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Characteristic of patient with cutaneous candidiasis at Dr. Soetomo General Hospital Surabaya in 2017-2022

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Abstract

Introduction: Cutaneous candidiasis is a fungal infection caused by *Candida* spp., localized on the skin, appearing as erythematous patches or plaques with satellite papules and vesiculopustules accompanied by itching. Fungal infections of the skin remain a significant health problem in Indonesia.

Methodology: This study employed a descriptive design using a cross-sectional method and retrospective data collection, utilizing medical records of cutaneous candidiasis patients at the Mycology Division of the Outpatient Unit for Skin and Venereal Health at Dr. Soetomo General Hospital, Surabaya, from 2017 to 2022.

Result: A study of 156 cutaneous candidiasis patients found most cases in females (59.6%) aged 45–64 (32.7%), predominantly from Surabaya (72.4%) and primarily housewives (21.1%). The most common clinical presentation was intertriginous candidiasis (40.4%), with itching as the main complaint (59.6%). Diabetes mellitus was the most frequent comorbidity (10.9%), and scales were the predominant lesion type (37.2%). Blastospores were the most common finding in KOH 10–20% tests (28.2%). Culture identified *Candida albicans* in 5.8% of cases and *Candida tropicalis* in 0.6%. Ketoconazole were the most common treatment (59%).

Conclusion: Cases of cutaneous candidiasis at the Outpatient Unit of Dr. Soetomo General Hospital, Surabaya, varied each year from 2017 to 2022.

Keywords: Cutaneous candidiasis; *Candida* infection; *Candida albicans*; Fungal infection; KOH; Culture

1. Introduction

Cutaneous candidiasis is a fungal infection caused by *Candida* spp., typically localized on the skin as thick red patches and plaques with satellite lesions in the form of papules and pustules surrounding the affected area.¹ In recent years, cases of cutaneous candidiasis have become increasingly common due to a rising number of immunocompromised patients.² *Candida* fungal infections remain prevalent in Indonesia and can occur due to fungal growth in conditions of moist, sweaty skin and a lack of education about personal hygiene. Indonesia, as a tropical country, has high temperatures and humidity levels that support the development of this fungal infection.³

Cutaneous candidiasis, a fungal infection, is found worldwide and can affect all age groups and genders. Indonesia ranks third in the incidence of dermatomycosis cases. In several cities such as Medan, Makassar, and Denpasar, the highest incidence of superficial dermatomycosis has been recorded. A study at Dr. Soetomo General Hospital in Surabaya

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showed that candidiasis ranks third after dermatophytosis and pityriasis versicolor. During the 2013–2016 period, the Dermatology and Venereology Outpatient Unit at Dr. Soetomo General Hospital recorded 298 new cases of candidiasis. Another study conducted in 2011–2012 at the Mycology Division of the same unit reported 137 cases of candidiasis involving the skin and nails.^{3,4}

Cutaneous candidiasis is caused by an infection of *Candida* spp., with *Candida albicans* being the most common species infecting humans. In addition to *Candida albicans*, there are over 150 other *Candida* spp. most of which are commensal non-parasitic organisms in humans.⁵ Based on several epidemiological studies in Hong Kong, the incidence of candidiasis in Asia shows that *Candida albicans* is the most frequently identified species, accounting for an average of 56% of all candidiasis cases.³ The number of *Candida* spp. infections has increased dramatically in recent years, reflecting a rise in the number of immunocompromised patients. While *Candida albicans* remains the most commonly implicated species, there has been a noticeable increase in infections caused by non-*albicans* *Candida* species, such as *Candida tropicalis*, *Candida glabrata*, and *Candida parapsilosis*.⁶ In the United States, approximately 80 million people experience health issues due to fungal infections from the *Candida* genus, particularly *Candida albicans*.⁷ *Candida albicans* remains the leading cause of *Candida* bloodstream infections, with prevalence rates of 33.3% in Singapore, 55.6% in Taiwan, and 41% in Japan.⁸

Based on the information presented regarding the global increase in the incidence of cutaneous candidiasis infections, this study aims to evaluate the profile of cutaneous candidiasis, including patient baseline data, history of comorbidities, exploration of risk factors, diagnosis using KOH examination and culture, treatment, and therapy evaluation. The goal is to minimize diagnostic errors and determine more appropriate therapeutic approaches for patients with cutaneous candidiasis, particularly in the Mycology Division of the Dermatology and Venereology Outpatient Unit at Dr. Soetomo General Hospital, Surabaya.

