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Research Article

Incidence of Dermatophytosis Based on Age and Gender at The Regional General Hospital in Gianyar District Hospitals

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ABSTRACT

Background: Dermatophytosis is a superficial fungal infection caused by filamentous fungi that attack the keratinized tissue of the skin, nails, and hair. The clinical manifestations of dermatophytosis, in addition to depending on the source host factors, such as age, sex, and race, are significant epidemiological factors. However, the relationship of infection susceptibility remains unclear. **Purposes**: This study aimed to determine the relationship between age and sex and dermatophytosis incidence in Gianyar Regency. **Methods:** This study was observational with a cross-sectional design using 200 samples divided into 100 dermatophytosis patients and 100 non-dermatophytosis patients. Statistical analysis of the data used was a chi-square test with 95%CI. **Results**: The majority of patients with dermatophyte infections were >19 years old (74%), female (57%), and tinea corporis (36%). The chi-square test showed that there was a significant relationship between age and sex with the incidence of dermatophytosis (p = 0.025; OR = 1.978; 95% CI = 1.087-3.599 and p = 0.003; OR = 2.357; 95% CI = 1.334-4.162). **Conclusion**: It can be concluded that older age and female tend to suffer dermatophytosis.

Keywords: age, dermatophytosis, fungal infection, sex, tinea

INTRODUCTION

Dermatophytosis is a superficial fungi infection that infects keratinized tissues in the stratum corneum, such as skin, hair, and nails. The cause of dermatophytosis is dermatophyte, which degrades keratin as a source of nutrition without attacking the underlying non-keratinized tissue (1). The three genera of Dermatophytes—Trichophyton (skin, nails, and hair), Epidermophyton (skin and nails), and Microsporum (skin and hair)—are included in the class of Deuteromycota (Fungi imperfecti) (2,3). Based on their environment, dermatophytes can be divided into three categories: anthropophilic (found on human skin), zoophilic (found on animal skin), and geophilic (found on soil) (3).

In practically every region of Indonesia, dermatophytosis may be observed due to the humid, hot, and tropical environment and the favorable geographic circumstances for the growth of fungi, including dermatophytosis (4). Dermatophytosis is estimated to be around 10 to 15% of individuals experiencing a dermatophyte infection at some point (5). The World Health Organization (WHO) reports that about 25% of people worldwide are affected with

dermatophytosis (6). In Indonesia, the prevalence of dermatophytosis is 52% of all dermatomycosis cases (7). According to research done in Bali by Sari (2021), tinea unguium caused the majority of dermatophytosis patients (4).

The clinical manifestations of dermatophytosis, in addition to depending on the source, host factors, such as age, sex, and race, are significant epidemiological factors. However, the relationship of infection susceptibility remains unclear.8 Infections with dermatophytes are five times more prevalent in males than females. Adults are more likely to get tinea corporis than children are to get tinea capitis (4).

Superficial fungal infections can be experienced in all age groups. In childhood, due to the lack of fatty acid production before puberty, the inhibition of fungi colonization (6,8). However, most adult studies had dermatophytosis infections connected to increased physical activity, changes in hormonal patterns, and high exposure potential (9). The results of research by Rashidian (2015) in Iran concluded that there was a significant relationship between age and the incidence of dermatophytosis (10), while a study by Rustika (2018) in Tangerang concluded that there was no relationship between age and the incidence of dermatophytosis (11).

Males are more likely to have dermatophytosis infections caused by the physiological structure of males who are more active outdoors and demand physical activity to provide conditions conducive to the growth of dermatophytes (12). On the other hand, female is less likely to be infected with dermatophytes, which is associated with their lifestyle, including a lot of housework, indoor activities, and hormonal factors (9). The results of a study by Nnagbo (2021) in India concluded that there was a significant relationship between sex and the incidence of dermatophytosis (13), while the results of research by Riani (2014) in South Jakarta concluded that there was no significant relationship between sex and the incidence of dermatophytosis (14). Based on the description above, there are still high cases of dermatophytosis that affect people of all ages and sexes. Because the relationship between age and sex with the incidence of dermatophytosis gives varying results, the researchers are interested in researching the relationship between age and sex with the incidence of dermatophytosis in Gianyar Regency.

