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The incidence of *Trichophyton rubrum* infection related to personal hygiene between fishers and home-based fish processors in Bengkulu City

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Abstract

Purpose: This study aimed to compare the incidence of *Trichophyton rubrum* fungal infections related to personal hygiene between fishers and home-based fish processors in coastal communities in Nelayan Village, Sumber Jaya District, Bengkulu City. **Method:** This observational-analytic cross-sectional study took the consecutive sampling of 124 fishers and domestic fish processors in the research site. Data collection used questionnaires to obtain demographic characteristics and personal hygiene data. This study used a 10-20% KOH examination to diagnose dermatophytosis and fungal culture on Sabouraud Dextrose Agar to identify *Trichophyton rubrum.* **Results:** The highest incidence of dermatophytosis was tinea pedis (50%). Fishers and home fish processors in the research site had poor personal hygiene (100%) and 8.9% were infected with *Trichophyton rubrum*. **Conclusions:** There is no difference in *Trichophyton rubrum* fungal infections between fishers and home fish processors.

Keywords: *Trichophyton rubrum*; personal hygiene; fishers; home fish processing; coastal communities

INTRODUCTION

Dermatophytosis often occurs in tropical countries with the highest prevalence in areas with high humidity and dense populations, and poor hygiene [1]. Dermatophytosis prevalence in sub-Saharan Africa in 2005 was approximately 78 million cases. In 2016, dermatophytosis prevalence reached 23.4% in Harari Regional State, Ethiopia [2]. The incidence of dermatophytosis in Indonesia ranges from 2.93-27.6% in 2009-2011 [3]. The distribution of dermatophytosis in Indonesia is mostly in the productive age range [4].

According to research at Dr. Cipto Mangunkusumo Jakarta in 1980, the most common causes of dermatophytosis in Indonesia are the Trichophyton rubrum (T. rubrum). Trichophyton rubrum is also the most common cause of dermatophytosis worldwide. Trichophyton rubrum causes a lot of tinea corporis, tinea pedis, and tinea unguium [5]. Dermatophytosis due to T. rubrum lasts long and is prone to relapse [6].

Personal hygiene, slum and crowded environment, socioeconomic status, education level, occupation, physical environment, and exposure to chemicals influence the spread of dermatophytosis. The incidence of dermatophytosis may increase due to the use of occlusive materials and the presence of trauma. Exposure to hot temperatures can also increase skin temperature and humidity [4].

Bengkulu City is one of the cities in Indonesia, which has a wet tropical climate and is located on the coast with excellent fishery potential. Bengkulu City has a fishing village close to the port, namely Kampung Nelayan, in Sumber Jaya Village. According to research conducted by Rijal and Ardiansyah in 2016, Kampung Nelayan belonged to the medium slum area category. This classification included various aspects, such as building density, drainage system, solid waste system, and PDAM network coverage [7].

The occupational health problem for fishers and fish processors in coastal communities is dermatophytosis. Factors that support dermatophytosis in fishers include personal hygiene, humid environment, wet conditions, or a lot of sweating [8]. Other risk factors for dermatophytosis in fish processors are a cold environment, poor personal hygiene, and inadequate knowledge and practices [9].

Research on the relationship of personal hygiene with the incidence of T. rubrum fungal infection in coastal communities in Bengkulu City is still limited. This study examines the relationship of personal hygiene with the incidence of T. rubrum fungal infection in coastal fisher communities.

METHODS

This observational-analytic cross-sectional study took the consecutive sampling of 124 fishers and domestic fish processors aged between 18-64 years in Nelayan Village, Sumber Jaya Village, Bengkulu City. The Ethics Commission approved this research for Medical and Health Research, Poltekkes Kemenkes Bengkulu Number DM.01.04 / 293/3 / XI / 2018. The data collection used questionnaires and laboratory examinations on research subjects' characteristics and personal hygiene conditions. T. rubrum was identified using a 10% KOH examination and Sabouraud Dextrose Agar (SDA) culture. Mann-Whitney Test was used for the Bivariate analysis.

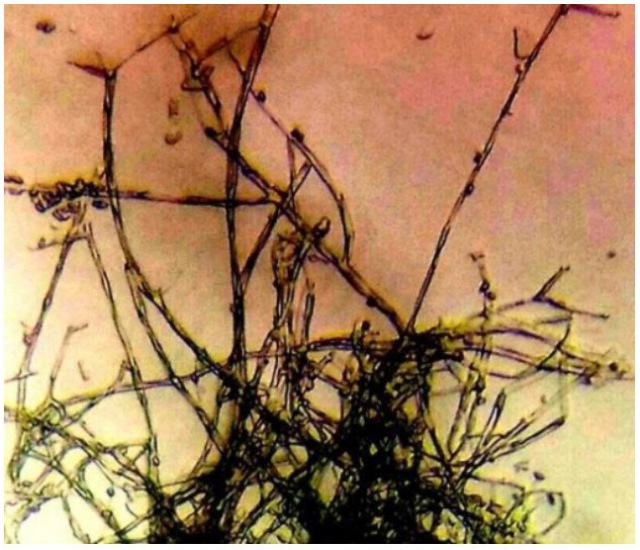

Figure 1. A positive result for T. rubrum on microscopic examination

RESULTS

Table 1 presents the characteristics of respondents. Among 124 respondents, 50% were fishers and 50% domestic fish processors. 54.8% were male, and 90.3% were in the age between 45-64 years. Most of the respondents had graduated from junior high school (30.6%), have income below the minimum wage (90.3%), and from the Basemah tribe (29.8%).

