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The Identification Malassezia Species and Sebum Content on Seborrheic Dermatitis Patients

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Abstract

The research aimed at investigating the relationship between Malassezia species and sebum content on the seborrheic dermatitis patients. The research was conducted in Makassar City from July to September 2017. The research used the analytic observational method with the cross sectional design. Samples were the seborrheic dermatitis patients who fulfilled the criteria in Makassar City. Skuama was taken from 48 samples on the seborrheic dermatitis lesions, and the examination of KOH, culture and sebumeter were conducted. The research result of 48 patients samples, as many as 9 samples (18,8%) indicate the positive KOH and culture examinations, as many as 39 samples (81.2%) indicate the negative KOH and culture examinations. There is no compatibility of the sebum content examination between the positive and negative culture examinations.

Keywords: KOH; culture; Malassezia; sebumeter.

1. Introduction

Seborrheic dermatitis is a skin inflammatory disorder on the skin that rich in sebaceous glands, affected 3% to 5% of the population.

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The clinical feature of this disorder is reddish and squamous patches on the scalp, face, chest and lips. The role of seborrhea in seborrheic dermatitis is controversial and does not appear to be associated with seborrhea [10]. Seborrheic dermatitis is classified into two age groups: the self-limited form that exists in the first 3 months of life and a very chronic adult form. Men are dominantly have this disorder at all ages, without predilection. The prevalence rate of seborrheic dermatitis is 3% -5% in young adults, and 1% -5% in general population [4].

The pathogenesis of seborrheic dermatitis is not fully understood. Seborrheic dermatitis is associated with excessive production of sebum and linked to *Malassezia* [5]. *Malassezia* (formerly known as *Pityrosporum*) is lipophilic organism linked to yeast, which is natural to human and animal skin, and also the cause of certain skin diseases [1,7].

The specific causes of seborrheic dermatitis are unknown. Several factors are involved in the etiopathogenesis of this disease, such as the type of *Malassezia* species, activity of sebaceous gland, and the susceptibility of the individual. The evidence of *Malassezia*'s role on this disease is explained by the lesion improvement due to antifungal drugs administration. It is proven that antifungal drugs leads to a decrease in the population of *Malassezia*. *Malassezia* is a lipophilic dimorphic fungus and naturally is a part of skin's normal flora and can be isolated by skin scrapings from rich-sebum area of the body, such as the chest, back, and head areas. Found in 90% of healthy adult skin, this yeast can change its role, from saprophytes commensals into pathogens under some predisposing factors, e.g. changes in skin's microflora and / or changes in host defense [2].

In an earlier study conducted by (2016), in Manado, seborrheic dermatitis patients mostly are male, 61 patients (67.0%), and female cases are 30 patients (33.0%).

Although primary identification of the *Malassezia* species is loosely based on its morphological characteristics (colony morphology and microscopic examination), but this method did not provide a detailed information in more specific isolates. However, some biochemical method was conducted for the physiological identification of the *Malassezia* species. This biochemical method needs a lot of stage to be done, and takes a lot of time. However, the cost required to perform such method is relatively cheaper and requires some simple equipments, therefore this method remains widely used in several studies [8, 6]. Sabouraud Dextrose Agar (SDA), contains cycloheximide with olive oil layer, and Modified Dixon Agar (MDA) are more specialized mediums that allows better visualization and colony of the isolates [3].

The aim of this study is to determine the infection of *Malassezia* species disease on seborrheic dermatitis patients that diagnosed based on the KOH preparation and culture from the patients's skin. This study evaluate skin's sebum content and culture result of the seborrheic dermatitis patients.

2. Materials and Methods

2.1. Time and Place

The study was conducted in the Dermatovenereology Department of Dr. Wahidin Sudirohusodo Hospital, and networking hospital in Makassar City. KOH preparation, culture, and sebumeter examinations were performed in

the Mycology Laboratory of the Dermatovenereology Science Department, Faculty of Medicine, Hasanuddin University. The study was conducted from July to September 2017.

2.2. Design and Variables

This observational study is using cross sectional design. The research variables are independent variables (age, sex, occupation and identification of *Malassezia*) and dependent variables (KOH, culture, and sebum level).

2.3. Subject

The subjects of this study are seborrheic dermatitis patients in Dermatovenereology Outpatient Clinics in Dr. Wahidin Sudirohusodo Hospital and Networking Hospitals in Makassar City that meet the criteria of inclusion and exclusion criteria

2.4. Collecting data method

Seborrheic dermatitis patients who meet the inclusion and exclusion criteria will be interviewed and examined to obtain his/her history of illness and the physical examination data. Informed consent are obtained. History taking and physical examination are performed to confirm the diagnosis of seborrheic dermatitis. Furthermore, samples was obtained from each subject for KOH preparation, culture and sebumeter skin surface test. Data will be analyzed and reported.

2.5 Analysis

Data processed by computer statistical software—SPSS version 20. Hypothesis of the analysis was tested by using Independent T-test. The hypothesis is accepted when the *P* value <0.05 with 95% confidence interval. All results of the analysis will be presented in tabular form with annotations.

3. Results

This observational study was conducted using cross sectional design. The correlation of *Malassezia* species identification in seborrheic dermatitis patients using KOH preparation, culture and sebumeter examination was analyzed. This study was conducted by the Dermatovenereology Department Dr. Ir. Wahidin Sudirohusodo Hospital, and networking Hospital in Makassar City. KOH preparation, culture and Sebumeter examinations were performed in the Mycology Laboratory of the Dermatovenereology Department Sciences, Faculty of Medicine, Hasanuddin University. The study was conducted from July to September 2017.

