, though it may be accompanied by mild itching, which intensifies with sweating, high humidity, or high temperatures. From the patient's perspective, the most significant issue is the unsightly appearance of the lesions, which causes discomfort and embarrassment, especially when they feel reluctant to expose their skin in public[16]. A full return to normal skin pigmentation may take up to several months.

In the literature, we can find information about the occurrence of several variants of pityriasis versicolor:

- Oval or round lesions with distinct borders and fine scales. These are mainly found on the upper trunk, but can also be observed on the neck, proximal parts of the limbs, and lower parts of the trunk. Over time, the spots tend to merge into irregular patches. During sunny periods, there is a significant contrast between healthy and affected skin. Even light rubbing leads to strong scaling of these lesions.
- An inverse variant primarily occurring in skin folds and on the face. This form is typical for patients with immunosuppression. It is often mistaken for other conditions such as psoriasis, seborrheic dermatitis, or candidiasis.
- A form that primarily appears on the limbs, torso, and back, associated with the presence of hair follicles. This variant is characterized by areas of hyperpigmentation around the hair follicles. It is often mistaken for bacterial folliculitis due to the very

similar clinical appearance. It is more common in patients with diabetes, those using steroids, immunosuppressive therapy, or antibiotics.

- Small, firm, reddish-brown papules measuring 2-3 mm in diameter, which often lack scales. They appear on the torso and are painless. Under the microscope, signs of inflammation are visible in the deeper layers of the skin.
- Atrophic pityriasis versicolor is a rare variant characterized by oval or round lesions that are red or ivory colored. The surface of these lesions is wrinkled, and they only appear in areas affected by pityriasis versicolor. Under the microscope, epidermal atrophy, vascular expansion, and a reduced amount of elastin and collagen fibers are visible. These lesions are typical for patients who have been using topical corticosteroid therapy for a long time, but they can also occur in patients who have never used topical glucocorticosteroids [4].

Diagnosis

As mentioned earlier, the diagnosis is primarily based on the typical clinical presentation. However, some forms of tinea versicolor are so similar to other conditions that it can be difficult to distinguish them based solely on the physical examination. In such cases, the use of a Wood's lamp can be helpful, as it may show fluorescence in yellow-green, gold-yellow, or copper-orange colors in the case of tinea versicolor, although some lesions do not fluoresce. When the fluorescence also covers the area surrounding the lesion, it indicates that the infection is spreading. Dermoscopy can also be useful, showing the "contrast halo" sign, meaning the lesion is surrounded by a ring of hyper- or hypopigmentation. Additionally, fine scales on the skin and hypopigmentation of the hair follicle may be observed. In more difficult cases, we also have the option of performing a potassium hydroxide test. Scraping from the edge of the lesion, soaked in 10-15% KOH, reveals numerous short and thick hyphae mixed with fungal spores. KOH dissolves the keratin, making the hyphae clearly visible under the microscope. The highest concentration of the fungus is found at the border of the lesion, which is why scrapings are taken from there [1].

Treatment

Before starting treatment, we need to inform patients that their condition is not contagious, and that the causative agent is a fungus naturally present on human skin. Completion of treatment does not mean the disappearance of the spots, and the return to normal skin color may take several months.

The first-line treatment for pityriasis versicolor involves topical medications. A 2% ketoconazole shampoo is highly effective. It should be applied to the affected areas for 5 minutes and then rinsed off. It is typically used for 1 to 3 days, most often for 3 days, as pityriasis versicolor tends to recur. Alternative topical treatments include:

- a lotion or shampoo containing selenium sulfide at a concentration of 2.25% to 2.5% applied for 10 minutes daily for a week
- 1% terbinafine used once or twice daily for 1–4 weeks
- 1% ciclopirox applied once daily for 5 minutes over 2 weeks.

In cases where topical therapy is ineffective, oral treatment can be considered. This approach is also suitable for patients with extensive lesions, where topical treatment would be difficult to apply. Before initiating oral therapy, it is important to confirm the failure of topical treatment, bearing in mind that pigmentation changes may persist for several months after completing therapy. Oral treatment options include itraconazole at a dose of 200 mg for 7 days or 300 mg of fluconazole once every 7 days for 2 weeks.

