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Impacts of Clinical and Demographical Aspects on the Duration of Pytiriasis Versicolor

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ABSTRACT

Background: Pityriasis versicolor (PV) or tinea versicolor is a superficial fungal infection characterized by macules on the skin. It is generally caused by the fungus Malassezia. PV is found throughout the world, especially in tropical countries. Generally, this infection is influenced by humidity, hyperhidrosis, and population density around the world. One of the ways to establish PV is through the KOH examination. **Purpose:** Evaluating the correlation between the clinical and demographic factors and the duration of illness of outpatient PV patients of the Mycology Division of Dermatology and Venereology Department at Dr. Soetomo General Academic Hospital from 2018 to 2020. **Methods:** This is an observational analytic study based on medical records at the outpatient clinic of Mycology Division of the Dermatology and Venereology Department of Dr. Soetomo General Academic Hospital. The data was collected in October 2021. The chi-square test is used to analyze the data in this study. **Result:** 216 PV patients' data was collected. Most gender was male, most age group was 20-60, most weight group was 51 – 60 kg, most regional origin was from Surabaya, and most duration of infection was <3 months. In this study, topical and systemic treatment of this disease had a significant relationship with patients' duration of illness (topical p=0.05; systemic p=0.026). **Conclusion:** Topical and systemic treatment of this disease has a significant relationship with the duration of illness in PV patients.

Keywords: pytiriasis versicolor, treatment, human and disease, clinical factor, demographic factor.

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BACKGROUND

Indonesia is a tropical country with a high temperature of up to more than 30ºC and a high humidity of up to 70 to 90% on a daily basis. The high temperature and high humidity promote the growth of tropical microbes such as fungi. Dermatomycosis, or mycosis, is a dermatological disease due to a fungal infection that comprises superficial and subcutaneous mycosis.[1]

Pityriasis versicolor (PV) or tinea versicolor is one of the superficial mycoses due to *Malassezia* spp., which could be identified through the presence of irregular multicolored maculae on the skin with a pronounced or diffused border.[2,3] PV is commonly found throughout the world, often in countries with tropical climates. As with all other fungal infections, the occurrence and recurrence of PV are highly influenced by high humidity, over-perspiration, and the local population density.[4]

The genus *Malassezia* spp. includes 14 species as the etiology of PV. Seven species had been identified in 1996, including *M. globosa, M. restrikta, M. furfur, M. sympodialis, M. slooffiae, M. obtuse,* and *M. pachydermatis*, while the other seven had just been recently found in the last decade, including *M. dermatis, M. japonica, M. nana, M. yamatoensis, M. equina, M. caprae, and M. cuniculi*.[5]

The general prevalence of superficial mycosis in Indonesia has not been observed yet, while the prevalence of superficial mycosis between dermatology centers is widely varied. In the Dermatology and Venerology Outpatient Center of Dr. Soetomo General Academic Hospital, Surabaya, superficial mycosis occurred in 502 patients (5,47%) in 2011, 312 patients (4,91%) in 2012, and 322 patients

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(5,90%) in 2013. Among the superficial mycosis diagnoses, 94 patients (28.3%) were diagnosed with PV during the 2013 - 2015 period.[6] Another Dermatology and Venerology Center in Denpasar, the Outpatient Center of Sanglah Regional Public Hospital, reported that in 2017, superficial mycosis was observed in 36 patients (1.13%), which mostly comprises men (61.1%) and patients aged 11 to 22 years old (38.8%).[7]

The incidence of PV was relatively significant, particularly in compromised countries with tropical climates such as Indonesia. Thus, we assumed that the observation of incidences, sociodemographic characteristics, clinical profile, and predisposing factors of PV is related to the duration and severity of the illness and rather beneficial for the prevention, diagnosis, treatment, and education of the patients. Hence, improving the quality of life of patients with PV.