Based on the characteristics of the sample, 48 samples was obtained, 27 subjects were male (56.2%) and 21 subjects were female (43.7%). The age group of 18-65 years is the highest frequency group, 37 people (77.1%), while the lowest frequency, 2 samples, founded in the 80-99 years age group (4.2%). Based on family history, 11 subjects (22,9%) have family history of seborrheic dermatitis and the rest of subjects, 37 (81,2%) were without family history of this disease. Based on the lab examination, 9 out of 48 subjects (18,8%) showed both KOH

preparation and Culture test positive and 39 subjects (81,2%) showed KOH preparation and Culture test negative. Based on their work activity, 37 subjects (77.1%), were working outdoor and 11 subjects (22.9%) are working indoor (appendix, Table 1).

Table 1: Subjects Characteristics

Categories	n	%
Sex		
Male	27	56,2
Female	21	43,7
Age (years old)		
0 – 17	6	12,5
18 - 65	37	77,1
66 - 79	3	6,2
80 – 99	2	4,2
Working activity		
Indoor	37	77,1
Outdoor	11	22,9
Family history		
Yes	11	22,9
No	37	77,1
KOH preparation		
Positive	9	18,8
Negative	39	81,2
Culture examination		
Positive	9	18,8
Negative	39	81,2
SEBUM CONTENT		
T-ZONE		
Dry	21	43,7
Combination-dry	2	4,2
Normal	25	52,1
Oily	0	0
Combination-oily	0	0
SASI		
Mild	46	95,8
Moderate	2	4,2
Severe	0	0
Total	48	100

Table 2: Comparison of Sebum Content and Culture Examination of *Malassezia* species

Culture						
result	n	Minimum	Maximum	Mean	SD	p
Positive	9	10	198	101,33	55,240),880
Negative	39	4	186	104,67	58,124	

The mean rate of sebum content is higher in subjects with negative culture (104.7 vs 101.3). However, the statistical results showed that the difference was not significant ($p > 0.05$), so it can be concluded that sebum content in patients with seborrheic dermatitis in this study did not correlate with the positivity of culture examination (appendix, Table 2).

4. Discussion

This study showed that sebum content in patient with seborrheic dermatitis did not correlate with the positivity of culture test.

The size of subjects in this study is 48 male and female, with age ranged from 3 to 90 years. The age group 18-64 years old, was the most frequent age group, (37 subjects) compared to other age group, 0-17 years—consisted of 6 subjects. Based on outpatient data from Dermatovenereology Outpatient Clinics of RS Wahidin Sudirohusodo in 2013-2015, there are 139 cases of seborrheic dermatitis patient, divided into several age group, which is the highest frequency is in 19-60 years old (60,43%), age > 60 years (23,02%), and age 5-18 years (10.79%). Other literature also mentioned that seborrheic dermatitis mostly occurs in adolescence or young adulthood, and the incidence rate increased in older patients (older than 50 years). Elderly patients immunity mostly has compromised, so they are more susceptible to various diseases, including seborrheic dermatitis.

This study shows that male patients are more in numbers. Male patients were identified in 27 subjects (56.2%) and women were 21 subjects (43.7%). Seborrheic dermatitis patient data from outpatient data from Dermatovenereology Outpatient Clinics of RS Wahidin Sudirohusodo in January 2013-December 2015, the most prevalence sex was male, 73 patients out of 139, compared to female, 66 patients (47,48%). The similar result was shown by Malak et.al. (9), in Manado, men is more frequent (61 subjects (67.0%) than women 30 subjects (33.0%). This may be explained by the higher androgen hormone stimulation in men compared to women. Androgen hormones play role in sebum production, and the sebum activity is known as one of several causes of seborrheic dermatitis.

Based on family history seborrheic dermatitis, 11 subjects (22.9%) have family history and 37 subjects (77.1%) have no family history. According to the literature, family history is often reported, but recent study suggested that mutation of ZNF750 encoding zinc finger protein (C2H2) causing an autosomal dominant seborrhea-like dermatosis dermatitis and this mutation was found in Moroccan-Jewish -Israel descent patients with family history [4].

Based on laboratory examination, KOH preparation and culture examination from 48 samples showed positive result in both examination in 9 samples (18.8%) and 39 samples (81.2%) showed both examinations negative. Based on the literature that we know, the exact cause of seborrheic dermatitis is still unknown, but the presence of seborrheic dermatitis is associated with the *Malassezia* fungus, abnormal immunity, sebaceous activity, and individual susceptibility [4].

Literature mentioned that sebum content is not an important factor, because not all patients with seborrheic dermatitis will experience increased levels of sebum production. On the other hand, some patients with increasing sebum content may also not have seborrheic dermatitis [4].

5. Conclusion

The authors concluded that there was no correlation between sebum content and positivity of *Malassezia* culture examination. The authors suggested that further studies in *Malassezia* identification comparison based on KOH preparation, culture examination and PCR-based examination on seborrheic dermatitis is needed. It also needed to compare the number of *Malassezia* species colonies between seborrheic dermatitis patients versus healthy controls. Further studies is needed to determine the role of various microbiota other than *Malassezia* on the skin surface that play role in the pathogenesis of seborrheic dermatitis. Limitation in age group is needed.

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6. Competing Interest

The authors declare that they have no conflict of interests. The authors alone are responsible for the content and writing of the paper.

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