2. Methodology

This study employs a descriptive design with a cross-sectional method and retrospective data collection using medical records of cutaneous candidiasis patients at the Mycology Division, Skin and Venereal Health Outpatient Clinic of Dr. Soetomo Regional General Hospital, Surabaya, from 2017 to 2022. The sampling technique used in this study is total sampling, which includes all medical records of patients diagnosed with cutaneous candidiasis.

The obtained data will be processed by grouping it based on predetermined research variables and presented in the form of frequency distribution tables. The data will then be analyzed descriptively to evaluate the clinical profile of cutaneous candidiasis in the Mycology Division of the Skin and Venereal Health Outpatient Clinic at Dr. Soetomo Regional General Hospital, Surabaya, from 2017 to 2022. The data will be processed using Microsoft Excel 2023.

3. Results

Table 1 Distribution of patients with cutaneous candidiasis

Year	Frequency	Percentage
2017	39	25
2018	13	8.3
2019	48	30.8
2020	27	17.3
2021	14	9
2022	15	9.6
Total	156	100

In Table 1, a total of 156 patients were diagnosed with cutaneous candidiasis in the Mycology Division of the Skin and Venereal Health Outpatient Clinic at Dr. Soetomo Regional General Hospital during the period from January 2017 to December 2022. The highest number of cutaneous candidiasis cases occurred in 2019, with 48 patients (30.8%), followed by 2017 with 39 patients (25%), 2020 with 27 patients (17.3%), 2022 with 15 patients (9.6%), and 2021 with 14 patients (9%). The lowest number of cases was recorded in 2018, with 13 patients (8.3%).

Table 2 Distribution of patients based on age

Usia	Frequency	Percentage
0-<1 month	25	16
1-4 year	17	10.9
5-14 year	6	3.8
15-24 year	11	7.1
25-44 year	31	19.9
45-64 year	51	32.7
>65 year	15	9.6
Total	156	100

Based on the data in Table 2, the majority of cases were in the age group of 45-64 years, with a total of 51 patients (32.7%), followed by the age group of 25-44 years, with 31 patients (19.9%).

Table 3 Distribution of patients based on gender

Gender	Frequency	Percentage
Male	63	40.4
Female	93	59.6
Jumlah	156	100

Based on the data in Table 3, the majority of patients seeking treatment were female, totaling 93 patients (59.6%), followed by male patients, totaling 63 patients (40.4%).

Table 4 Distribution of patients based on residence

Domisili	Frequency	Percentage
Surabaya	113	72.4
Outside Surabaya	43	27.5
Total	156	100

Based on the data in Table 4, the majority of patients seeking treatment were from Surabaya, totaling 113 patients (72.4%), followed by patients from outside Surabaya, totaling 43 patients (27.5%).

Table 5 Distribution of patients based on occupation

Occupation	Frequency	Percentage
Civil servant	7	4.5
Private employee	31	19.9
Entrepreneur	11	7.1
Retirement	13	8.3
Housewife	33	21.1
University student	4	2.6
Student	10	6.4

Underage	29	18.6
Others	18	11.5
Total	156	100

Based on the data in Table 5, the distribution of cutaneous candidiasis patients grouped by occupation shows that the highest number were housewives, totaling 33 patients (21.1%), followed by private employees, totaling 31 patients (19.9%).

