

Superficial mycosis profile in the Tertiary Hospital Dr. Moh. Hoesin Palembang: retrospective research

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ABSTRACT

Background Superficial mycoses is a fungal infection of the skin, nails and hair that caused by dematophytes, yeast and mold. Superficial mycoses infections are commonly found in high temperature and humidity area such as Indonesia. Palembang is one of regions in Indonesia has a high temperature and humidity, considered the incidence of this disease is high. A retrospective study of new cases of superficial mycoses, data taken from medical records and register book at Polyclinic of Dermatology and Venereology Dr. Moh. Hoesin Palembang during 5 years from January 2014-December 2018. There were 1,236 (17.1%) new cases of superficial mycoses. Incidence of superficial mycoses varies with range 6.9%-23%. The most common superficial mycoses is dermatophytes (38,3%). *Microsporum canis*, *Trichophyton rubrum* dan *Trichophyton hmentagrophytes* are frequent isolates in this study. The most age group is 36-45 years (17.6%) with male more than female. Superficial mycoses are often found in students (26.9%), followed by unskilled workers (20.8%). Of the 1,236 new cases, 125 patients had comorbidities, such as malignancy 21 (16.8%) patients, cerebrovascular disease and diabetes mellitus each 16 patients (7.4%). Inguinal and abdomen are the most commonly infected regions. 656 (53.1%) patients was given topical antifungal. The most common topical antifungal was ketoconazole 2% cream (62%) and systemic antifungal was itraconazole (55,3%). **Conclusion:** Cases of superficial mycoses, especially dermatophytosis and Malassezia were still commonly found, especially in Palembang.

1. Introduction

Fungal infections, often called mycoses, can be divided into superficial mycosis, subcutaneous mycosis and systemic mycosis.¹ Superficial mycosis is a superficial fungal infection of the skin, nails, and hair caused by dermatophytes, yeast and molds.² Diseases that include superficial mycosis include dermatophytosis, pityriasis versicolor, Malassezia folliculitis and superficial candidiasis.³

Although superficial dermatomycosis rarely causes death, it generally interferes with the quality of life and daily activities.² Until now, superficial dermatomycosis is still common worldwide and is still a general health

problem, especially in developing countries.^{2,4} It is estimated that superficial mycosis affects more than 25% of the world's population.¹ Superficial mycosis is quite common in tropical countries. The tropical climate in Indonesia with high temperature and humidity is a good environment for fungal growth and it is estimated that the incidence of this disease is quite high and can be found in all places. Data from various general public medical teaching hospitals in Indonesia in 2009-2011 showed that the lowest proportion of superficial mycosis to dermatoses was in Yogyakarta at 4.06% and the highest was in Semarang at 26.4%⁵

Superficial mycosis is influenced by several factors such as socioeconomic, age, malnutrition, *personal hygiene*, congested living conditions, immunosuppressive conditions such as diabetes mellitus, *human immunodeficiency virus* (HIV), cancer or malignancy.^{6,7} Some activities and habits are also associated with fungal infections. such as contact with animals, sports, wearing closed shoes, wearing tight clothing.⁸ Diagnosis of superficial mycosis is based on history, clinical examination, and direct mycological examination using potassium hydroxide (KOH) and culture or culture.⁹

Superficial mycosis infection is still a major health problem in most countries, so epidemiological data are important to improve strategic planning and disease eradication.⁶ This retrospective study aims to determine an overview of superficial dermatomycosis in the Dermatology and Venereology Polyclinic of Dr. Moh. Hoesin Palembang for the period 2014-2018.

2. Research Methods

This retrospective descriptive study used data taken from the register book and medical records of patients with superficial dermatomycosis who were registered at the Dermatology and Venereology polyclinic, Dr. Moh. Hoesin Palembang for 5 years from 2014 to 2018. The population includes all new cases recorded as having skin diseases at the Dermatology and Venereology Polyclinic, Dr. Moh. Hoesin Palembang. The sample of the study were all new cases diagnosed with superficial dermatomycosis in the Dermatology and Venereology Polyclinic, Dr. Moh. Hoesin Palembang. All data were processed using the *Statistical Analysis Software Package (SPSS) version 22.0 (IBM Corporation)*.

