



## To Study the Clinical and Mycological Study of Pityriasis Versicolor

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### ABSTRACT

**BACKGROUND:** Pityriasis versicolor does not pose a threat to life, but due to its high frequency of recurrence, accompanying cosmetic impacts, and high rate of prevalence, it has earned a place as a significant public health issue. Furthermore, the condition sometimes returns with a variety of clinical symptoms even after receiving appropriate treatment, which presents significant therapeutic hurdles for dermatologists in practice. This emphasizes the necessity of standardizing *Malassezia* spp. susceptibility testing in order to offer valuable insights into the resistance epidemiology of currently available antifungal medications. This could be accomplished by conducting a number of joint studies in India and other countries. Moreover, in natural systems like the human stratum corneum, the clinical significance of susceptibility results will be concurrently assessed with pharmacodynamic and pharmacokinetic investigations. With a focus on their distribution in various clinical specimens and in healthy controls, this study aims to address important queries regarding the involvement of *Malassezia* spp. in the etiology of PV.

**AIM:** The aim of the study was the Clinical and mycological study of pityriasis versicolor.

**MATERIAL AND METHOD:** This is a case-control study carried out in a hospital by the dermatology department. Patients with PV who visit the dermatology department are considered cases, while controls who appear healthy and meet inclusion criteria are men and women. For the in-person interview, a semi-structured and pre-tested questionnaire was used. With their consent, the person was clinically assessed for the related ailment, and the investigator completed the questionnaire herself. Important information was gathered from the lab reports, which are completed as a component of the patient's care. Control groups were chosen from among the patients' onlookers, and in-person interviews were used to record their personal information.

**RESULTS:** 250 individuals who visited the Skin and Venereal Disease Outpatient Department and had clinical signs of PV made up the study group. A total of 270 specimens with varying body sites and 250 PV patients were examined in terms of the color of the lesions. There were 125 persons in the control group, 63 of whom were male and 62 of whom were female, who appeared to be in good health and free of skin problems. With a male to female ratio of 1.03:1, there were 150 (or 60%) male cases and 100 (or 40%) female cases out of 250 total cases. In this investigation, all three forms of pigmentations—hypo, hyper, and erythematous—were identified; hypopigmentation was the most common, accounting for 225 instances (90.0%). Hyperpigmented lesions were found in 77 (30.8%), while erythematous lesions were found only in 3 (1.2%) cases.

**CONCLUSION:** More research is required to determine the spread of different *Malassezia* species, paying particular attention to underlying illnesses and predisposing factors that may hasten the onset of PV. Since the pathogenic strains of *Malassezia* can create strong AhR ligands, more research is needed to understand how chemical AhR modulation affects photo-carcinogenesis and how *Malassezia* is related to skin carcinogenesis. *Malassezia* yeasts have the potential to produce fungemia, particularly in very sick preterm newborns receiving parenteral lipid emulsions. For this reason, lipid-supplemented blood culture medium containing palmitic acid are not commonly used.

**KEYWORDS:** Pityriasis Versicolor, *Malassezia*, Onychomycosis and Pigmented Lesions

### Introduction:

A persistent superficial fungal illness of the stratum corneum, pityriasis (tinea) versicolor is etiologically linked to *Malassezia* species.<sup>1,2</sup> On the typical skin of humans and other warm-

blooded mammals, these are opportunistic yeasts.<sup>3</sup> The genus *Malassezia*, which is lipid dependant, is frequently found in regions with a high concentration of sebaceous glands, such as the shoulders, back, chest, and neck. *Malassezia*

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is a prominent member of the human skin's natural flora and is present in both healthy and diseased skin. It has drawn a good deal of interest. This is a global illness that is most commonly observed in tropical regions with high relative humidity and temperatures. In temperate zones, the incidence ranges from around 1% to nearly 50%, while in some tropical places, hot and humid conditions lead to an increase in prevalence, with a larger incidence in the summer.<sup>4</sup>

Pityriasis is a kind of tiny skin scaling; the term "versicolor" refers to the disorder's many colors. Distinct or confluent discolored skin patches coated in tiny furaceous scales are indicative of the condition. Although all age groups have been documented to experience this, young adults with a larger affinity for sebum-rich areas of the skin are the usual patient. It is mostly a cosmetic concern because it is more common in young adults, and the pigmentary changes in the skin that result from exposure can cause serious mental discomfort, especially when one is approaching marriage. Its appearance is mostly influenced by local environmental conditions such as high temperature and humidity, oily skin, immunodeficiency, corticosteroid medication, pregnancy, and genetic susceptibility. No racial or gender disparities have been identified.<sup>5</sup>

