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Comparison between Celphane Taping and Skin Scrapping Method for KOH Examination In Dermatopohytosis Diagnosis

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ABSTRACT

Background: Fungal skin infections are prevalent in developing countries, with dermatophytosis and tinea versicolor being the most prevalent. The KOH test is a practical and easy-to-do examination for diagnosing superficial fungal skin infections on an outpatient basis. Skin scraping is the most known method for collecting samples for KOH testing, but some studies have shown that cellophane tape is also used for a more patient-friendly approach. **Purpose:** This study is aimed at comparing KOH examinations using cellophane tape and skin scrapings**. Methods:** This research is a diagnostic test study with a cross-sectional approach. The research data were obtained from 51 medical records of skin patients at Dr. Soedirman Kebumen Municipal Hospital with the diagnosis of tinea cruris and tinea corporis who underwent KOH examination with cellophane tape and skin scrapings. Data correlation was analyzed using the Chi square test. **Result :** From the research, it was found that there was no statistically significant difference between the use of cellophane tape and skin scrapings in the KOH test sampling for tinea cases (p = 0.153), which indicates that there was no significant difference between the use of the two methods for the diagnosis of dermatophytosis. **Conclusion:** The tapping method as an alternative method of skin scraping for KOH examination can be used to establish the diagnosis of dermatophytosis.

Keywords: cellophane tape**,** dermatophytosis, KOH examination, skin scrapings, tinea.

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BACKGROUND

The most common skin fungal infections in the world are dermatophytosis and pityriasis vesicolor.[1] This skin fungal infection is more common in tropical countries (63%) like India due to factors like heat and humidity, overpopulation, and poor hygienic conditions. Humidity and high temperatures provide fertile soil for the abundant growth of this fungus.[1]

The increasing incidence of dermatophytosis worldwide has raised global concern.[2] In cases of skin mycosis, including tinea cruris, it affects 20 to 25 percent of the world's population.[3] Developing and tropical countries have an increased prevalence of dermatophyte infections due to high temperatures and increased humidity.[3] The prevalence of dermatophytosis is also common in Indonesia.[4] This is supported by data that has been taken from various regions in Indonesia.[5] From outpatient data at the Department of Dermatovenereology of Prof. Dr. R. D. Kandou Central General Hospital Manado, in the period January to December 2013, found 153 (3.7%) cases of dermatophytosis were found out of 4099 (100%), which consisted of 54 cases (35.3%) of tinea cruris, tinea corporis (50 cases/32.7%), tinea capitis (11 cases/7.2%), tinea unguium or onychomycosis (8 cases/5.3%), and tinea pedis et manum (4 cases/2.6%). A dermatophytosis study at the Department of

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Dermatovenereology of Tangerang General Hospital in 2011 found 27.89% of dermatophytosis cases, with a pattern of distribution of dermatophytosis based on sex. An overview of female patients, namely 99 cases (55.5%) and male patients with 79 cases (44.4%), and based on age, it was found that the most affected age group suffering from dermatophytosis was the age of 15-40 years with a total of 88 cases (49.4%).[6] In the United States, there are an estimated 29.4 million cases of superficial yeast infections and more than 51 million reported doctor visits.[7]

The KOH examination is the initial screening test for diagnosing superficial fungal infections, and it does not require a lot of money or time.[8] This examination can be done as an outpatient procedure.[9] The KOH examination is carried out by dripping KOH liquid on the scrapings of the lesion.[10] However, previous research has shown that KOH examinations can also be carried out using a tape procedure.[11] Research conducted by Arora et al. found several advantages to using the tapping method with cellophane tape including that it is easy to do and the results of the examination can be known immediately.[12] However, the tapping method as an alternative examination to dermatophytosis diagnosis has not been widely implemented due to the lack of studies related to this examination in clinical settings. This study aims to compare skin sampling with scraping and tapping as a diagnostic test for tinea cruris and corporis.