Table 6 Distribution of patients based on clinical manifestation

Clinical manifestation	Frequency	Percentage
Cutaneous candidiasis	50	32.1
Intertriginous candidiasis	63	40.4
Miliary candidiasis	0	0
Interdigital candidiasis	7	4.5
Paronychia candidiasis	2	1.3
Onychia candidiasis	23	14.7
Diaper rash	11	7
Total	156	100

In Table 6, the most commonly found clinical manifestation is intertriginous candidiasis, with 63 patients (40.4%), followed by cutaneous candidiasis with 50 patients (32.1%).

Table 7 Distribution of patients based on comorbidity

Patient history	Frequency	Percentage
Diabetes Mellitus	17	10.9
Allergies	16	10.2
Hypertension	9	5.8
Idiopathic Thrombocytopenic Purpura	2	1.3
Asthma	2	1.3
Multi Drug Resistant Tuberculosis	2	1.3
Epilepsy	2	1.3
Cruris tinea	2	1.3
Vaginal discharge	2	1.3
Seborrheic dermatitis	1	0.6
Venereal dermatitis	1	0.6
Arrythmia	1	0.6
Appendicitis	1	0.6
Cholecystitis	1	0.6
Billiary atresia	1	0.6
Benign Prostatic Hyperplasia	1	0.6

Cow's Milk Protein Allergy	1	0.6
Diarrhea	1	0.6
Hashimoto's thyroiditis	1	0.6
Hyperthyroidism	1	0.6
Laryngomalacia	1	0.6
Lymphoblastic leukemia	1	0.6
Coronary heart disease	1	0.6
Arthritis	1	0.6
Psoriatic arthritis	1	0.6
Psoriatic vulgaris	1	0.6
Pemphigus vulgaris	1	0.6
Vitiligo vulgaris	1	0.6
Systemic Lupus Erythematosus	1	0.6
Spondyloarthritis	1	0.6
Obesity	1	0.6
Wilson's disease	1	0.6
None	96	61.5

The predisposition factors causing fungal infections that are commonly found in patients with cutaneous candidiasis include diabetes mellitus (10.9%), as shown in Table 7. From the observations, it can be seen that one patient may have more than one comorbidity.

Table 8 Distribution of patients based on main complaint

Main complaint	Frequency	Percentage
Itchy	93	59.6
Red spots	86	55.1
Dots/ bumps	16	10.2
Dicolored nails	7	4.5
Brown/ black spots	6	3.8
White spots	5	3.2
Scales	4	2.6
Pain	4	2.6
Sore	4	2.6
Damaged/ brittle nails	3	1.9
Scally	2	1.3
Swollen	1	0.6
Rash	1	0.6
Skin peeling	1	0.6
Nail tickening	1	0.6

Spots on nails	1	0.6
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Table 8. shows that the most common main complaints of patients with cutaneous candidiasis are itching (59.6%) and red spots (55.1%). The main complaints in patients are very diverse and may involve more than one symptom in a single patient.

Table 9 Distribution of patients based on efflorescence

Efflorescence	Frequency (n)	Percentage (%)
Scale	58	37.2
Eryt Erythema macule with sharp border	57	36.5
Erythema macule with indistinct border	56	35.9
Satellite papule	47	30.1
Satellite lesion	31	19.9
Multiple papules	16	10.2
Hyprepigmented macule	8	5.1
Erosion	8	5.1
Dyschromia	6	3.8
Subungual hyperkeratosis	5	3.2
Dystrophic	5	3.2
Maceration	5	3.2
Papule	3	1.9
Crust	3	1.9
Plaque	3	1.9
Hypopigmented macule	2	1.3
Pustule	2	1.3
Onycholysis	2	1.3
Hyperkeratosis	2	1.3
Dystrophy	2	1.3
Lichenification	2	1.3
Hyperpigmentation	2	0.6
Discoloration	1	0.6
Excoriation	1	0.6
Papule - pustule	1	0.6
Serous exudate	1	0.6
Konfluens	1	0.6
Multiple pustules	1	0.6
Bullae	1	0.6
Multiple patch hyperpigmentation	1	0.6

In Table 9, the results of the physical examination evaluation of lesions in patients with cutaneous candidiasis show that the most common lesion found is scales (37.2%), followed by erythematous macules with well-defined borders (36.5%) and erythematous macules with undefined borders (35.9%). Patients may have more than one type of lesion on their skin.