3. Results

During the January 2014-December 2018 period, the number of new patient visits at the DV Polyclinic RSMH Palembang was 7,250 patients. Of these, 1,238 (17.1%) new patients with superficial mycosis were found. The incidence of superficial mycosis shows different results each year, ranging from 6.9% to 23%. The highest incidence was found in 2016. (**Table 1**).

Based on the type of superficial mycosis, dermatophytosis was the most common case of 473 (38.3%) and then *Malassezia* of 437 (35.4%), but in terms of each diagnosis, pityriasis versicolor was the most common case, 428 (34.6%) patients, followed by tinea corporis in 437 (38.3%). From the culture, it was found that *Microsporum canis*, *Trichophyton rubrum* and *Trichophyton mentagrophytes* were mostly found. This study also found 181 (14.6%) patients had a mixed diagnosis, most of which were 162 patients with tinea corporis et cruris (**Table 2 and Figure 1**).

Based on the age group, the most cases of superficial mycosis were between the ages of 26-35 years with 217 patients (17.5%) followed by the 17-25 years age group for 207 patients (16.7%) as in **Table 3**. The mean age of superficial mycosis patients was 32.08 ± 17.94 (mean SD), the youngest subject was 1 month old and the oldest was 87 years old. In this study, it was found that tinea capitis was found mostly in children aged 6-11 years. In general, most of the sexes were male, as many as 764 patients (61.7%), while women were 474 patients (38.3%).

Figure 2 shows the distribution of superficial mycosis cases based on the patient's occupation and the highest number was obtained, namely students 332 (26.9%) cases, followed by 258 workers (20.8%) and housewives 231 (18.7%) cases.

In this study, the regions frequently infected with superficial mycosis were inguinal 338 (18.2%), abdomen 210 (11.3%), posterior trunk 205 (11.1%), and gluteal 199 (10.7%), respectively.), whereas the cruris 12 (0.6%) and human 15 (0.8%) regions were the least infected with superficial mycosis (**Table 4**).

The management used in cases of superficial mycosis in the Dermatology and Venereology Clinic RSMH Palembang during the 2014-2018 period was topical antifungal 656 (53.1) cases and a combination of topical and systemic antifungals in 580 (46.9%) cases (**Figure 3**).

Of the 1,222 patients who used topical therapy, 758 (62%) patients used 2% ketoconazole cream, followed by ketoconazole 2% shampoo in 376 (30.7%) cases. Of the 580 patients who used systemic therapy, 321

(55.3%) patients used itraconazole and 212 (36.6%) patients used ketoconazole (**Table 5**).

Of the 1,236 new patients with superficial mycosis, it was found that 125 patients had other comorbid diseases (table 6). The most comorbid diseases of 126 superficial mycosis patients were cancer by 21 (16.8%) and the second highest was cerebrovascular disease

and diabetes mellitus by 16 (12.8%). Of the 125 comorbid patients, the majority had a diagnosis of dermatophytosis (34.4%) and candidiasis cutis (32.8%) compared to other diagnoses. The results of statistical tests with chi square, there was a significant relationship between comorbid diseases and diagnosis, Pvalue 0.000 (P <0.05).

Table 1. Distribution of cases of superficial mycosis

New Case	2014 N (%)	2015 N (%)	2016 N (%)	2017 N (%)	2018 N (%)	Total (%)
Superficial mycosis	110 (6.9)	264 (14.8)	334 (23)	289 (22)	239 (21.8)	1.236 (17.1)
DV Polyclinic	1.605	1.784	1.454	1.313	1.094	7.250