But in some predisposing circumstances, these yeasts multiply abundantly and develop into hyphal form without causing inflammation, unlike PV, or they are associated with disorders that clearly cause inflammation.<sup>6</sup> Additionally, they have a role as an associated agent in the development of confluent and reticulate papillomatosis, onychomycosis, folliculitis, and neonatal cephalic pustulosis, among other dermatological diseases.<sup>7</sup> Moreover, it has become a significant pathogen since it has been linked to potentially fatal systemic infections such as pneumonia and catheter-acquired sepsis, especially in newborns receiving lipid parenteral therapy, keratitis, and otitis externa. Furthermore, it has been documented to be a noteworthy contributor to fungal infections in cancer patients, septic arthritis, abscesses, and peritonitis in patients receiving ambulatory peritoneal dialysis.<sup>8,9,10</sup>

PV is rather simple to treat, often returns even after receiving appropriate care, and presents

significant therapeutic hurdles for dermatologists in practice. The fungus is a typical element of the flora in susceptible persons and lives deep in the hair follicles; it is impossible to completely remove. Relapses may therefore happen sooner rather than later. Furthermore, this disease may develop significantly as a result of unpredictable environmental elements like humidity and high temperatures, which may continue even after therapy.<sup>4</sup> Pigmentary changes might linger even after receiving the right medication and take a few weeks to go away, leading the patient to believe that the illness has returned. PV's high rate of occurrence, frequent recurrence, and related cosmetic impacts have earned it a place as a significant public health issue even if the disease does not pose a threat to life itself.<sup>2</sup> There is every chance that the organism will become resistant to such medications given the widespread concern over high minimum inhibitory concentrations (MICs) to antifungal medicines with growing resistance as well as a rise in reports of PV case recurrences and infections linked to *Malassezia*. These worries are reinforced by recent reports of elevated fluconazole minimum inhibitory concentrations in *Malassezia* species.<sup>7,10</sup> This study has been carried out to respond to major questions about the role in the etiology of PV.

#### **MATERIAL AND METHODS**

This is a case-control study carried out in a hospital by the dermatology department. Patients with PV who visit the dermatology department are considered cases, while controls who appear healthy and meet inclusion criteria are men and women. For the in-person interview, a semi-structured and pre-tested questionnaire was used. With their consent, the person was clinically assessed for the related ailment, and the investigator completed the questionnaire herself. Important information was gathered from the lab reports, which are completed as a component of the patient's care. Control groups were chosen from among the patients' onlookers, and in-person interviews were used to record their personal information.

#### **Inclusion criteria**

- Clinically diagnosed PV cases belonging to all age groups and both sexes.
- PV cases with or without associated clinical conditions.

- Apparently healthy men and women without any skin diseases, or who were diagnosed with or not previously treated for Malassezia-associated skin diseases.

#### Exclusion criteria

- Subjects who could not converse with the interviewer owing to language, physical, or cognitive barriers were excluded from the study.
- Subjects who were on antifungal treatment for the same were excluded.

A total of 250 PV cases (270 sites) and 125 (63 apparently healthy men and 62 women) individuals, without any skin diseases or who were not treated for Malassezia-associated skin diseases were included as controls in the study. A face-to-face interview using a pretested and predesigned questionnaire was used to gather information about each case, including physical characteristics (including name, sex, current age, occupation, and other factors), clinical form of PV (hyper/hypo pigmented or combination of both and erythematous), type of lesion (macular, nummular, follicular, patches, mixed), anatomic sites, number of locations, family history of infection, recurrence, symptoms, co-existing diseases, history of animal contact, and other factors.

#### Specimen Collection

Using sterile No. 15 scalpel blades, specimens were removed from PV lesions by scraping them from the lesions' center without disturbing any parts that appeared to be healthy. Samples were collected using the transparent cellophane tape strip method in situations when there were few scales. When a patient has lesions in more than one area, only the most prominent location was used to get specimens; however, when a patient has mixed hypo- and hyper-pigmented lesions, both lesions were examined under a microscope and cultured.

#### Sample Processing

The laboratory connected to the Dermatology Outpatient Department processed the samples. For the first time, we report on the application of Pugh's stain (initially used to identify the volutin granules of diphtheria bacilli) to demonstrate Malassezia fungal components in both PV and healthy, normal persons. Its effectiveness was evaluated by comparison with KOH wet mount, which is frequently utilized. A spotless glass slide was coated with a drop of Pugh's stain. A drop of stain was carefully deposited onto a clean glass slide, then the adhesive side of a clear cellophane tape was placed onto the lesion. The preparation was examined using a microscope's 100X objective, and the existence of fungal components was noted.