Table 10 Distribution of patients based on 10-20% KOH microscopic examination

KOH 10-20% examination	Frequency	Percentage
Blastospore	44	28.2
Pseudohypha	5	3.2
Hypha	9	5.8
Blastospore + pseudohypha	38	24.3
Blastospore + hypha	12	7.7
Negative	26	16.7
None	22	14.1
Total	156	100

Table 11 Distribution of patients based on culture examination

Culture examination		Not conducting a culture examination
<i>Candida albicans</i>	<i>Candida tropicalis</i>	
9 (5.8)	1 (0.6)	146 (93.6)

The diagnostic tests for cutaneous candidiasis based on microscopic examination with 10-20% KOH, as shown in Table 10, indicate that the most common structure found is blastospores (28.2%). In the culture examination results from Table 11, the most common species identified were *Candida albicans* in 9 patients (5.8%) and *Candida tropicalis* in 1 patient (0.6%). Meanwhile, 146 patients (93.6%) did not undergo a culture test.

Table 12 Distribution of patients based on therapy

Therapy	Frekuensi (n)	Presentase (%)
Ketoconazole	92	59
Others	64	41

The management of cutaneous candidiasis cases (Table 12) shows that the most common topical therapy used was ketoconazole, with 92 patients (59%).

4. Discussion

The cases of cutaneous candidiasis at the Dermatology and Venereology Outpatient Unit of Dr. Soetomo General Hospital Surabaya from January 2017 to December 2022, as shown in Table 1, recorded a total of 156 patients. In 2019, there was an increase in the number of cutaneous candidiasis cases by 30.8%. However, there was a decrease in the number of cases in 2020 (17.3%), 2021 (9%), and 2022 (9.6%), which was due to the occurrence of COVID-19. The number of patients visiting the hospital in 2019 was still high because COVID-19 had not yet entered Indonesia. The first case of COVID-19 in Indonesia was reported on March 2, 2020, in Depok, Jakarta. It is likely that the number of COVID-19 cases during the first quarter of 2021 and 2022 reached 50,000-60,000 confirmed positive cases. Surabaya became one of the cities with a red zone, meaning high risk, and ranked first in the spread of COVID-19 in East Java as of July 27, 2020.⁹ This factor caused people to be reluctant to seek treatment at hospitals, as they considered hospitals to be high-risk

places for the transmission of the coronavirus. This led to a decrease in the number of patient visits to the hospital's outpatient unit. Since the COVID-19 pandemic, there have been significant changes in outpatient healthcare services, including adjustments to patient admission procedures in compliance with health protocols. Patients are required to wear masks, undergo screening procedures, and adhere to restrictions on visitors or accompanying individuals.¹⁰