Table 2. Distribution of types of superficial mycosis

Diagnosis	2014 (%) n=110	2015 (%) n=264	2016 (%) n=334	2017 (%) n=289	2018 (%) n=239	Total (%) n=1236
Dermatophytosis	56 (50.9)	99 (37.5)	126 (37.7)	87 (30.1)	105 (43.9)	473 (38.3)
Tinea corporis	28 (25.5)	39 (14.8)	57 (17)	36 (12.5)	50 (20.9)	210 (16.9)
Tinea cruris	22 (20)	32 (12.1)	37 (11.1)	32 (11.1)	36 (15.1)	159 (12.9)
Tinea capitis	3 (2.7)	10 (3.8)	15 (4.5)	8 (2.7)	5 (2.1)	41 (3.3)
Tinea manus	0 (0.00)	1 (0.4)	1 (0.3)	2 (0.7)	1 (0.4)	5 (0.4)
Tinea pedis	3 (2.7)	17 (6.4)	16 (4.8)	9 (3.1)	13 (5.4)	58 (4.7)
Malassezia	20 (18.2)	106 (40.2)	115 (34.4)	113 (39.1)	83 (34.7)	437 (35.4)
Pythiriasis versicolor	20 (18.2)	106 (40.2)	115 (34.4)	111 (38.4)	76 (31.8)	428 (34.6)
Malassezia Folliculitis	0 (0.00)	0 (0.00)	0 (0.00)	2 (0.7)	7 (2.9)	9 (0.7)
Candidiasis cutis	13 (5.9)	37 (14)	27 (8.1)	20 (6.9)	19 (7.9)	116 (9.4)
Onychomycosis	3 (2.7)	4 (1.5)	13 (3.9)	7 (2.4)	2 (0.8)	29 (2.3)
Mix	18 (16.4)	18 (6.8)	53 (15.9)	62 (21.5)	30 (12.6)	181 (14.6)

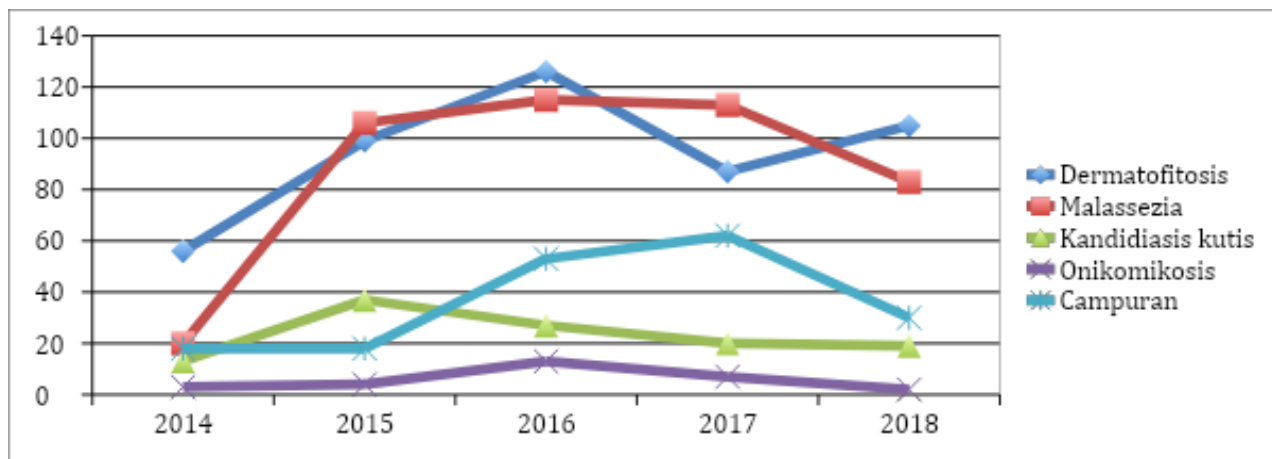


Figure 1. Annual distribution of superficial mycoses

Table 3. Distribution of superficial mycoses by age group and sex

Diagnosis	0-5	6-11	12-16	17-25	26-35	36-45	46-55	56-65	>65	Male n (%)	Female n (%)	Total n (%)
Dermatophytosis	10	38	68	77	59	82	83	39	17	252	221	473 (38.3)
Tinea corporis	2	13	25	36	24	34	40	27	9	97	113	210 (17)
Tinea cruris	2	1	36	31	24	29	25	8	3	92	67	159 (12.9)
Tinea capitis	6	24	3	1	2	2	2	0	1	28	13	41 (3.3)
Tinea manus	0	0	0	0	0	3	2	0	0	2	3	5 (0.4)
Tinea pedis	0	0	4	9	9	14	14	4	4	33	25	58 (4.7)
Malassezia	9	24	94	90	69	72	40	32	7	354	83	437 (35.4)
Pityriasis Versicolor	9	24	93	88	68	70	38	31	7	350	78	428 (34.7)
Malassezia Folliculitis	0	0	1	2	1	2	2	1	0	4	5	9 (0.7)
Candidiasis cutis	30	6	5	4	9	22	24	10	6	50	66	116 (9.4)
Onychomycosis	0	3		1	7	3	8	6	1	14	15	29 (2.3)
Mix	1	10	30	34	30	38	14	19	5	94	87	181 (14.6)
Total	50 (4.1)	81 (6.5)	197 (15.9)	206 (16.7)	174 (14.1)	217 (17.6)	169 (13.7)	106 (8.6)	36 (2.9)	764 (61.8)	472 (38.2)	1236 (100)