METHODS

This analytic observational study with a cross-sectional design was conducted at the Sanjiwani Hospital, Gianyar, and Darma Giri Skin Center Clinic. The number of samples used in this study was a minimum of 172 samples taken with a total sampling technique from secondary data, specifically medical records and registers of patients diagnosed with dermatophytosis and non-dermatophytosis at the Dermatology and Venereology Polyclinic of Sanjiwani Hospital, Gianyar and Darma Giri Skin Center Clinic in 2018-2021. Inclusion criteria that must be met in the study sample are patients who come for a check-up and have been diagnosed with dermatophytosis and non-dermatophytosis clinically and/or laboratory at the Dermatology and Venereology Polyclinic, Sanjiwani Hospital, Gianyar and Darma Giri Skin Center Clinic. Meanwhile, the exclusion criteria for the sample of this study were that the patient had a history of systemic disease (Diabetes Mellitus, HIV/AIDS, and Cushing's disease) and used immunosuppressant drugs (corticosteroids and cytostatics), as well as

incomplete medical record data. The variables examined in this study are age and sex as independent variables and dermatophytosis as the dependent variable. After the data is collected, data analysis will be carried out for hypothesis testing. The data were analyzed by descriptive statistics to determine the characteristics of the research subjects, followed by the correlation test of categorical data, basically statistical tests with the Chi-Square test to determine the relationship between the independent variable and the dependent variable with a significant value limit of $p < 0.05$. This data analysis was carried out with the help of the Statistical Package for the Social Sciences 22 version application. This research was approved by Ethical Committee of Faculty of Medicine and Health Sciences Warmadewa University by Ethic number 255/Unwar/FKIK-EC-KEPK/IV/2022.

RESULTS

This study was approved and carried out at the Sanjiwani Hospital, Gianyar, and Darma Giri Center Clinic, with research samples collected from February to March 2022. The overall sample size for this study was 200 samples, including 100 samples (dermatophytosis) and 100 samples (non-dermatophytosis). Table 1. shows that the most diagnosed type of dermatophytosis in the dermatophytosis group was tinea corporis (36%), followed by tinea cruris (24%), tinea manuum (18%), tinea pedis (11%), tinea capitis (10%) and tinea unguium (1%). Table 2. shows that the most significant number of samples based on age in the dermatophytosis and non-dermatophytosis groups was the age group >19 years (74% and 59%). Meanwhile, based on sex, most in the dermatophytosis group were female (57%), and in the non-dermatophytosis group were male (64%).

Table 1. Type of Dermatophytosis

Type of Dermatophytosis	Frequency (n)	(%)
Tinea Capitis	10	10
Tinea Corporis	36	36
Tinea Cruris	24	24
Tinea Manuum	18	18
Tinea Pedis	11	11
Tinea Unguium	1	1
Total	**100**	**100**

Table 2. Correlation of Age with Dermatophytosis

Variable	Dermatophytosis		Total n (%)	*p-value*	OR	CI 95%
	Yes n(%)	No n(%)				
Age (year)						
0-18	26(38.8)	41(61.2)	67(100)	0.025	1.978	1.087-3.599
>19	74(55.6)	59(44.4)	133(100)			

Table 3. Relationship of Sex with Dermatophytosis Incidence

Variable	Dermatophytosis		Total n (%)	*p-value*	OR	CI 95%
	Yes n(%)	No n(%)				
Sex						
Male	43(40.1)	64(59.9)	107(100)	0.003	2.357	0.334-4.162
Female	57(61.2)	36(38.8)	93(100)			

Table 3. shows the correlation test results for categorical data on the age variable using the chi-square test seen from the p-value = 0.025 (p < 0.05). It can be concluded that age is related to the incidence of dermatophytosis. The Odd Ratio value generated in the table above is 1.978 (95% CI = 1.087-3.599), which means that people aged >19 years have a 1.97 times greater risk of developing dermatophytosis than people aged 0-19 years with a confidence interval 95%. Meanwhile, the results of the correlation test of categorical data on the sex variable using the chi-square test seen from the p-value = 0.003 (p < 0.05) can be concluded that sex has a relationship with the incidence of dermatophytosis. The Odd Ratio value generated in the table above is 2.357 (95% CI = 1.334-4.162), which means that females have a 2.35 times greater risk of developing dermatophytosis than males with a 95% confidence interval.