Cutaneous candidiasis is a fungal infection of the skin that can occur in all age groups and genders. In Table 2, it shows that the age group 45-64 years recorded the highest number of cutaneous candidiasis cases, with 51 patients (32.7%). The results found in this study are in line with previous research at the Dermatology and Venereology Outpatient Unit of Dr. Soetomo General Hospital Surabaya conducted by Puspitasari from 2013-2016, which also showed the highest prevalence of cases in the 45-64 years age group. The high prevalence of candidiasis in the adult age group is caused by physiological predisposition factors, namely the weakening of body defense or immunological status as age increases, making individuals more susceptible to infections. Based on gender (Table 3), it shows that the highest number of cases occurred in women, with 93 patients (59.6%). A study conducted by Puspitasari from 2013-2016 and Soetojo from 2011-2013 at the Outpatient Dermatology and Venereology Unit of Dr. Soetomo General Hospital Surabaya also showed that cases of cutaneous candidiasis were more common in women than in men. Women tend to have more skin folds, such as in the areola mammae area, which facilitates fungal growth. Additionally, women are more often involved in household chores, such as washing clothes or dishes, which involves frequent contact with water, and wearing tight clothing. Other predisposition factors include physiological changes such as pregnancy and menstruation, which increase the risk of *Candida* fungal infections. Moreover, women tend to be more health-conscious, which leads them to seek medical attention more frequently when experiencing cutaneous candidiasis infections. Patients treated at the Outpatient Dermatology and Venereology Unit of Dr. Soetomo General Hospital Surabaya are predominantly from Surabaya, with 113 patients (72.4%), as shown in Table 4. This result aligns with previous research conducted by Puspitasari from 2013-2016 and Soetojo from 2011-2013 at the Skin and Venereal Health Unit of Dr. Soetomo General Hospital, Surabaya, which also showed that the highest prevalence of cases came from Surabaya. This is most likely due to patients preference to seek treatment at hospitals closer to their residence, so the majority of patients come from Surabaya. Additionally, Surabaya, known as one of the cities with the highest temperatures in Indonesia, contributes to excessive sweating, which in turn increases the risk of fungal skin infections. In table 5, the most common cases of cutaneous candidiasis occur in housewives, with 33 patients (21.1%). This is due to the many household activities carried out by women, especially in wet areas, such as washing clothes or dishes. Excessive skin contamination in wet areas can lead to fungal growth, which causes fungal skin infections like candidiasis caused by *Candida* spp.^{3,4,11}

Cutaneous candidiasis has various clinical manifestations, depending on predisposition factors and the area of skin affected. In this study (Table 6), the most common manifestation found was intertriginous candidiasis, with 63 patients (40.4%), followed by cutaneous candidiasis with 50 patients (32.1%). A previous study by Puspitasari from 2013-2016 showed similar results, where the most common clinical manifestation of candidiasis Dermatology and Venereology Outpatient Unit of Dr. Soetomo General Hospital Surabaya was intertriginous candidiasis, accounting for 62.6%, followed by cutaneous candidiasis at 23.7%.³ A similar study by Soetojo from 2011-2013 at the same hospital also showed that the most common clinical manifestation was intertriginous candidiasis, with 71 patients (62.2%).⁴ *Candida* spp. fungi have a predilection for colonizing skin folds such as the axilla, breast folds, and groin. Other factors influencing this include wearing tight clothing, which can cause skin folds to be covered, triggering excessive sweat production. This condition makes the skin moist and more susceptible to fungal infections, especially intertriginous candidiasis.⁵

Candidiasis infection occurs when there are predisposition factors that cause a decrease in the immune system's mechanisms, thereby promoting the growth of *Candida* spp. colonies.¹² The presence of both endogenous and exogenous predisposition factors can lead to changes in *Candida* spp., transforming it into a pathogen capable of infecting humans.¹³ The distribution of comorbidity (Table 7) most commonly found was diabetes mellitus, with 17 patients (10.9%). This result is similar to a study conducted by Puspitasari at the Dermatology and Venereology Outpatient Unit of Dr. Soetomo General Hospital Surabaya from 2013-2016, which also showed that the most common comorbidities found was diabetes mellitus. In individuals with diabetes mellitus, blood, urine, and saliva sugar levels tend to increase, which can stimulate the growth of *Candida albicans*. Additionally, uncontrolled diabetes mellitus leads to impaired function of primary defense cells, namely leukocytes. This impairment occurs due to imbalances in chemotaxis and phagocytosis functions, reducing the body's sensitivity to fungal infections. Studies also show a correlation between high blood glucose levels and the growth of *Candida albicans* in individuals with uncontrolled diabetes mellitus.¹⁴