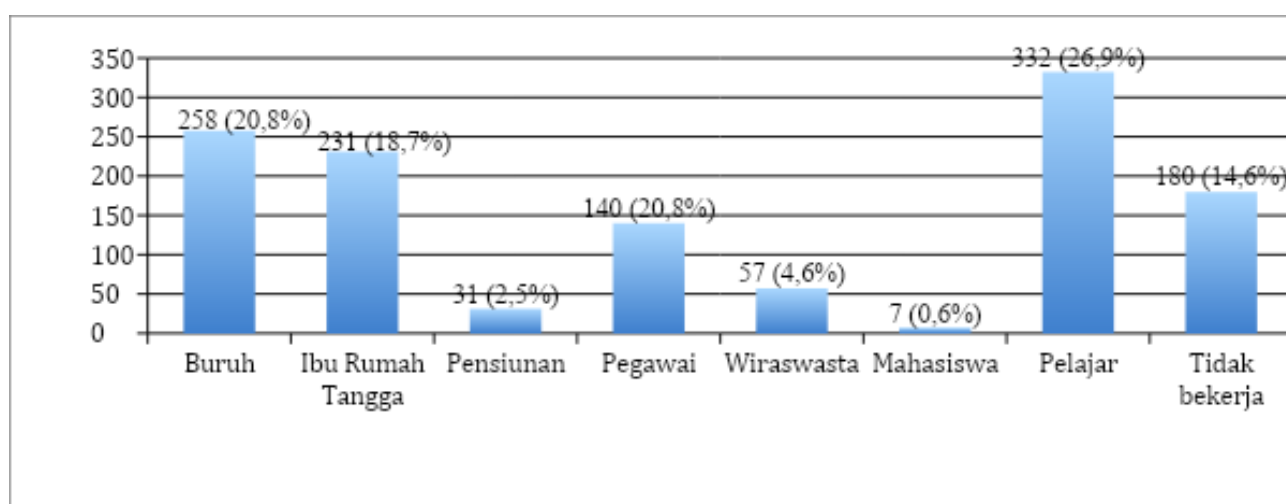
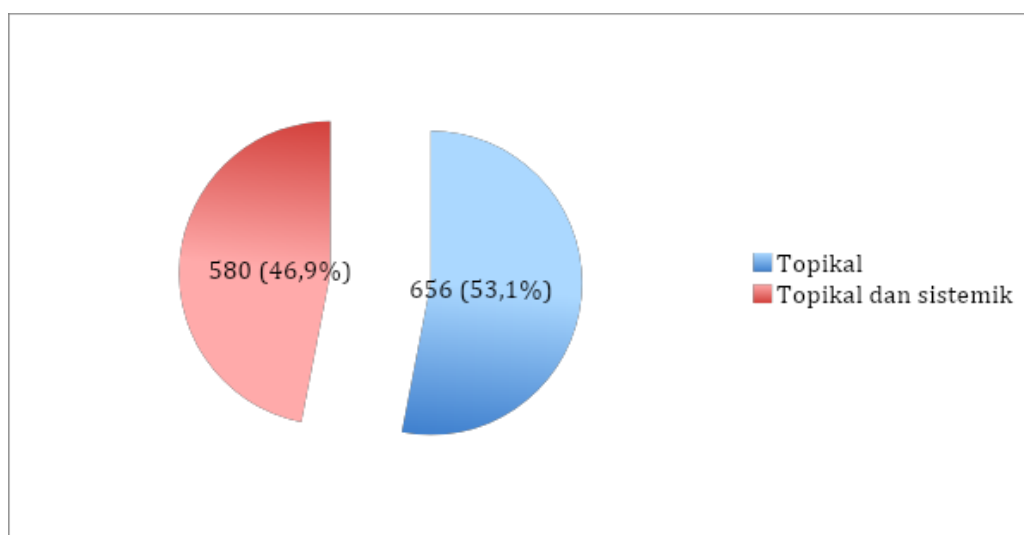


