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Analysis of Risk Factors for Dermatomycosis in Patients Seeking Treatment at Unyur Community Health Center, Serang City

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ABSTRACT

Dermatomycosis or superficial fungal infection (SFI) is one of the most common fungal skin infections suffered by the world community and often occurs in countries with tropical climates. The prevalence of SFI itself is still very high at around 20%-25% of the world's population. Data on the prevalence of SFI in Indonesia cannot be found with certainty. Dermatomycosis spreads through skin contact, poor sanitation, wearing contaminated items and consumption of immunosuppressive drugs. Dermatomycosis is not life-threatening but greatly interferes with daily activities. This study aims to determine the risk factors associated with the occurrence of dermatomycosis cases in patients seeking treatment at the Unyur Health Center. This study used observational analytical method with cross-sectional design. The subjects studied were dermatomycosis patients who sought treatment at the Unyur Health Center in Serang City. Samples were taken by consecutive sampling of 41 workers. Data collection was carried out using questionnaires and medical records. Data were analyzed using Fisher's Exact test and Chi-Square test. The prevalence of dermatomycosis in patients who seek treatment at the Unyur Health Center in Serang City is 56.1%. There was no significant relationship between the level of patient hygiene and sociodemographic factors of patients with the incidence of dermatomycosis at the Unyur Health Center

Keywords: *dermatomycosis, hygiene level, sociodemographic factors*

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INTRODUCTION

Dermatomycosis, or superficial fungal infection (SFI), is one of the most common fungal infections worldwide and frequently occurs in tropical countries. The high prevalence of SFI makes it a major public health issue, as it affects 1.2 billion people globally. Cases of dermatomycosis are more common in tropical regions than in subtropical ones. High humidity and hot climates in tropical areas often lead to skin fungal infections, especially in densely populated regions with poor hygiene. According to the World Health Organization (WHO), approximately 20–25% of the global population is affected by dermatomycosis, with varying prevalence in each country.[1,2,3,4,5]

Dermatomycosis invades the stratum corneum, nails, hair, and the mucosal surfaces of the mouth and vulva. It is caused by dermatophyte and non-dermatophyte fungi such as *Candida* spp. and *Malassezia*. These superficial fungal infections can spread through skin contact with infected individuals, poor hygiene, contaminated objects, and the use of immunosuppressive drugs. Although these infections are not considered life-threatening, they can interfere with daily activities due to intense itching, pain, fever, hair loss, and skin tissue damage.[6,7]

A study in Nigeria reported that 67% of 82 dermatological cases found in a clinic were caused by fungi, with the most commonly affected age group being 10–40 years. A 2015 study conducted in 123 rural areas in India found a dermatomycosis prevalence rate of 27.6%. The dominant age group affected by the infection was 22–45 years, likely due to their frequent outdoor activities. The most common types of fungal infections identified were tinea corporis (78.1%), tinea cruris (10.1%), tinea manuum (2.5%), tinea faciei (1.8%), and tinea pedis (0.7%). The group affected by dermatomycosis was predominantly male.[8]

According to a study by Chikoi R, et al. in 2017 in Southern Tanzania, the prevalence of dermatomycosis was found to be 35.2%. This study showed that the rate of dermatomycosis among school-aged children was quite high. The associated risk factors identified in this study included the 10–14 age group, middle economic status, working parents, poor hygiene (such as infrequent bathing, not using soap, and bathing with water from alternative sources), and living or sleeping with more than three people in the same room.[9] Another study conducted at the Mycology Division of the Dermatology and Venereology Department of Dr. Soetomo General Hospital in Surabaya reported a dermatomycosis prevalence of 89.2%. Additionally, a study conducted at the Outpatient Dermatology and Venereology Clinic of Dr. Soedono Regional Hospital in Madiun in 2021 found a prevalence of superficial fungal infections among patients aged 25–44 years to be 31.25%. This is likely because this age group is considered to be in the productive adult phase, which includes predisposition factors such as activities