METHODS

This is an analytic observational study with a cross-sectional approach. The sample for this research was all patients with Pityriasis Versicolor admitted to the Mycology Division of Dermatology and Venerology Outpatient Unit in Dr. Soetomo General Academic Hospital from 2018 to 2020. Samples were chosen using the total sampling method. Secondary data was obtained through medical records. The duration of illness, age, gender, Body Mass Index (BMI), risk factors, clinical features, location of lesions, supporting examinations, and treatment regimens were observed. The length of illness is the dependent variable in this study.

Data from this study were analyzed through nominal regression with Statistical Package for the Social Sciences (SPSS) v.25 and presented in tables. The chi-square test is used to analyze the data in this study, and a *p*-value of <0.05 was considered significant.

The ethics were cleared by the Ethics Committee of Dr. Soetomo General Academic Hospital, Surabaya, East Java, Indonesia (0559/LOE/301.4.2/VIII/2021).

RESULTS

Table 1. Characteristics of the Duration of Illness of Pityriasis Versicolor at the Outpatient Dermatology and Venerology of Dr. Soetomo General Academic Hospital Surabaya during 2018 – 2020

Characteristics	n (%)
Duration of Illness	
<3 months	118 (54.6%)
>3 months	98 (45.4%)

During the 2018 - 2020 period, a total of 216 patients were admitted to the Mycology Division of the Dermatology and Venerology Outpatient Unit in Dr. Soetomo General Academic Hospital. Consecutively, 77 patients (35.65%) were admitted in 2018, 90 patients (41.67%) in 2019, and 49 patients (22.69%) in 2020.

Most of the patients suffered from PV for less than 3 Months - 118 patients (54.6%). The duration of the illness was accounted for from the first clinical presentation up to the first medical appointment.

Table 2. The sociodemographic of Pityriasis Versicolor at the Outpatient Dermatology and Venerology of Dr. Soetomo General Academic Hospital Surabaya during 2018 – 2020

Sociodemographics			
Characteristics	Duration of illness		*p*
	<3 months n (%)	>3 months n (%)	
Age groups			
0-1 years	5 (2.3%)	2 (0.9%)	0.819
2-10 years	15 (6.9%)	10 (4.6%)	
11-19 years	31 (14.4%)	24 (11.1%)	
20-59 years	64 (29.6%)	59 (27.3%)	
>60 years	3 (1.4%)	3 (1.4%)	
Gender			
Male	67 (31.0%)	63 (29.2%)	0.262
Female	51 (23.6%)	35 (16.2%)	
BMI			
<18,5 kg/m^2	20 (9.3%)	16 (7.4%)	
18,5 - 22,9 kg/m^2	64 (29.6%)	47 (21.8%)	0.187
23 - 24,9 kg/m^2	11 (5.1%)	15 (6.9%)	
25 - 29,9 kg/m^2	13 (6.0%)	17 (7.9%)	
>30,0 kg/m^2	10 (4.6%)	3 (1.4%)	

BMI = Body Mass Index

PV most commonly occurred in adult men : 130 patients (60.2%), 123 (56.9%) patients at the age of 20 to 59 years old, and 111 patients (51.4%) with normal BMI. There is no significant relationship between age

(p=0.819*),* gender *(p*=0.262), BMI *(p*=0.187) and PV duration of illness.

Table 3. The risk factor of Pityriasis Versicolor at the Outpatient Dermatology and Venerology of Dr. Soetomo General Academic Hospital Surabaya during 2018 – 2020.

Endogen factors			
Characteristics	Duration of illness		*p*
	<3 months n (%)	>3 months n (%)	
Oily Skin			
Not presence	9 (4.2%)	8 (3.7%)	0.884
Presence	109 (50.5%)	90 (41.7%)	
Hyperhidrosis			
Not presence	89 (41.2%)	74 (34.2%)	0.988
Presence	29 (13.4%)	24 (11.1%)	
Hereditary			
Not presence	111 (51.4%)	94 (43.5%)	0.758
Presence	7 (3.2%)	4 (1.9%)	
Immunodeficiency			
Not presence	116 (53.7%)	95 (44.0%)	0.661
Presence	2 (0.9%)	3 (1.4%)	
Immunosuppressant			
Not presence	97 (44.9%)	85 (39.4%)	0.363
Presence	21 (9.7%)	13 (6.0%)	
Leprosy			
Not presence	108 (50.0%)	93 (43.1%)	0.332
Presence	10 (4.6%)	5 (2.3%)	
Other Comorbid			
Not presence	101 (46.8%)	86 (39.8%)	0.643
Presence	17 (7.9%)	12 (5.6%)	