Figure 2. Occupational distribution of the superficial mycoses

Table 4. Distribution of superficial mycoses by region of infection

Region Infected	Total	%
Skalp	45	2.4
Facialist	154	8.3
<i>Colli</i>	169	9.1
Anterior thorax	162	8.7
Axillary	51	2.8
<i>Brachialis & Antebrachialis</i>	123	6.7
Abdomen	210	11.3
Posterior trunk	205	11.1
Gluteal	199	10.7
Inguinal	338	18.2
Femoral	39	2.1
Kruris	12	0.6
Manus	15	0.8
Pedis	70	3.8
<i>Fingernails</i>	29	1.6
<i>Toenails</i>	34	1.8
Total	1855	100

**Figure 3.** Treatment of superficial mycosis**Table 5.** Distribution of management in superficial mycosis

Therapy	Total	(%)
Topical	1.222	100
2% ketoconazole cream	758	62
Miconazole cream	61	5
Clotrimazole cream	1	0.1

Nystatin cream	3	0.3
2% ketoconazole shampoo	376	30.7
2.5% selenium sulfide shampoo	8	0.7
Solusio resorcinol	3	0.3
8% cyclopyrox lacquier	12	0.9
Systemic	580	100
Terbinafin	4	0.7
Griseofulvin	35	6
Ketoconazole	212	36.6
Itraconazole	321	55.3
Fluconazole	8	1.4

Tabel 6. Penyakit komorbid dari 125 pasien mikosis superfisialis.

Comorbid disease	Tinea corporis N (%)	Tinea corporis N (%)	Tinea corporis N (%)	Tinea corporis N (%)	Tinea corporis N (%)	Tinea corporis N (%)	Tinea corporis N (%)	Tinea corporis N (%)	Tinea corporis N (%)
Cerebrovascular disease	4	2	0	1	0	8	1		16 (12.8)
HIV	1	0	1	1	0	0	0	2	5 (4)
Liver abscess	0	0	0	0	0	0	0	1	1 (0.8)
Cerebral abscess	0	0	0	0	0	1	0	0	1 (0.8)
Anemia	2	0	0	0	0	1	0	0	3 (2.4)
Cancer	4	3	1	2	0	6	1	4	21 (16.8)
Capitis trauma	2	0	0	0	0	0	0	1	3 (2.4)
Chronic heart failure	0	0	0	0	0	2	0	3	5 (4)
Chronic kidney disease	1	0	1	0	1	0	0	2	5 (4)
Diabetes mellitus	5	2	1	0	0	4	1	3	16 (12.8)
Anasarchal edema	0	0	0	1	0	0	0	0	1 (0.8)
Pleural effusion	0	0	0	0	0	1	0	0	1 (0.8)
meningitis	0	0	0	0	0	6	0	0	6 (4.8)
encephalitis	0	0	0	0	0	0	0	1	1 (0.8)
meningoencephalitis	0	1	0	0	0	1	0	0	2 (1.6)
myelomeningocele	0	0	0	0	0	1	0	0	1 (0.8)
epilepsy	0	0	0	0	0	3	0	0	3 (2.4)
sepsis	1	0	0	0	0	3	0	0	4 (4.2)
Pulmonary TB	2	0	0	1	0	1	0	2	6 (4.8)
Pneumoni	0	0	0	1	0	1	0	0	2 (1.6)

COPD	0	0	0	0	0	0	0	1	1 (0.8)
Patent ductus arteriosus	0	0	0	0	0	0	0	0	1 (0.8)
Cushing's Syndrome	1	0	0	0	0	0	0	0	1 (0.8)
Nephrotic syndrome	0	0	0	0	0	0	0	1	1 (0.8)
SLE	4	2	1	1	1	0	0	2	11 (8.8)
Intracranial SOL	0	0	0	0	0	1	0	3	4 (4.2)
TB spondylitis	0	0	0	0	0	0	0	1	1 (0.8)
Hemophilia	1	0	0	0	0	0	0	0	1 (0.8)
Hypothyroidism	0	0	0	0	0	0	0	1	1 (0.8)
Total	28 (22.4)	10 (8)	5 (4)	8 (6.4)	2 (1.6)	41 (32.8)	3 (2.4)	28 (22.4)	125 (100)