Oral terbinafine is not used because it is ineffective in this form [17]. Systemically administered azole drugs can interact with other medications and may also impair liver function. Some studies have demonstrated the effectiveness of ketoconazole in systemic therapy; however, numerous adverse effects have been reported, such as adrenal insufficiency and liver damage. Consequently, ketoconazole therapy is also not used [18] [19].

Patients with recurrent pityriasis versicolor, especially those with compromised immunity, may use topical or oral medications to prevent relapses, particularly when exposed to high temperatures. Preventive therapies include a 2.5% selenium sulfide shampoo, or a 2% ketoconazole shampoo applied for 10 minutes once a month. Alternatively, itraconazole at a dose of 200 mg twice daily can be used once a month [20].

Conclusion

Tinea versicolor is a relatively common condition in the general population, but it is also recurrent and chronic. Due to its visibility to the naked eye, it often becomes an aesthetic concern for many patients. Although the disease generally has a distinctive clinical presentation, it can sometimes closely resemble other conditions. Therefore, it is worth exploring additional diagnostic methods to ensure accurate diagnosis. It is also essential to be familiar with various treatment options to select the most suitable therapy for each patient and their specific needs, ensuring its effectiveness. We hope that our work will contribute to further improvements in the diagnosis and treatment of this condition.

DISCLOSURE

Author's contribution

Conceptualization: Adrianna Jasiuk, Mateusz Wiekiera, Natalia Madeja, Sylwia Koziej, Martyna Niemczuk; Emilia Kowalczyk methodology: Adrianna Jasiuk, Mateusz Wiekiera, Natalia Madeja, Sylwia Koziej, Martyna Niemczuk; Emilia Kowalczyk software: Adrianna Jasiuk, Mateusz Wiekiera, Natalia Madeja; Enilia Kowalczyk formal analysis: Natalia Madeja, Sylwia Koziej, Martyna Niemczuk; investigation: Adrianna Jasiuk, Mateusz Wiekiera, Natalia Madeja, Sylwia Koziej, Martyna Niemczuk; resources: Adrianna Jasiuk, Mateusz Wiekiera; Emilia Kowalczyk data curation: Sylwia Koziej, Martyna Niemczuk; writing - rough preparation: Natalia Madeja; writing - review and editing: Adrianna Jasiuk, Mateusz Wiekiera, Natalia Madeja, Sylwia Koziej, Martyna Niemczuk; Emilia Kowalczyk visualization: Adrianna Jasiuk; supervision: Adrianna Jasiuk, Natalia Madeja; Emilia Kowalczyk project administration: Adrianna Jasiuk.

All authors have read and agreed with the published version of the manuscript.

Funding Statement

This research received no external funding.

Institutional Review Board Statement

Not applicable

Informed Consent Statement

Not applicable

Data Availability Statement

Not applicable

Conflict of Interest Statement

The authors declare no conflict of interest.

REFERENCES

[1] Leung AK, Barankin B, Lam JM, Leong KF, Hon KL. Tinea versicolor: an updated review. Drugs Context. 2022;11:2022-9-2. Published 2022 Nov 14. doi:10.7573/dic.2022-9-2

[2] Łabędź N, Navarrete-Dechent C, Kubisiak-Rzepczyk H, Bowszyc-Dmochowska M, Pogorzelska-Antkowiak A, Pietkiewicz P. Pityriasis Versicolor-A Narrative Review on the

Diagnosis and Management. Life (Basel). 2023;13(10):2097. Published 2023 Oct 22. doi:10.3390/life13102097

[3] Almalki MK, Alruwaili ZM, Alhammad NS, Alawadi TM, Dajam MS. Tinea Versicolor in a Three-Month Infant: A Case Report and Literature Review. Cureus. 2023;15(6):e40763. Published 2023 Jun 21. doi:10.7759/cureus.40763

[4] Karray M, McKinney WP. Tinea Versicolor. [Updated 2024 Feb 12]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK482500/

[5] Gupta AK, Foley KA. Antifungal Treatment for Pityriasis Versicolor. J Fungi (Basel). 2015;1(1):13-29. Published 2015 Mar 12. doi:10.3390/jof1010013