Exogen factors			
Characteristics	Duration of illness		*p*
	<3 months n (%)	>3 months n (%)	
Humidity			
Not presence	38 (17.6%)	30 (13.9%)	0.802
Presence	80 (37.0%)	68 (31.5%)	
Hygiene			
Not presence	102 (47.2%)	79 (36.6%)	0.247
Presence	16 (7.6%)	19 (8.8%)	
Garments Occlusion			
Not presence	107 (49.5%)	95 (44.0%)	0.063
Presence	11 (5.1%)	3 (1.4%)	

This study classified the possible risk factors for PV into endogenous and exogenous factors. Among patients with >3 months of illness, there are 90 patients (41.7%) with oily Rskin, 24 patients (11.1%) with hyperhidrosis, 4 patients (1.9%) with hereditary patterns, 3 patients (1.4%) with immunodeficiency conditions, a total of 13 patients (6.0%) using immunosuppressant agents, 5 patients (2.3%) with leprosy, and 12 patients (2.6%) with other comorbidities. Among the endogenous risk factors, there is no significant relationship between all endogenous risk factors and duration of illness (for oily skin p=0.884; hyperhidrosis p=0.988; patients with hereditary p=0.758; for immunodeficiency patients p=0.661; immunosuppressant consumers p=0.363; leprosy patients p=0.332 and other comorbidities p=0.643).

On the exogenous side, among patients with >3 months of illness, the humidity risk factor was present in 68 patients (31.5%, p=0.802), while hygiene was present in 19 patients (8.8%, p=0.247), and garment occlusion in 3 patients (1.4%, p=0.063). There is no significant relationship between exogenous risk factors and duration of illness, but garment occlusion is closely associated with PV duration of illness.

Table 4. The clinical manifestation of Pityriasis Versicolor at the Outpatient Dermatology and Venerology of Dr. Soetomo General Academic Hospital Surabaya during 2018 – 2020.

Characteristics	Duration of illness		*p*
	<3 months n (%)	>3 months n (%)	
Dermatologic presentations			
Hypopigmentation			
Negative	21 (9.7%)	16 (7.4%)	0.775
Positive	97 (44.9%)	82 (38.0%)	
Hyperpigmentation			
Negative	99 (45.8%)	77 (35.6%)	0.316
Positive	19 (8.8%)	21 (9.7%)	
Erythematous			
Negative	88 (40.7%)	75 (34.7%)	0.740
Positive	30 (13.9%)	23 (10.6%)	
Supporting examinations			
Wood's Lamp			
Negative	77 (35.6%)	58 (26.9%)	0.359
Positive	41 (19.0%)	40 (18.5%)	
Potassium hydroxide (KOH)			
Negative	8 (3.7%)	8 (3.7%)	0.699
Positive	110 (50.9%)	90 (41.7%)	

The majority of the patients with ≥ 3 months of illness came with clinical manifestations of hypopigmentation: 82 patients (38.0%, *p*=0.775), while hyperpigmentation and erythematous skin lesions were only present in consecutively 21 patients (9.7%, *p*=0.316) and 23 patients (10.6%, *p*=0.740).

Among the patients with ≥ 3 months of illness that were assessed for Wood's lamp examination, 40 patients (18.5%, *p*=0.359) tested positive for *Malassezia* spp. infection, while the Potassium hydroxide (KOH) examination accounted for more positive results in fungal infection in 90 patients (41.7%, *p*=0.699).

Table 5. The lesion sites of Pityriasis Versicolor at the Outpatient Dermatology and Venerology of Dr. Soetomo General Academic Hospital Surabaya during 2018 – 2020.