4. Discussion

The number of new cases of superficial mycosis in the Dermatology and Venereology Polyclinic has shown an increase over the past 3 years with an incidence of more than 20%. The increase in the number of cases is probably due to several factors, such as the majority of the community does not understand about a clean and healthy lifestyle, as well as increased public awareness for treatment.¹⁰

Based on gender, the prevalence of superficial mycosis varies considerably in several countries, generally five times more men than women.¹¹ This study showed that superficial mycosis was higher in men than women with a ratio of 1.6: 1. Kumar's research in India also shows that the prevalence of men is more dominant than women with a ratio of 1.12: 1.¹² This is probably due to men more often physical activity outside the home, causing sweating easily thus facilitating the growth of fungi.⁷

In this study, it was found that students and workers most often suffer from superficial mycosis. This research is similar to research by Nayeemuddin SW in India, where it was found that students were most infected with 28.18% and workers by 20% .¹³ Research by Fatima Alzahraa in Iraq found that students and housewives were most infected with the fungus.¹⁴ group of patients who have high activity outside the home. Students generally often do sports

and play outside the home while workers work more in the field. Hot environmental conditions accompanied by activities that cause sweating and are not balanced with personal hygiene will make it easier to get a yeast infection¹⁵

Superficial mycosis can be found all over the world and affects all ages.¹⁶ In Indonesia, the age range 25-64 years suffers the most from superficial mycosis compared to younger or older people.¹⁷ In this study, the most superficial mycoses were in the age range of 36-45 years. 217 (17.6%) cases. Similar results were also found in a study by Sarada in India in 2015, where the highest number of cases of superficial mycosis was in the 31-41 year age group by 26.4%.¹⁸ Research in Brazil reported more cases of superficial mycosis in older patients, such as the Costa- Orlandi in 2009-2010 reported that the highest age group was 41-70 years 68.29%.⁸ Superficial mycosis infection is more common in adults because at older age there is a change in immune response, and this age group is still of working age, if accompanied by increased physical activity will increase the risk of fungal infection.¹⁹ In contrast to research in India by Kaur, it was found that the age group 21-30 years of age are more affected by superficial mycosis by 23.3% .²⁰ The same result was also found in the Iranian study by Berenji, which reported that the largest age group was 20-29 years at 35.5% .⁶ This is probably due to patient age Younger people are more likely to have outdoor activities and

physical activities, in addition, young patients pay more attention to appearance and seek treatment than older patients.²⁰

This study found that dermatophytosis furthermore *Malassezia* infection was found the most in patients. Several previous studies also reported similar results. Research conducted by Rosida F at the Clinic of Skin and Sex in Dr. Soetomo Surabaya for the period 2011-2013 reported that dermatophytosis was the most common superficial mycosis disease at 79.50% while candidiasis and *Malassezia* infections were the most after dermatophytosis. Research in Singapore by Tan HH reported that out of 12.903 cases of superficial mycosis, found 57% were dermatophytosis, *Malassezia* 25.2%, candidiasis 11.1% and onychomycosis 6.8%.²¹ Berenji F et al 2000-2011 in Iran, obtained results in contrast to *Malassezia*, the most common and the second most common dermatophytosis. Research by Costa-Orlandi CB in 2009-2010 in Brazil found that candidiasis is the most cases of superficial mycosis^{6,8}

Among the dermatophytosis, the clinical type most often found in this study was *tinea corporis* 210 (16.9%) cases and further *tinea cruris* amounting to 159 (12.9%). The results of this study are in accordance with other studies reported by Surekha et al. In 2015 and Gadadavar in 2018.^{7,22} Research conducted by Lyngdoh CJ in Meghalaya, India reported different results from *tinea pedis* which was mostly found at 26.6%. This is because the majority of the population in Meghalaya India wears socks and shoes for a long time accompanied by hot weather which makes fungal infection easier.²³ Several studies in developed countries have also reported that the cases of *tinea pedis* and onychomycosis are higher than other types of superficial mycosis. The high prevalence of *tinea pedis* and onychomycosis in developed countries is associated with sports activities and the use of closed shoes.²⁴