#### STATISTICAL ANALYSIS

Statistical analysis was performed with the Statistical Package for Social Sciences (SPSS) 16.01 and Excel 2007 and 2010. Descriptive statistics for categorical data were formulated as percentages and numerical data were formulated as mean. For the comparison of categorical data Chi-square test was used.

#### RESULT: -

250 individuals who visited the Skin and Venereal Disease Outpatient Department and had clinical signs of PV made up the study group. A total of 270 specimens with varying body sites and 250 PV patients were examined in terms of the color of the lesions. There were 125 persons in the control group, 63 of whom were male and 62 of whom were female, who appeared to be in good health and free of skin problems. With a male to female ratio of 1.03:1, there were 150 (or 60%) male cases and 100 (or 40%) female cases out of 250 total cases.

**Table 1: Colour of the PV Lesions**

Color of the lesion	Number	Percentage
Hypopigmentation	145	58.00
Hyperpigmentation	77	30.8
Erythematous	3	1.2
Mixed	25	10
<b>Total</b>	<b>250</b>	<b>100</b>

All three types of pigmentations (hypo, hyper, and erythematous) were found in this study with the most frequent being hypopigmentation as seen in 225 cases (90.0%). Hyperpigmented lesions were found in 77 (30.8%), while erythematous lesions were found only in 3 (1.2%) cases. Mixed types of lesions were seen in 25 (10%) cases of which 23 cases were hypo and hyperpigmented lesions and two cases showed all three types of lesions.

**Table 2: Form of the PV Lesions**

Form of the lesions	Number	Percentage
Macular	112	44.8
Patches	35	14.00
Follicular	33	13.2
Nummular	23	9.2
Mixed	47	18.8
<b>Total</b>	<b>250</b>	<b>100</b>

With regard to the form of lesions, macular 112 (44.8%), patches 35 (14.00%), follicular 33 (13.2%), and nummular 23 (9.2%) forms were seen. Mixed type of macular lesions along with patches and small perifollicular lesions were presented with 47 cases (18.8%). No papular lesions were observed

**Table 3: Associated Clinical Condition**

Associated clinical condition	Number	Percentage
Seborrhoeic dermatitis	115	46
Diabetes mellitus	37	14.8
Acne vulgaris	15	6
Hypertension	12	4.8
Asthma	14	5.6
Candidiasis	10	4.00
Malignancy	8	3.2
Warts	7	2.8
Keloid	4	1.6
Melasma	5	2
Alopecia areata	5	2
Hansen disease	2	0.8
Berckes nevus	1	0.4
Vitiligo	2	0.8
No disease association	13	5.2
<b>Total</b>	<b>250</b>	<b>100</b>

Out of the total 250 PV cases studied, 115 patients (46%) had co-existing seborrhoeic dermatitis, 37 (14.8%) had diabetes mellitus, 15 (6%) had acne vulgaris and 14 (5.6%) had asthma. Other infections like candidiasis were observed in 10 (4%), malignancy in 8 (3.2%), warts in 7 (2.8%), keloid in 4 (1.6%), melasma in 5 (2%), alopecia areata in 5 (2%). Hansen's disease was seen in 2 (0.8%), Berckes nevus 1 (0.4%), and vitiligo 2 (0.8%) were very few in number. PV cases

without any associated disease were observed in 13 cases (5.2%). Underlying diseases associations with PV cases.

#### **DISCUSSION**

One of the most common cutaneous dyspigmentations found in tropical and subtropical regions of the world is pityriasis versicolor. Lipophilic fungi of the genus *Malassezia*, which are thought to be a normal part of the skin's flora, are the cause of PV.<sup>11,12</sup> It's a dermatosis that presents as discolored

patches with fine furfuraceous scales that are either discrete or confluent. Additional synonyms are body posts, liver spots, dermatomycosis furfuracea, tinea versicolor, and chromophytosis.<sup>13,14</sup>

With a male-to-female ratio of 1.06:1, the study reveals no gender preference and demonstrates that both sexes are equally susceptible to this illness. There were 51.42% males and 48.58% females. This is consistent with research conducted across the globe, including in India. This could be because both sexes are paying more attention to skin health and appearance, especially in the examined area among young adults who are ready to get married. With a male-to-female ratio of 1.06:1, the study reveals no gender preference and demonstrates that both sexes are equally susceptible to this illness. There were 51.42% males and 48.58% females. This is consistent with research conducted across the globe, including in India. This could be because both sexes are paying more attention to skin health and appearance, especially in the examined area among young adults who are ready to get married.<sup>15,16</sup>