that cause excessive sweating, moisture, and trauma, all of which increase the risk of dermatomycosis. Furthermore, the most common type of dermatomycosis found in that study was tinea corporis (22.5%), which may be related to the humid climate. However, this finding differs from the results of a study conducted at Sanglah General Hospital in Denpasar in 2017–2018, where the most frequent type was tinea unguium (45%). This discrepancy may be due to geographical differences or variations in the study population, such as demographic or behavioral factors. In addition, other predisposing factors should be considered, such as genetics, hot and humid climates, hygiene and sanitation, walking barefoot, immunocompromised conditions, and comorbidities such as diabetes mellitus.[10]

Based on a survey conducted at the Unyur Community Health Center in Serang City, skin diseases are the third most common type of illness. Data from the Regional Development Planning Agency (Bappeda) in 2020 showed that Serang District has the highest population density in Serang City, reaching 8,659 people per square kilometer. This high population density has led to the development of slum residential areas in Serang District. However, to date, there has been no definitive research on the risk factors for dermatomycosis in Serang City.[10]

Based on this, the author is motivated to explore and conduct further research on the matter. It is hoped that this study, conducted at the Unyur Community Health Center, can serve as a reference and help educate the public on the importance of maintaining personal and environmental hygiene, as well as raise awareness about dermatomycosis and other skin diseases.

METHODS

This study is an analytical observational study using a cross-sectional design. It aims to examine the relationship between risk factors such as hygiene level, sociodemographic factors, and densely populated living environments and the incidence of dermatomycosis among patients seeking treatment at the Unyur Community Health Center in Serang City. The sampling technique used in this study is consecutive sampling, with a total of 37 samples collected using sociodemographic and personal hygiene questionnaires, housing density questionnaires, and medical records. Data collected from all questionnaires will be analyzed using the Statistical Package for the Social Sciences (SPSS) version 29. Both univariate and bivariate analyses will be conducted. The variables studied are the risk factors for dermatomycosis in patients visiting UPTD Unyur Community Health Center, Serang City. The data will be analyzed using the Fisher's Exact Test and Chi-Square Test. Since human subjects are involved, ethical approval was obtained from the Ethics Committee of the Faculty of Medicine and Health Sciences, Sultan Ageng Tirtayasa University. This study has passed ethical review with approval letter number 41/UN43.20/KEPK/2024.

RESULTS

This study was conducted in the area around the UPTD Unyur Health Center in 2024 using the door-to-door method to respondents homes. The total sample in this study was initially 61 samples, but several samples were excluded because they no longer lived at their original address, had died and the address in the medical record was incomplete so that only 41 samples were analyzed. The characteristics of the 41 respondents in this study listed in Table 1 are aged >40 years (61%), female (75.6%), and have jobs that are not at risk of dermatomycosis (61%). The level of hygiene in this study used several 5 indicators in its assessment, consisting of skin cleanliness and hand and nail cleanliness with the majority of respondents having a proportion of 87.8%, good clothing cleanliness with a proportion of 56.1%, towel cleanliness 61%, and bed and bed linen cleanliness with the majority of respondents having poor hygiene 65.9%. In addition, in terms of population density, 24.4% live in densely populated areas and the prevalence of dermatomycosis in this study was 56.1%.

Table 1 Respondent characteristics

Characteristics	Total (n=41)	
	Frequency (n)	Percentage (%)
Hygiene Level		
Skin Hygiene		
Good (>75%)	5	12,2
Bad (<75%)	36	87,8
Hand and Nail Hygiene		
Good (>75%)	5	12,2
Bad (<75%)	36	87,8
Clothing Hygiene		
Good (>75%)	23	56,1
Bad (<75%)	18	43,9
Towel Hygiene		
Good (>75%)	25	61
Bad (<75%)	16	39
Cleanliness of Bed and Sheets		
Good (>75%)	14	34,1