Lesion sites			
Characteristics	Duration of illness		*p*
	<3 months n (%)	>3 months n (%)	
Face			
Negative	58 (26.9%)	59 (27.3%)	
Positive	60 (27.8%)	39 (18.1%)	0.105
Superior extremities			
Negative	82 (38.0%)	67 (31.0%)	0.859
Positive	36 (16.7%)	31 (14.4%)	
Anterior thorax			
Negative	79 (36.6%)	62 (28.7%)	
Positive	39 (18.1%)	36 (16.7%)	0.571
Posterior thorax			
Negative	65 (30.1%)	50 (23.1%)	0.551
Positive	53 (24.5%)	48 (22.2%)	
Inferior extremities			
Negative	102 (47.2%)	81 (37.5%)	0.441
Positive	16 (7.4%)	17 (7.9%)	
Generalized			
Negative	107 (49.5%)	92 (42.6%)	0.385
Positive	11 (5.1%)	6 (2.8%)	

The lesion sites of PV patients were found to be tremendously varied. In patients with ≥ 3 months of illness, lesions in the posterior thorax, being the most predilected area, were found in 48 patients (22.2%, *p*=0.551), while other lesions were found in the facial area in 39 patients (18.1%, p=0.105), upper extremities in 31 patients (14.4%, *p*=0.859, anterior thorax in 36 patients (16.7%, *p*=0.571), inferior extremities in 17 patients (7.9%, *p*=0.441), and generalized lesions in 6 patients (2.8%, *p*=0.385).

Table 6. The treatment of Pityriasis Versicolor at the Outpatient Dermatology and Venerology of Dr. Soetomo General Academic Hospital Surabaya during 2018 – 2020.

Treatment regiments			
Characteristics	Duration of illness		*p*
	<3 months n (%)	>3 months n (%)	
Topical			
No Topical Treatment	61 (28.2%)	72 (33.3%)	0.005
Ketoconazole	53 (24.5%)	24 (11.1%)	
Non-Ketoconazole	4 (1.9%)	2 (0.9%)	
Systemic			
No Systemic Treatment	40 (18.5%)	21 (9.7%)	0.026
Ketoconazole	66 (30.6%)	72 (33.3%)	
Non-Ketoconazole	12 (5.6%)	5 (2.3%)	

The treatment regimens were classified into topical and systemic regimens. This study did not account for the combined regimens of topical and systemic agents in the regression due to its limited findings in 9 patients (4.16%).

In patients with ≥ 3 months of illness, most of the patients did not receive any topical treatments, (72 patients, 33.3%), but instead were prescribed systemic regimens (72 patients, 33.3%). Ketoconazole remained the treatment of choice in PV management. Among the patients with ≥ 3 months of illness receiving topical treatments, 24 patients (11.1%) were prescribed ketoconazole. Other topical treatments comprise antibiotic ointments, steroids, and combined topical regimens, while other systemic regimens comprise oral antibiotics, oral corticosteroids, oral antihistamines, and combined systemic regimens. In this study, topical and systemic treatment of these disease had a significant relationship with patients' duration of illness (topical p=0.05; systemic p=0.026).

DISCUSSION

Pityriasis versicolor, or tinea versicolor, is a chronic benign superficial fungal infection caused by *Malassezia* spp., which is one of the varied normal skin flora. Due to the immensely varied environmental states and the climate-dependent characteristics of PV, the epidemiological and clinical presentation of PV vary accordingly between different geographical areas.[8]

Several factors that had been previously associated with PV comprise high humidity, oil-based ointments due to the lipophilicity of *Malassezia* spp., steroids overuse, genetic predisposition, malnutrition, and hyperhidrosis. Other studies also reckon that increased sebum secretion during puberty in late adolescence and early adulthood, tropical and subtropical climates, immunosuppression, prolonged usage of oral corticosteroids, poor hygiene, Cushing syndromes, disease, and pregnancy are significant predisposing factors for PV occurrence. [8,9,10]