In terms of each case, pityriasis versicolor was the most common of all cases of superficial mycosis, namely 428 (34.26%). Pityriasis versicolor spread throughout the world, especially in tropical areas with high temperatures and humidity. Environmental

factors (skin moisture) and individual susceptibility factors (genetic predisposition, other underlying diseases, malnutrition) play a role in the pathogenesis of pityriasis versicolor. This factor is widely found in Indonesia, which is a tropical area, so the incidence of pityriasis versicolor is still high²⁵

In this study, it appears that *tinea capitis* is more dominant in elementary school age children. Another study also reported the same findings in the group of children aged 0-15 years, there were 72.7% cases of *tinea capitis*.²³ The Chiacchio study in Brazil from 2005 to 2011 found 42.59% of *tinea capitis* in children aged <10 years.¹⁶ This is because children often use combs, hats, towels, frequent contact with other infected children or pets and have not been able to maintain cleanliness.²³

The region most infected with superficial mycosis, namely inguinal at 338 (18.2%). The inguinal region is an area of the groin that is easily infected with fungi and can be found in *tinea cruris* and candidiasis cutis. Research by Chiacchio in Brazil found that the most infected anatomical locations were the nails (62.26%) and the foot region (25.42%), while the inguinal region was only in the range of 3.42% .¹⁶

In addition to environmental and hygiene factors, decreased endurance, comorbid diseases such as endocrine and metabolic disorders are known to play a role in the emergence of superficial mycosis.¹⁰ The Cost-Orlandi study in Brazil, found other comorbid diseases in superficial mycosis patients, most of them hypertension (54.63%), diabetes mellitus type 2 (20.37%), lupus or thyroid disease (7.4%), cancer (1.85%), while AIDS and cardiovascular disease were only 0.92%.⁸ In this study, the most comorbid diseases were found. cancer by 21 (16.8%), *cerebrovascular disease* and diabetes mellitus respectively by 16 (12.8%). Cutaneous candidiasis was the most common superficial mycosis in patients with comorbidities, namely 41 (32.8%).

The choice of antifungal drugs is determined by the extent and severity of the disease, the location of the lesion, co-infection or potential drug interactions, treatment efficacy, price and accessibility and ease of

use. Antifungal drugs consist of topical and systemic preparations. Superficial fungal infections generally respond well to topical antifungals but systemic treatment is often required.¹¹ Tinea capitis and onychomycosis generally require systemic therapy because topical antifungals do not penetrate the hair and nails.²⁶ In the study, 656 (53.1%) cases received treatment. topical and 580 (46.9%) cases received combination topical and systemic therapy. This result is different from the research conducted by Bertus in Manado in 2012 where combination therapy was the most widely used therapy for patients, namely 83.08%.⁴

The topical antifungals that were most widely used in this study were the azole group of 62% ketoconazole cream 2% and ketoconazole 2% shampoo by 30.7%. Azole class topical antifungals are most widely used because of their broad spectrum activity. Topical antifungals belonging to the azole class include *ketoconazole*, *clotrimazole*, *miconazole*, *econazole*, *sulconazole*, and *oxiconazole*.²⁶ Nystatin is only effective against candida but is not effective against dermatophytes.²⁷ Cyclopyrox is a topical antifungal that is effective against dermatophytes and yeasts. Cyclopyrox 8% *nail lacquer* has been approved as a therapy for onychomycosis since 1999.²⁶ In this study 12 (0.9%) cases used 8% cyclopyrox *nail lacquer*.

The azole drug is currently the most commonly used antifungal for superficial, subcutaneous, and systemic fungal infections. Preparations that can be used systemically include ketoconazole, fluconazole, itraconazole, voriconazole, and posaconazole. Griseofulvin is still considered one of the antifungal options for superficial mycosis, but it is only effective against dermatophytes. second ketoconazole 36.6%, while griseofulvin ranks third at 6%.

5. Conclusion

The incidence of superficial mycosis in the Dermatology and Venereology Polyclinic of RSMH Palembang for the period 2014-2018 is still quite high, around 17.1%. Mostly found in men, students and workers with an age range of 26-35 years. Dermatophytosis affects most patients followed by

Malassezia infection and candidiasis. Of 1.236 new patients with superficial mycosis, it is known that 125 patients have the most comorbid carcinoma / malignancy, *cerebrovascular disease* and type 2 diabetes mellitus. Knowing the superficial mycosis profile in patients can be used for preventive measures and health education regarding fungal infections so that it is expected to reduce morbidity.

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