Bad (<75%)	27	65,9
Densely populated environment		
Dense	10	24,4
Not Dense	31	75,6
Sociodemographic Factors		
Age		
<40	16	39
>40	25	61
Gender		
Man	10	24,4
Women	31	75,6
Occupation		
Risk of Dermatomycosis	16	39
No risk of Dermatomycosis	25	61
Dermatomycosis Occurrence		
Positive	23	56,1
Negative	18	43,9

Source: Muhammad Aidil Qahtan, 2024

Based on Table 2, in this study there was no significant relationship between the level of skin hygiene and the incidence of dermatomycosis (p>0.05). In addition, in this study it was found that there were 58.3% of respondents with poor skin hygiene and positive dermatomycosis and there were 40% of respondents with good hygiene and positive dermatomycosis.

Table 2 The relationship between skin hygiene levels and the incidence of dermatomycosis

		Dermatomycosis Occurrence				
		Positive	Negative	**Total**	**OR (IK 95%)**	***p-value***
		n (%)	n (%)			
Skin Cleanliness Level	Bad	21 (58,3)	15 (41,7)	36(100)	2,1 (0,31 – 14,15)	0,638[f]
	Good	2 (40)	3 (60)	5 (100)		
	Total	23 (56,1)	18 (43,9)	41 (100)		

**f) fisher exact test*

Source: Muhammad Aidil Qahtan, 2024

Based on Table 3, it shows that 55.6% of respondents have poor hand and nail hygiene and are positive for dermatomycosis. In addition, 40% of respondents with good hand and nail hygiene were diagnosed with dermatomycosis. In this study, the level of hand and nail hygiene did not have a significant relationship with the incidence of dermatomycosis with a p value of 1.00 using the Fisher exact test (p>0.05).

Table 3 The relationship between hand and nail hygiene levels and the incidence of dermatomycosis

		Dermatomycosis Occurrence				
		Positive n (%)	Negative n (%)	**Total**	**OR (IK 95%)**	***p-value***
Hand and Nail Hygiene	Bad	20 (55,6)	16 (44,4)	36 (100)	0,833 (0,124 -5.606)	1.000[f]
	Good	3 (60)	2 (40)	5 (100)		
	Total	23 (56,1)	18 (43,9)	41 (100)		

**f) fisher exact test*

Source: Muhammad Aidil Qahtan, 2024

In this study, table 4 shows that 44.4% of 18 respondents with poor clothing hygiene were known to be positive for dermatomycosis and 34.8% of 23 respondents with good clothing hygiene were known to be negative for dermatomycosis. Based on statistical analysis using chi-square in this study, there was no significant relationship between clothing hygiene and the incidence of dermatomycosis in patients diagnosed with dermatomycosis who were treated at the Unyur Health Center during the period 2023 to 2024 (p>0.05).

Table 4 The relationship between the level of clothing cleanliness and the incidence of dermatomycosis

		Dermatomycosis Occurrence				
		Positive n (%)	Negative n (%)	**Total**	**OR (IK 95%)**	***p-value***
Cleanliness of Clothes	Bad	8 (44,4)	10 (55,6)	18(100)	0,427 (0,120-1,512)	0,183[cs]
	Good	15 (65,2)	8 (34,8)	23(100)		
	Total	23 (56,1)	18 (43,9)	41(100)		

**cs) chi-square test*

Source: Muhammad Aidil Qahtan, 2024

Based on the data in table 5 with 41 respondents, 16 respondents had poor towel hygiene and 50% of them were diagnosed with dermatomycosis. In addition, of the 25 respondents with good towel hygiene, 60% of them were diagnosed with dermatomycosis. In this study, the researcher did not find a significant relationship between towel hygiene and the incidence of dermatomycosis in patients diagnosed with dermatomycosis and treated at the Unyur Health Center during the period 2023 to 2024 (p>0.05).