DISCUSSION

The results of this study were in consistent with research by Astritd (2016) in Medan which reported that the most dermatophytosis patients were in the 40-59-year age group (36.2%) and followed by 20-39 years old (33.3%) (15). This study's results are consistent with Riani's (2014) research in South Jakarta, which concluded that there is a relationship between age and the incidence of dermatophytosis. According to the results of this study, the average age of patients having dermatophytosis was 35.2 years (14). However, the results of this study were different in other countries by Bitew (2019) in Ethiopia. The results of the study found that there was no relationship between age and the incidence of dermatophytosis. Due to discrepancies in the study's sample group, which only utilized one type of dermatophytosis they are tinea unguium (16).

The results of this study are consistent with existing epidemiology in Indonesia, which demonstrates that the 25-64-year age range is more susceptible to dermatomycosis than younger or older adults (14). The majority of research demonstrate that dermatophytosis infections are widespread in adults and are connected to increased physical activity, changes in hormonal patterns, and high exposure potential (9). Adult age is the age of workers, therefore there is more physical activity, which is aided by a hot and humid climate that boosts sweat production. Excessive perspiration can diminish oil production, which prevents the growth of fungi on the skin, rendering it vulnerable to dermatophyte infections (17).

The immune system changes with age can reducing the body's ability to fight illness (18). There are physiological changes, such as the skin being drier, thinner, and wrinkled, as well as having fewer sweat glands, sebaceous glands, and hair follicles, which makes it more vulnerable to infections or causes the natural flora to become opportunistic (19). The body's ability to distinguish foreign objects also changes whether they enter the body or parts of the

body itself. There is also a process of thymic involution, in which the volume of thymus tissue is reduced, making many T lymphocytes unable to work and fight disease compared to when they were young, and thus the body's ability to control disease is reduced. Cell-mediated immunity can also change, basically changes in the production of cytokines (IL-2, 4, TNF-α, and IFN-γ) that regulate lymphocyte responses (Th-1 and 2 cells). Decreased function of T-lymphocyte cells can affect the function of B-lymphocytes, which secondly regulate the production of antibodies to recognize antigens. IgM response to infection and maturation of B lymphocyte cells is also reduced, so that it can reduce the number of antibodies produced to fight infection (20).

According to the results of this study, female was more likely than male to have dermatophyte infections. Dermatophytosis infection can affect both sexes, although the incidence rates fluctuate depending on habits and lifestyle factors (21). The results of this study are in consistent with research by Sondakh (2016) in Manado showing that dermatophytosis infections are often found in female as much as 60.8% (22). Another contradiction is Kang's (2019) claim that male are five times more likely than female to get dermatophyte infections (23). However, because the sample's sex makeup is not proportionate to the number of visits, these findings likewise cannot be used to describe the population. Due to the belief that female is more concerned with appearance-related issues than male, and then a greater proportion of patients are female than male (22).

The results of this study are supported by the research of Nnagbo (2021) in India which concluded that there was a significant relationship between sex and the incidence of dermatophytosis, where the study found that female was more often found to have dermatophytosis (13). The results of this study are consistent with research conducted in Nigeria by Samuel (2013), which found that postmenopausal female had low levels of triacylglycerides in their sebum, making them more susceptible to dermatomycosis infections than other adults (24). Menopause is the cessation of menstrual periods for 12 months due to permanent ovarian function resulting in a dramatic decrease in estrogen levels. Low estrogen levels can contribute to signs of aging skin, including dry skin, a loss of suppleness, and slow wound healing. The structural and architectural changes in the skin, such as reduced sebum production, collagen levels, thicker skin, and elastin fibers, are responsible for these symptoms (25).

The results of this study are different from research by Riani (2014) in South Jakarta. The study found that there was no relationship between sex and the incidence of dermatophytosis. This unrelated result was due to the fact that the sampling was only at the public health center where most of the patients had similar characteristics, such as lifestyle and daily habits (15).

CONCLUSION

Based on the result of this study it can be concluded there was significant correlation of age with incidence of dermatophytosis. Older age tends to suffer dermatophytosis compared with younger age. It also found female more frequently suffer dermatophytosis compared with male subject.

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CONFLICT OF INTEREST

None declared.

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