Table 1. Frequency distribution of demographic characteristics of respondents (n=124)

Characteristics	%
Sex	
Male	54.8
Female	45.2
Age (years old)	
18-25	5.6
26-44	4.0
45-64	90.3
Education	
No history of education	11.3
Unfinished elementary education	21.8
Elementary school graduate	21.8
Middle school graduate	30.6
High school graduate	14.5
Occupation	
Fishers	50.0
Domestic fish processor	50.0
Income (per month)	
> Rp 1.888.000	9.7
< Rp 1.888.000	90.3
Ethnicity	
Rejang	0.8
Minang	13.7
Basemah	29.8
Bataknese	17.7
Javanese	10.5
Malay	20.2
Bugis	7.3

The macroscopic examination of suspect T. rubrum discovered a white surface cotton-like image with brownish-yellow pigmentation on the other side of the colony. Afterward, we obtained a hypha in the form of long and branched macroconidia resembling a cigar (Cigar shape). Using a binocular light microscope with a magnification of 40 x 10, we also found microconidia in the shape of a pin with thin hyphae on each wall that resembles a torn tree.

Table 2 shows all of the subjects have poor personal hygiene, and most are infected with tinea pedis (50.0%), followed by tinea manuum (25.0%), tinea corporis (12.1%), tinea cruris (8.1%), tinea unguium (2.4%), tinea capitis (1.6%), and tinea facialis (0.8%).

Table 2. The frequency distribution of dermatophyte fungi and personal hygiene of the respondents (n=124)

Infection site	(%)
Tinea capitis	1.6
Tinea facialis	0.8
Tinea manuum	25.0
Tinea corporis	12.1
Tinea cruris	8.1
Tinea pedis	50.0
Tinea unguium	2.4
Macroscopic Examination	
Suspect	16.1
Non-Suspect	83.9
Microscopic Examination on Suspect	
Positive	55
Negative	45
Personal hygiene	
Good	0
Bad	100

Table 3 presented no difference in the incidence of T. rubrum fungal infection related to personal hygiene between fishers and domestic fish processors in this research site (p-value = 0.753; p> 0.005).

Table 3. Comparison of the incidence of T. rubrum infection between fishers and domestic fish processors

	N	Mean Risk	P-value
Fishers	62	63	0.753
Domestic fish processors	62	62	

DISCUSSIONS

The largest gender distribution on the research subject was male because women paid more attention to their appearance and were more motivated to see a doctor [10]. This group belongs to the productive age category. If they engaged in activities that produce sweat without paying attention to their hygiene, it would increase the risk of developing dermatophytosis [11]. Most of the latest education research subjects were junior high school graduates. The level of education is related to a person's ability to absorb and receive health information, which plays a role in health development [12]. Most of the research subjects' income was below the minimum wage. The economic level of a person affects the type and level of hygiene practices used. The Basemah tribe is the largest ethnic group found in the study sample mainly because the Basemah tribe migrated to the Bengkulu area [13].

Factors that support the occurrence of tinea pedis are poor personal hygiene, a humid environment, wet or sweaty feet, and poor foot care [14]. Fishers have risk factors for tinea pedis such as prolonged contact with water, rarely using footwear, sailing in the sea for several days, and poor personal hygiene. Fishers rarely take a shower or clean themselves upon arrival. They immediately hand over their catch to the fish processors, and then they wash their boat. When working, the fishers only use makeshift clothes. Sometimes they do not wear clothes because of the heat; they often sweat and are exposed to direct sunlight. After returning to the mainland, many fishers complain of itchiness.

On the other hand, domestic fish processors also have risk factors for tinea pedis, such as prolonged contact with water when cleaning and salting fish, the use of rubber boots, frequent sweating, and exposure to direct sunlight when drying fish. The skin on the feet' soles often cracks, and the fish processing facilities are dirty and open spaces.

All research subjects had poor personal hygiene. Unhygienic behaviors that can affect dermatophytosis are a lack of personal hygiene, wet conditions, and dirty water. The condition of housing or settlement is one factor that determines the state of environmental hygiene and sanitation. As a medium slum settlement, this coastal village community with poor personal hygiene is very suitable for skin diseases.

The macroscopic appearance of the T. rubrum is a white, cotton-like surface with a brownish-yellow pigmentation on the other side of the colony. The microscopic appearance of T. rubrum shows long, branched, cigar-like macroconidia and peg-shaped microconidia with thin hyphae on each wall that resemble a torn tree [15].

Compared to the domestic fish processors, more fishers had T. rubrum. Furthermore, bivariate analysis using the alternative statistical test Mann-Whitney Test with a confidence interval of 95% or a significance level of α = 0.05 obtained a value of p = 0.753 (p <0.05). The finding indicates no difference in the incidence of associated T. rubrum yeast infection and the personal hygiene between fishers and home fish processors in coastal communities in the Kampung Nelayan, Sumber Jaya Village, Bengkulu City.

CONCLUSION

The highest incidence of dermatophytosis infection is tinea pedis (50%). This study showed that fishers and domestic fish processors had the same risk factors for T. rubrum infection, namely having poor personal hygiene. Continuous education with the Puskesmas and the Health Office needs to be made sufficient to improve a healthy lifestyle so that workers in the fishers Village, whose main job is in contact with water, can avoid fungal infections.

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