Table 5 The relationship between towel cleanliness levels and the incidence of dermatomycosis

		Dermatomycosis Occurrence				
		Positive n (%)	Negative n (%)	**Total**	**OR (IK 95%)**	***p-value***
Towel Cleanliness	Bad	8 (50)	8 (50)	16 (100)	0,667 (0,188-2,362)	0,529[cs]
	Good	15 (60)	10 (40)	25 (100)		
	Total	23 (56,1)	18 (43,9)	41 (100)		

**cs) chi-square test*

Source: Muhammad Aidil Qahtan, 2024

Based on statistical analysis in table 6 using chi-square in this study, the researcher did not find a significant relationship between the level of bed and bed sheet cleanliness and the incidence of dermatomycosis with a p value of 0.154 (p>0.05). It is known in this study, as many as 48.1% of respondents with poor bed and bed sheet cleanliness were diagnosed with dermatomycosis and 43.9% of respondents with good bed and bed sheet cleanliness without dermatomycosis.

Table 6 The relationship between the level of bed cleanliness and the incidence of dermatomycosis

		Dermatomycosis Occurrence				
		Positive n (%)	Negative n (%)	**Total**	**OR (IK 95%)**	***p-value***
Cleanliness of Bed and Sheets	Bad	13 (48,1)	14 (51,9)	27(100)	0,371 (0,093 - 1,482)	0,154[cs]
	Good	10 (71,4)	4 (28,6)	14(100)		
	Total	23 (56,1)	18 (43,9)	41 (100)		

**cs) chi-square test*

Source: Muhammad Aidil Qahtan, 2024

The relationship between densely populated environments and the incidence of dermatomycosis in this study did not find a significant relationship, with a p value of 0.467 using the Fisher exact test. In Table 7, 70% of respondents with densely populated environments were diagnosed with dermatomycosis and 51.6% of respondents with non-densely populated environments were diagnosed with dermatomycosis.

Table 7 The relationship between densely populated environments and the incidence of dermatomycosis

		Dermatomycosis Occurrence				
		Positive n (%)	Negative n (%)	**Total**	**OR (IK 95%)**	***p-value***
Densely Populated Environment	Dense	7 (70)	3 (30)	10 (100)	2.188 (0,476-10,051)	0,467[f]
	Not Dense	16 (51,6)	15 (48,4)	31 (100)		
	Total	23 (56,1)	18 (43,9)	41 (100)		

**f) fisher exact test*

Source: Muhammad Aidil Qahtan, 2024

The age of respondents in this study was categorized into <40 years and >40 years. In table 8, 56.3% of respondents aged >40 years and 6.1% aged <40 years were diagnosed with dermatomycosis. It is known that in this study, there was no significant relationship between age and the incidence of dermatomycosis with a p value of 0.987 (p>0.05).

Table 8 Relationship between age and incidence of dermatomycosis

		Dermatomycosis Occurrence				
		Positive n (%)	Negative n (%)	**Total**	**OR (IK 95%)**	***p-value***
Age	>40 Years	9 (56,3)	7 (43,8)	16 (100)	1.010 (0,285 - 3,578)	0,987[cs]
	<40 Years	14 (56)	11 (44)	25 (100)		
	Total	23 (56,1)	18 (43,9)	41 (100)		

**cs) chi-square test*

Source: Muhammad Aidil Qahtan, 2024

Based on table 9, there was no significant relationship between gender and the incidence of dermatomycosis with a p value of 0.467 using the fisher exact test. In addition, it is known that from 10 male respondents, 70% of them were positive for dermatomycosis and from 31 female respondents

51.6% of them were positive for dermatomycosis.

Table 9 Relationship between gender and incidence of dermatomycosis

		Dermatomycosis Occurrence				
		Positive n (%)	Negative n (%)	**Total**	**OR (IK 95%)**	***p-value***
Gender	Man	7 (70)	3 (30)	10 (100)	2,188 (0,476 - 10,051)	0,467[f]
	Woman	16 (51,6)	15 (48,4)	31 (100)		
	Total	23 (56,1)	18 (43,9)	41 (100)		

**f) fisher exact test*

Source: Muhammad Aidil Qahtan, 2024

Based on Table 10 using chi-square analysis, the researcher did not find a relationship between work and the incidence of dermatomycosis in patients diagnosed with dermatomycosis and treated at the Unyur Health Center (p>0.05). In this study, 68.8% of respondents had jobs that were at risk of dermatomycosis and were diagnosed positive for dermatomycosis, while 52% of respondents had jobs that were not at risk and without dermatomycosis.