The high prevalence of PV among adults from 20 to 60 years old was presumably due to the compromised nature of adults and an overproduction of sebum. The adult apocrine glands are naturally more active, which underlies the more oily and infection-prone skin in adults.[11] However, age is not the only factor affecting the occurrence of PV, as other predisposing factors such as occupations, living environments, and sun exposure could also promote the occurrence of PV in other age categories. We found a huge range of ages in this study, with the youngest patient being 4 months old and the oldest being 90 years old. PV is generally possible in all age groups, from infants to seniors.[12]

Men comprise most of the PV patients in this study. This finding follows previous similar studies in Denpasar, Indonesia, which reported a 61.1% predominance of men in the PV population.[4] Fundamentally, the occurrence of PV based on gender varies in different countries. However, the hypermetabolism that often occurs in men, in addition to the men-inclined occupational factors that are commonly more physical and outdoorsy, tends to trigger over-perspiration in men, which then causes more fungal infections on the skin.[4,13]

The percentage of boys was higher than the proportion of girls among all the children with superficial fungal infections. This is predicted given that women in our environment perform more domestic tasks like cleaning dishes and clothes as well as other hygiene rituals like hand washing. Additionally, women are more concerned with personal cleanliness and grooming, such as weaving their hair to lower the chance of infection, whereas men are more likely to participate in outdoor activities that promote intimate contact with the ground. Males typically cut their hair short and frequent the neighborhood barbershops, where the tools used to cut hair may not be frequently sanitized and the barbers are less likely to consistently acquire the disinfectants due to ignorance.[13]

Although the majority of PV patients in this study had a normal BMI, 41.2% of them—or nearly half—were overweight or obese. This is in line with a previous study that reported a significant impact of BMI on the occurrence of PV. A higher BMI created a hyperhidrosis condition due to higher fat amounts in the obese body. This abundance of fat also increases the internal production of heat, which further promotes the intensity of the hyperhidrosis that occurs. As previously reported, not only hyperhidrosis was observed to significantly prolong the duration of PV in this study, but hyperhidrosis had also been previously reported to increase the occurrence of PV in the preceding study.[14]

As in other diseases, PV involves an entanglement of various risk factors, both inside and outside one's body. PV is generated through the activity of *Malassezia* spp., which is transformed into mycelium. This transformation implicates both endogenous and exogenous risk factors for the host. One of the most glorified exogenous risk factors in PV is high temperatures and high humidity, as these risk factors promote the transformation of the fungus.[15] This promotion of growth explains the predominance and the significant association between humidity and the occurrence of PV in this study, particularly in Indonesia, a tropical country with high temperatures and high humidity. In these high temperatures and humidity environments, the daily perspiration would be overabundant due to physiological thermoregulation to decrease internal temperatures, thereby increasing the opportunity of fungal infection due to the humidity created by the overperspiration.[16]

The maintenance of personal cleanliness was linked to superfisial fungal infections. Children with poor personal cleanliness were more likely to have SFIs than those with high or average personal hygiene. This was consistent with the results of earlier research. This observation may be explained by the fact that the environment is favorable for the growth of both dermatophytes and non-dermatophytes due to the presence of filthy skin, unkempt nails, hair, and clothing.[13]

Personal hygiene is the act of caring for oneself and keeping one's body and clothing clean to promote overall health and well-being. Hygienic behaviors include using towels for personal use only, wearing sweat-absorbing clothes, bathing with soap, and other essential daily habits that are often ignored, particularly by people with low socioeconomic status. Maintaining a high level of personal hygiene can help increase self-confidence and self-esteem, leading to a healthy lifestyle. While failure to maintain hygiene standards may have many implications, not only is there a high risk of disease or infection, but there are also many social and psychological problems that may result from poor hygiene.[17,18,19]

A study by Wardana *et al*. (2020) also presented a significant association between poor hygiene and the prevalence of PV.[18] Another study by Ray *et al*. (2019) also reported that personal hygiene, along with frequent garment occlusion, is a key factor in the development of PV. The overgrowth of commensal fungus, *Malassezia* spp., is triggered by high temperatures, high humidity, and skin occlusion, primarily by clothing, cosmetics, and sanitary napkins. The occlusion of synthetic clothing produces an increased concentration of carbon dioxide, skin microflora alterations, and increased skin acidity. These cascades would synergistically and interchangeably further promote the development of PV.[8,10]