[6] Saunte DML, Gaitanis G, Hay RJ. Malassezia-Associated Skin Diseases, the Use of Diagnostics and Treatment. Front Cell Infect Microbiol. 2020;10:112. Published 2020 Mar 20. doi:10.3389/fcimb.2020.00112

[7] Wissal Chebil, Najoua Haouas, Raja Chaâbane-Banaoues, Latifa Remadi, Najla Chargui, Selim M'rad, Sameh Belgacem, Azer Ben Salah, Hichem Belhadj Ali, Zeineb Chemli, Marwa Lakoudi, Claudia Cafarchia, Hamouda Babba. Epidemiology of Pityriasis versicolor in Tunisia: Clinical features and characterization of Malassezia species, Journal of Medical Mycology,
Volume 32, Issue 2, 2022, 101246, ISSN 1156-5233, https://doi.org/10.1016/j.mycmed.2022.101246

[8] Alvarado Z, Pereira C. Fungal diseases in children and adolescents in a referral centre in Bogota, Colombia, MycosesVolume 61, Issue 8 p. 543-548, Published 2018 Mar 30. https://doi.org/10.1111/myc.12774

[9] Velegraki A, Cafarchia C, Gaitanis G, Iatta R, Boekhout T. Malassezia infections in humans and animals: pathophysiology, detection, and treatment. PLoS Pathog. 2015;11(1):e1004523. Published 2015 Jan 8. doi:10.1371/journal.ppat.1004523

[10] Sparber F, LeibundGut-Landmann S. Host Responses to Malassezia spp. in the Mammalian Skin. Front Immunol. 2017;8:1614. Published 2017 Nov 22. doi:10.3389/fimmu.2017.01614

[11] Später, S., Hipler, UC., Haustein, UF. et al. Bildung von reaktiven Sauerstoffspezies in vitro durch Malassezia-Hefen . Hautarzt 60, 122–127 (2009). https://doi.org/10.1007/s00105-008-1684-y

[12] Kurniadi I, Hendra Wijaya W, Herawan Timotius K. Malassezia virulence factors and their role in dermatological disorders; 2022;31:65-70, doi: 10.15570/actaapa.2022.8
Available from: https://acta-apa.mf.uni-lj.si/journals/acta-dermatovenerol-apa/papers/10.15570/actaapa.2022.8/actaapa.2022.8.pdf
[13] Leung AK, Barankin B, Lam JM, Leong KF, Hon KL. Tinea versicolor: an updated review. Drugs Context. 2022;11:2022-9-2. Published 2022 Nov 14. doi:10.7573/dic.2022-9-2
[14] Mathur M, Acharya P, Karki A, Kc N, Shah J. Dermoscopic pattern of pityriasis versicolor. Clin Cosmet Investig Dermatol. 2019;12:303-309. Published 2019 Apr 30. doi:10.2147/CCID.S195166
[15] Anne Han, MD; David A. Calcara, BS; William V. Stoecker, MS, MD; et al, Evoked Scale Sign of Tinea Versicolor, Arch Dermatol. 2009;145(9):1078. September 2009, doi:10.1001/archdermatol.2009.203
[16] Renati S, Cukars A, Bigby M; Pityriasis versicolor, https://doi.org/10.1136/bmj.h1394 (Published 07 April 2015)
[17] Leeming JP, Sansom JE, Burton JL. Susceptibility of Malassezia furfur subgroups to terbinafine. Br J Dermatol. 1997;137(5):764-767.
[18] R.J. HAY, G. MIDGELEY, Short course ketoconazole therapy in pityriasis versicolor, Clinical and Experimental Dermatology, Volume 9, Issue 6, 1 November 1984, Pages 571–573, https://doi.org/10.1111/j.1365-2230.1984.tb00861.x
[19] Pityriasis versicolor with ketoconazole, Nardo Zaias. Available from: https://www.jaad.org/article/S0190-9622(89)80166-5/pdf
[20] Faergemann J, Gupta AK, Al Mofadi A, Abanami A, Shareaah AA, Marynissen G. Efficacy of Itraconazole in the Prophylactic Treatment of Pityriasis (Tinea) Versicolor. Arch Dermatol. 2002;138(1):69–73. doi:10.1001/archderm.138.1.69