The main complaints in cutaneous candidiasis are highly varied. The distribution of main complaints (Table 8) shows that the most common complaints were itching, reported by 93 patients (59.6%), and red spots, reported by 86 patients (55.1%). The results of this study align with research conducted by Apriliana at the Dermatology and Venereology Outpatient Unit of Dr. Soetomo Regional General Hospital in Surabaya from 2013-2016, which found that the main complaints of patients with cutaneous candidiasis were itching in 244 patients and red spots in 207 patients.³ A similar

study was also conducted by Soetojo from 2011-2013 at the same facility, which found that the majority of patients complained of itching (72.8%) and red spots (63.2%).⁴ These findings are consistent with research by Ahronowitz, which states that clinical manifestations of cutaneous candidiasis infection are often accompanied by itching and erythema, which appears as redness.¹

The clinical presentation of cutaneous candidiasis is characterized by skin lesions that initially start small, then spread, forming erythematous macules with well-defined borders. On the edges of the lesion, papules or scales may sometimes appear. These lesions often experience erosion or become wet due to the rupture of vesicles. Around the primary lesion, satellite lesions can be found, which are smaller lesions located near the primary lesion. These satellite lesions are usually in the form of small vesicles or pustules.¹⁵ The distribution of physical examination findings of the efflorescence (Table 9) shows that the most common finding was scales, observed in 58 patients (37.2%), followed by erythematous macules with well-defined borders in 57 patients (36.5%), erythematous macules with ill-defined borders in 56 patients (35.9%), and satellite papules in 47 patients (30.1%). In the physical examination of efflorescence, patients may have more than one type of efflorescence. A study by Apriliana at the Dermatology and Venereology Outpatient Unit of Dr. Soetomo Regional General Hospital in Surabaya from 2013-2016 showed that the most frequently found efflorescence was satellite papules, followed by scales and well-defined macules.³

The efflorescence seen in cutaneous candidiasis resembles other skin conditions, especially fungal infections, so physical examination through inspection alone is not sufficient to confirm the diagnosis. Therefore, supporting examinations such as a 10-20% KOH test and culture are essential steps to determine a more accurate diagnosis. In microscopic examination, one can observe the formation of blastospores, which are oval or round in shape, pseudohyphae resembling spaghetti and meatballs, and hyphae appearing as septate lines that are typically branched.¹⁶ The results of the 10-20% KOH microscopic examination (Table 10) most frequently showed the formation of blastospores, with 44 patients (28.2%). In a previous study by Apriliana at the Dermatology and Venereology Outpatient Unit of Dr. Soetomo Regional General Hospital in Surabaya from 2013-2016, the most common findings were blastospores + hyphae and blastospores.³ Another study conducted by Soetojo at the same hospital from 2011-2013 found that the most common formation was blastospores, found in 56.06% of cases.⁴

The diagnosis of candidiasis can also be established through culture examination by taking a sample from the infected area, which is then cultured on Sabouraud Dextrose Agar. The culture results will show white colonies, indicating the presence of *Candida* fungi.¹⁷ In Table 11, 10 patients underwent culture examination. Among these, the most commonly found species was *Candida albicans*, identified in 9 patients (5.8%), followed by *Candida tropicalis* in 1 patient (0.6%). Previous research conducted by Apriliana at the Dermatology and Venereology Outpatient Unit of Dr. Soetomo General Hospital Surabaya from 2013 to 2016, based on culture examinations, showed that the most prevalent species was *Candida* spp. (2.35%). Another study by Soetojo at the same unit from 2011 to 2013 found that *Candida albicans* accounted for 16.67% of the cultured patient specimens.^{3,4} Fungal infections caused by *Candida* spp. have become a public health threat, especially for patients with immune system disorders, who are considered vulnerable to these opportunistic infections. *Candida albicans* is known as the most common etiological agent of candidiasis. However, non-*albicans* *Candida* species, such as *Candida tropicalis*, *Candida parapsilosis*, *Candida glabrata*, *Candida auris*, *Candida guilliermondii*, and *Candida krusei*, have also increased in recent years. The rising frequency of non-*albicans* *Candida* species is associated with various factors, such as exposure to antifungal drugs, catheter use in hospitalized patients, cancer, age, and geographic distribution. *Candida tropicalis* is widely distributed and is a common colonizer of human skin, oral cavity, and gastrointestinal tract. This fungus is an important opportunistic pathogen capable of causing nosocomial infections and is the second most frequently isolated species after *Candida albicans*. An important aspect contributing to invasive candidiasis is drug resistance in recent years. The primary reason for the increased drug resistance of *Candida tropicalis* is mutations in the ERG11 gene encoding ergosterol synthase and the overexpression of transcriptional regulators encoded by *UPC2* (Gaviria, 2022). The clinical manifestations of infections caused by various NAC (non-*albicans* *Candida*) species are often difficult to differentiate from one another. However, some NAC species are naturally resistant, can develop resistance, or even both, to commonly used antifungal drugs (Deorukhkar, 2014).^{18,20,21}