Table 10 Relationship between work and the incidence of dermatomycosis

		Dermatomycosis Occurrence				
		Positive n (%)	Negative n (%)	**Total**	**OR (IK 95%)**	***p-value***
Work	Risk of Dematomycosis	11 (68,8)	5 (31,3)	16 (100)	2,383 (0,639 - 8,891)	0,192[cs]
	No risk of Dermatomycosis	12 (48)	13 (52)	41 (100)		
	Total	23 (56,1)	18 (43,9)	(100)		

**cs) chi-square test*

Source: Muhammad Aidil Qahtan, 2024

DISCUSSION

The results of the study showed that out of 41 subjects, 65.9% of respondents with dermatomycosis seeking treatment at the Unyur Community Health Center had poor hygiene levels. This finding is supported by previous research conducted by Anastacia et al., which stated that dermatomycosis tends to occur in individuals with poor hygiene. Additionally, a study by Sukmara et

al. reported a dermatomycosis prevalence rate of 67% in Nigeria, which is higher than the prevalence found in the working area of the Unyur Community Health Center in Serang City, which was 56.1%. The results also showed that the majority of respondents had a history of poor skin hygiene, poor hand and nail cleanliness, and poor cleanliness of bedding and bed sheets. These factors can be associated with an increased risk of dermatomycosis among the respondents. Furthermore, the majority of respondents were over 40 years old, with females being the dominant gender. This study also found that the sample population tended to have occupations that are less at risk of contracting dermatomycosis compared to high-risk occupations.[11]

Based on the statistical test results of this study using Fisher's Exact Test, it was found that there is no statistically significant relationship between skin hygiene levels and the incidence of dermatomycosis ($p = 0.638$). The frequency table shows that the majority of respondents had poor skin hygiene, but statistically, this was still not significant. This finding is consistent with a previous study conducted by Adwiyah, which also reported no significant relationship between skin hygiene levels and the occurrence of dermatomycosis ($p = 0.514$). This similarity may be due to the use of the same data collection methods and target samples as in this study. Research conducted by Melina in 2018 supports the idea that several factors can contribute to poor skin hygiene, such as bathing with water only without soap, bathing with stagnant (dirty) water, and bathing less than twice a day. These practices are not recommended as they can increase the risk factors for dermatomycosis.[12,13]

Furthermore, the results showed no statistically significant relationship between hand and nail hygiene and the incidence of dermatomycosis among patients at the Unyur Community Health Center, with a p-value of 1.00. This finding is not consistent with a previous study by Walaszek et al. in 2018, which examined nail length and its association with fungal skin diseases. Walaszek et al. reported a significant relationship ($p = 0.001$) between nail length and nail hygiene, indicating that long nails can harbor fungi and other microbes on both the nails and hands, making hand hygiene less effective when nails are long.[14]

Regarding the relationship between clothing hygiene and the incidence of dermatomycosis, the results of this study found no statistically significant relationship between clothing hygiene and dermatomycosis occurrence, with a p-value of 0.183. This finding is not consistent with a previous study by Nurul in 2021, which found a p-value of 0.035, indicating a significant relationship between clothing hygiene and dermatomycosis incidence.[64] This is also supported by research conducted by Adwiyah, which found a p-value of less than 0.005, meaning there is a significant relationship between clothing hygiene and the occurrence of dermatomycosis. Maintaining clothing hygiene is important to provide comfort to individuals when wearing clothes. Dirty clothing can cause skin diseases because it

results from sweat produced by the body during activities. In addition to making clothes dirty, sweat can cause unpleasant odors and increase the risk of itching on the body.[12]