The lesions of PV occur in multiple colors in the skin of infected individuals as its name implies<sup>10,17</sup> and present with various morphological patterns such as hypopigmented, hyperpigmented, and erythematous form (PV rubra), or a combination of these patterns.<sup>18,19</sup> In agreement with other studies conducted in India,<sup>20,21</sup> Brazil,<sup>2</sup> Indonesia,<sup>22</sup> Iraq<sup>23</sup> and Egypt<sup>16</sup> by different research groups, this study also shows more occurrence of hypopigmented lesions (70.62%) than hyperpigmented (22.51%) form with very few erythematous lesions (0.71%). A higher frequency of hyperpigmented lesions than hypopigmented form was also noticed in some studies from Egypt<sup>16</sup> and Bosnia–Herzegovina.<sup>24</sup> In this study, mixed type of pigmentations on the same patient was also observed in 6.61% of patients. These mixed types of pigmentations were observed in many studies<sup>2,24,25</sup> but have not been mentioned in some others. Similarly, erythematous lesions were observed in different studies<sup>2,12</sup> but not observed in some others.<sup>20,21</sup>

**Krishnan K et al. 2015**<sup>20</sup> in Jammu reported a history of immunosuppressive therapy in the past in 1.62% of the patients. Coexisting seborrhoeic dermatitis (9.73%), pityriasis

capitis (7.03%) acne vulgaris (14.05%) Pityriasis folliculitis (3.24%), and atopic eczema (3.24%) were found. **Tabaseera N et al. 2014**<sup>21</sup> in Mandya, Karnataka with reported associated seborrhoeic dermatitis in 31.4% of 105 PV cases. No co-existing systemic diseases were recorded. **Abdullah AM and Sulaiman AA 2013**<sup>25</sup> in Erbil City found seborrhoeic dermatitis in 24.2% of 120 patients with PV. Topical antifungal drugs were used by 25% of patients and a systemic antifungal was used by one patient only. Diabetes mellitus was present in four patients, three of them used topical steroids and two used systemic steroids.

Several theories have been put forward to explain hypopigmentation including the filtering of UV light by the growth of organisms in the skin,<sup>26</sup> a block in the transfer of melanosomes to keratinocytes, and the inhibition of melanin production by lipoxygenase resulting in the production of lipoperoxides which might have toxic effects on melanocytes.<sup>27,28</sup>

PV is relatively easy to cure and frequently recurs despite adequate treatment posing considerable therapeutic challenges to practicing dermatologists.<sup>29</sup> The fungus is a natural component of the flora in susceptible people; it lives deep within hair follicles and is difficult to completely eradicate. Relapses may therefore happen sooner rather than later. In addition, the development of this disease was greatly influenced by uncontrollable environmental conditions, such as high temperatures and humidity, which may continue even after therapy. This contributed to a range of recurrence rates even after treatment. The distinctive nature of the ailment may contribute to the widespread worry and likelihood of recurrence.<sup>4,21</sup>

**Banejee S 2011**<sup>12</sup> in West Bengal reported that out of 160 confirmed cases of PV, the majority of the lesions (146) were macular. Small perifollicular lesions were observed in 30% of their cases (either alone or in combination with larger no follicular macules) and significantly elevated papular lesions in 13.1% of cases. **Morais PM et al. 2010**<sup>2</sup> in Brazil reported that out of 116 PV cases, nummular lesions in 91.4%, confluent lesions in 48.3%, follicular lesions in 24.1%, and circinate lesions in 0.9%.

None of them had presented with papular lesions.

Many of the study participants claimed that using leaf extracts of *Cassia alata* (Anathakara) was an excellent treatment for pityriasis versicolor. Research on this leaf extract's potent anti-*Malassezia* properties as well as those of other plant extracts derived from Ayurvedic natural herbs is advised. This will help in the creation of fresh antifungal medications. Clinical evaluation of these more recent formulations is necessary to offer economical management approaches. Research institutions financed by the government and the commercial sector should collaborate on this project.

### CONCLUSION:

More research is required to determine the spread of different *Malassezia* species, paying particular attention to underlying illnesses and predisposing factors that may hasten the onset of PV. Since the pathogenic strains of *Malassezia* can create strong AhR ligands, more research is needed to understand how chemical AhR modulation affects photo-carcinogenesis and how *Malassezia* is related to skin carcinogenesis. The use of lipid-supplemented blood culture media (with palmitic acid), which are not used in routine cases, may be warranted for blood cultures, especially if cultures appear sterile on routine media to improve recovery of *Malassezia* in this patient group. This is because *Malassezia* yeasts can cause fungemia, especially in critically ill premature neonates receiving parenteral lipid emulsions. In this regard, a thorough investigation is necessary. This will make it easier to compare results with other research done in areas with similar climates.

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