The treatment of this disease generally involves eliminating the predisposition factors and administering antifungal medications. The most commonly prescribed antifungal therapy (Table 12) is ketoconazole, given to 92 patients (59%). The research conducted by Soetojo (2013) at the Dermatology and Venereology Outpatient Clinic of Dr. Soetomo General Hospital, Surabaya, in 2011-2013, found that the most commonly prescribed therapy was ketoconazole (78.1%).⁴ This aligns with the Clinical Practice Guidelines (PPK) from PERDOSKI, which are applied at Dr. Soetomo General Hospital, where ketoconazole is the recommended treatment for cutaneous candidiasis. Ketoconazole is a medication used in the treatment and management of fungal infections. It is a fungistatic agent believed to work through several mechanisms, including the inhibition of fungal 14 α -ergosterol demethylase, which is responsible for converting

lanosterol into ergosterol and inhibiting fungal cell membrane synthesis. Ketoconazole can also inhibit the synthesis of fungal triglycerides and phospholipids, as well as the oxidative and peroxidative enzyme activity in fungi, leading to the accumulation of hydrogen peroxide, which contributes to organelle damage.^{16,19}

Ketoconazole was approved for use in the United States in 1981, but it has since been replaced by other antifungal agents with fewer side effects and a broader spectrum of activity. This is due to its potential to cause severe adverse reactions, including hepatotoxicity. Ketoconazole has been withdrawn from many countries and has strict labeling in the United States, where it is recommended to be used only when other effective antifungal agents are unavailable or intolerable. In 2016, the Food and Drug Administration (FDA) issued a warning to avoid prescribing oral ketoconazole tablets for the treatment of fungal infections of the skin and nails. The use of this drug carries the risk of causing severe liver damage, adrenal gland issues, and dangerous interactions with other medications. However, in Asian countries, ketoconazole is still available and is often more affordable compared to other alternatives, and the prevalence of candidiasis fungal infections may be higher in Asia than in Europe. This makes ketoconazole still a choice for treating fungal infections, particularly in resource-limited areas. Ketoconazole remains an important part of fungal infection treatment in Indonesia, despite the risks of side effects that need to be properly managed. To prevent risk factors, it is crucial to perform liver and kidney function tests before administering pharmacological therapy to avoid side effects from antifungal medications.^{22,23}

5. Conclusion

In conclusion, the majority of patients with cutaneous candidiasis at the Dermatology and Venereology Outpatient Unit of Dr. Soetomo Regional General Hospital in Surabaya from 2017-2022 were predominantly female, within the age group of 45-64 years, and typically presented with the main complaint of itching, with most having comorbid diabetes. On physical examination, the most common lesion found was scales. The results of the microscopic KOH 10-20% examination showed that the most commonly found formation was blastospores. The culture examination revealed that the most common causative species was *Candida albicans*. Ketoconazole tablets were the most frequently administered treatment for patients with cutaneous candidiasis.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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