The level of towel hygiene showed a p-value of 0.529, indicating no statistically significant relationship between towel cleanliness and the incidence of dermatomycosis among patients seeking treatment at the Unyur Community Health Center. This finding is not consistent with a study conducted by Wahid in 2021, which reported a significant relationship between towel hygiene and the occurrence of dermatomycosis, particularly Pityriasis Versicolor (p = 0.024).[15]

Based on the results of statistical tests, no significant relationship was found between the level of bed cleanliness and the incidence of dermatomycosis in patients treated at the Unyur Health Center, with a p-value of 0.154. This result is not in line with previous research conducted by Irjayanti et al in 2023 which obtained a p-value of 0.018, which means that there is a significant relationship between the level of bed cleanliness and the incidence of dermatomycosis in the community in the work area of Amiyu Village in East Arso District.[16]

The analysis results also found no significant relationship between densely populated environments and dermatomycosis incidence with a p value of 0.467. This study is in line with previous research conducted by Oloyutin et al, which obtained a p value of 0.594 ($p < 0.05$), where in previous studies there was also no significant relationship between the environment in the population and dermatomycosis. The population environment in this study was mostly included in the non-dense category, just like previous studies.[17]

After that, the results showed that there was no significant relationship between age and the incidence of dermatomycosis in patients treated at the Unyur Health Center (p value = 0.987). A study conducted by Lakshmanan et al stated that the dominant age group infected with dermatomycosis was the age group 22-40 years, this is not in line with the results of this study (p value = 0.04), because previous studies found a significant relationship between age and the incidence of dermatomycosis. The results obtained from this study were dominated by the age category over 40 years with a percentage of 61% of the total sample obtained.[8] This is reinforced by the study of Nilawati et al who obtained a p-value of 0.031 from age characteristics with the incidence of tinea pedis, which means that there is a significant relationship between the two.[18]

There is no significant relationship between gender and dermatomycosis incidence (p value = 0.497). Furthermore, a study by Lakshmanan et al also explained that the majority of genders that are often infected with dermatomycosis are men with a percentage of 56% compared to women (44%). This is also not in line with this study because the p value <0.005 because the majority of respondents are

women (75.6%) while men are 24.4%, where the percentage is lower than the study by Lakshmanan et al.[8] According to Widhidewi et al in their study, the results of the p-value = 0.003 were obtained, which means that there is a significant relationship dominated by the male gender. The number of respondents also affects the difference in the results of this study with previous studies.[19]

The results of the last statistical test were that there was no relationship between work and the incidence of dermatomycosis in patients who were treated at the Unyur Health Center with a p value of 0.192. This is not in line with Akbar's research in 2020 on the relationship between work and the incidence of dermatomycosis which obtained a p value of 0.026, which means that there is a statistically significant relationship.[60] This is supported by research from Nilawati et al in 2021 on the study of the risk relationship between Jatibarang TPA workers and Tinea Pedis. Based on this study, a p value of <0.05 was obtained, which means that there is a statistically significant relationship, because in this study, TPA workers after finishing their work did not wash their feet regularly and did not wear footwear and socks, even though their work is included in the work that is at risk of dermatomycosis. Meanwhile, in this study, the majority of respondents were housewives (IRT) so they were included in the non-risk category.[18]

CONCLUSION

In this study it can be concluded that the demographic characteristics of dermatomycosis patients at the Unyur Health Center are 61% aged >40 years, while 39% are aged <40 years. Female patients (75.6%) are more dominant than male patients (24.4%). The patient's work is mostly doing non-risky work (61%) higher than risky work (39%). Then the prevalence of dermatomycosis cases from patients who came to the Unyur Health Center was 56.1%. The results of the study showed that skin hygiene was poor (87.8%), hand and nail hygiene was poor (87.8%), clothing hygiene was in the good category (56.1%), while the bad category (43.9%), towel hygiene was mostly in the good category (61%) and bed and bed linen hygiene was 65.9% in the bad category. The density of the environment around the respondents' homes was mostly not densely populated (75.6%).

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