Other than that, garment occlusion is also an important factor in this disease. A possible cause of chronic or recurrent exposure to fungus that accounts for treatment failure is the rising use of form-fitting synthetic undergarments and the sharing of clothing among family members. An additional disadvantage of tight undergarments is the retention of moisture in an enclosed setting for an extended period of time.[20]

This study shows several comorbidities and skin diseases related to PV, including leprosy, immunodeficiency, immunosuppressant use, and others. Leprosy is an infectious disease that targets macrophages and Schwann cells: and is caused by an acid-fast intracellular organism, *Mycobacterium leprae*. PV is a superficial fungal infection that is often considered in the clinical differential diagnosis of leprosy. Previous studies have reported a higher incidence of PV in leprosy patients when compared to the general population, but the underlying pathophysiologies are still unclear. Leprosy is marked by partial or complete destruction of the skin appeandages, including the sebaceous glands: thus, the localization of leprosy lesions and PV is a clinical paradox. Theoretically, leprosy would inhibit the growth of *Malassezia* spp. due to the lipophilic nature of the fungus, except for *M. pachydermatis,* which is mainly found in domestic animals such as dogs but could occasionally infect humans. The long duration of steroid administration in Morbus Hansen is thought to provide better clinical improvement. While 37.4% of the side effects of long-term steroid use are mild, such as dyspepsia, skin disorders, and lipodystrophy, 62.6% of them are severe, such as neuropsychiatric disorders, eye disorders, cardiovascular disease, gastrointestinal bleeding, metabolic-hormonal disorders, and infection

reactivation. Systemic steroid administration may be a major factor promoting the development of PV.[21,22,23]

Regarding the clinical manifestation of PV, we found that hypopigmentation predominated over the other clinical features of PV, which is indeed a common finding in most PV cases. Hypopigmented lesions manifest through the metabolism process of *Malassezia* spp. which produces azelaic acid, a competitive tyrosinase inhibitor. Tyrosinase can destroy melanocytes and disrupt melanin production. Hence, limited pigments would be produced: and presented as hypopigmented lesions in PV patients.[24,25] The presence of pityriacitrin during PV infection: produces metabolites with the ability to absorb and filter the ultraviolet light from sun exposure and disrupt the normal skin tanning process, further promoting the hypopigmentation of the skin.[24]

Other manifestations of PV in the skin are hyperpigmentation and erythematous lesions. Hyperpigmented lesions occur due to a thicker corneal layer, larger melanocytes, and inflammatory reactions during the fungal infection of PV. Therefore, hyperpigmented lesions generally occur due to more intense inflammation and increased production of melanin, which indicates a more intense severity of the disease and accordingly affects the prognosis of PV patients. Hyperpigmented lesions often have a higher number of organisms and a more pronounced inflammatory infiltrate than hypopigmented lesions. PV patients usually manifest diffuse scales. This clinical manifestation was more frequently seen in hyperpigmented lesions compared to hypopigmented lesions. The degree of scaling in these hyperpigmented lesions may indicate a more severe disease and a worse prognosis.[26,27]

This study also showed that the truncus areas were the most predilected lesion sites. The results corroborated with the basic theory that PV is a disease caused by saprophytic organisms of *Malassezia* spp., which habitually colonize the oily and fatty skin areas of the body due to the abundance of sebaceous glands, including the head, neck, and truncus.[28] PV could also occur at multiple lesion sites. These combined lesion sites also have a considerable portion compared to the singular lesion sites. This finding can occur allegedly due to a large number of patients who fail to receive appropriate treatments at the initial stage of the infection, which allows the lesions to spread and expand throughout the body. PV is also generally asymptomatic, therefore patients are not commonly aware of the infection.[29]

Wood's lamp is usually employed to diagnose skin diseases, whether due to bacterial and fungal infections, pigmentation disorders, porphyria, or other diseases. A positive result of Wood's lamp examination is indicated by the presence of golden-yellow fluorescence with clear boundaries of the lesions. This study did not find sufficient data regarding the characteristics of Wood's lamp examination results due to the large number of unrecorded examination results in the medical records. These poorly organized records of Wood's lamp examination results may be due to the non-routine nature of the examination. Wood's lamp is merely employed by clinicians to confirm the diagnosis of PV. However, the PV diagnosis can often be determined only through history-taking and basic physical examinations, illustrating the typical manifestation of PV.[30] The spaghetti and meatballs are the most observed microscopic manifestation upon KOH examination in this study. KOH is generally very accommodating in PV diagnosis. The blue hue would present itself right after the staining with KOH 10-20% and blue-black parker ink. The KOH examination could confirm the presence of fungal infection by illustrating hyphae or fungal mycelium, which formed as the letters I, J, and V, and fungal spores, which formed clustered circular or oval formations often called spaghetti and meatballs.[7]

The treatment regimens observed in this study comprise topical and systemic regimens. The most commonly prescribed topical treatment is the 2% ketoconazole cream. The consideration in prescribing this particular ointment is based on the recommendation from the Indonesian national association of dermatologists and venereologists, which has proven the effectiveness of the antifungal ointment through previous studies and observations.[31] This recommendation is also supported by randomized controlled trial (RCT) literature comparing the effectiveness of ketoconazole and luliconazole creams.[32]

For the systemic treatments, 200 mg oral ketoconazole is the most commonly prescribed regimen. Oral ketoconazole possesses similar effectiveness as an antifungal agent compared to topical ketoconazole. However, systemic drug administration could induce more pronounced adverse effects. Thus, systemic agents are usually employed as a second-line treatment and are only commonly used in more severe cases.[33,34] Systemic drugs would also be rationally used for relapse cases or in cases of minimal to no clinical response to topical antifungal agents.[29]

This study prevailed to present several significant risk factors in regards to the duration of illness in PV. Treatment of this disease, both systemic and topical, is associated with PV duration of illness. Topical antifungal medications typically work best for treating tinea versicolor because there are fewer side effects.

Patients with severe disease, recurrent recurrences, or disease that is resistant to topical therapy are often the only ones who receive oral antifungal therapy. Combining oral and topical treatments may be used for situations that are persistent or resistant. Oral antifungal medications are typically used only in cases of severe, extensive, resistant, or recurrent illness. The choice of antifungal agents depends on a number of factors, including the antifungal agent's effectiveness, safety, local availability, ease of administration, likelihood of compliance, and potential drug interactions, in addition to the severity and extent of tinea versicolor, patient age, and patient and doctor preferences.[35]

In clinical practice, the preferred course of action is frequently determined by patient preferences and the doctor's background. PV will continue if left untreated, and frequent or maintenance therapy is encouraged by high recurrence rates. It seems that the results are more positive when topical medicines are used for a longer period of time. Fluconazole and itraconazole's mycological cures are unaffected by duration or dose, meanwhile. To reduce symptoms, especially in more severe cases, preventive treatment may be required.[33,35]

PV is a disease that occurs due to the continuous interaction between endogenous and exogenous factors in the host. *Malassezia* spp., constituting the etiology of this disease, is a normal part of the skin flora of a human being. The prevalence of *Malassezia* infection depends on various factors, such as age, gender, body positioning, environment, and other endogenous factors. PV is a disease that is closely related to sebum production and hormonal influences. However, these factors are also influenced by the presence of major risk factors such as high temperatures, high humidity, oily skin, corticosteroid use, immunodeficiency diseases, and overcrowded living spaces. Exogenous factors such as habits and environment are strong predisposing factors for the occurrence of this disease and are associated with the patient's prognosis and disease course. Poor personal hygiene increases the risk of this disease six times higher in at-risk populations compared to good personal hygiene. Poor personal hygiene behaviors, including the use of non-absorbing clothing, result in increased sebum glands and a slower rate of sweat evaporation, causing an increase in the population of *M. furfur,* which can trigger and affect the course and prognosis of PV.[28,36]

The treatment of PV, both topical and systemic, played an important role in the duration of PV.

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