METHODS

This study is a diagnostic test with a cross-sectional design. The sample of this study were outpatients of the Department of Dermatovenerology of Dr. Soedirman Hospital, Kebumen, Central Java, who were diagnosed with tinea cruris and tinea corporis based on a physical examination and had previously agreed to participate in the study as participants. Exclusion criteria were a history of antifungal medication and patients with chronic skin diseases. The research was conducted in October 2022, with a sampling duration of one month.

The study was conducted by dermatovenereologists with the assistance of clinical assistants for sampling and clinical microbiologist for diagnostic examinations. The specimen was taken using the skin scraping method with a scalpel to scrape the edges of the lesion and then collected on the first slide before being given a 10% KOH solution. In the tapping method, the skin lesion is affixed to the adhesive side of cellophane, rubbed firmly (to ensure adequate recovery of scales), stripped together, moved, and attached to a second slide that has been dripped with 10% KOH solution. A positive result is confirmed by a 'spaghetti and meatball' appearance on microscopic examination.

Data analysis was carried out using the SPSS version 23 application. The data obtained was tested by Chi-square or Fisher's exact test analysis to determine significant differences between the parameters on the categorical scale with each method. P-value < 0,05 is considered significant. This study has received ethical clearance from the Ethics Committee of the Faculty of Medicine, Universitas Islam Indonesia, with the ethical number 16/Ka.Kom.Et/70/KE/X/2022.

RESULT

A total of 51 samples were obtained in October 2022. Based on the research that has been carried out, primary data was obtained with a distribution based on the type of tinea described in Table 1.

Table 1. Distribution of the research sample based on the type of tinea.

Types of tinea	Number	Percentage
Tinea Cruris	4	7.85%
Tinea Corporis	47	92.15%
Total	51	100%

Patients with tinea cruris obtained results from 4 patients (7.85%), while patients with tinea corporis obtained results from 47 patients (92.15%).

Of the 51 participants, each sample was taken using skin scraping and tape. All of the samples with scrapings obtained positive results, while 49 samples were obtained using tape with positive results. The results are described in Table 2.

Table 2. Distribution of KOH examination results.

Result based on KOH examination	Group	
	Skin scraping	Cellophane tape
Positive	51	49
Negative	0	2
Total	51	51

Based on the chi-squared statistical test in Table 3, a value of p = 0.153 was obtained. This result shows there is no significant difference between the use of tape and skin scrapings in taking KOH test samples for tinea cases.

Table 3. Statistical analysis results of KOH examination sample findings.

Result based on KOH examination	Group		P-value
	Skin scraping	Cellophane tape	
Positive	51 (100%)	49 (96.1%)	0.153
Negative	0 (0%)	2 (3.9%)	

DISCUSSION

This study compared the findings of fungal elements with the results of KOH examination using skin scrapings and tape sampling. In previous studies by Husein et al. (2010) in the pityriasis versicolor cases in Egypt, almost the same results were obtained with the tape method, which was positive 49 out of 50, while skin scrapings were positive 48 out of 50. However, the examination using tape has several conveniences compared to the examination using skin scrapings, including fewer difficulties when taking the samples from pediatric patients with more sensitive skin and pain sensitivity, thus minimizing the risk of injury. In the KOH examination, using adhesive tape will be easier to obtain than using the skin scraping method, which requires preparing tools and materials.[13]

More prominent fungal elements, less distorted parts, and better visualization are obtained with the cellophane tape method. Samples using the tape method can be restored for about a month.[14] In positive cases, where the examination shows hyphae and spores, the hyphae appear more regular and more numerous than in the KOH preparation using the scraping method.[15] In addition to KOH examination, fungus identification can be done by culture. In a study by Levitt et al. (2010), it was found that the sensitivity for KOH examination and culture was 73.3% (95% CI: 66.3 to 79.5%) and 41.7% (34.6 to 49.1%), respectively, with a specificity of 42.5% (36.6 to 48.6%) and 77.7% (72.2 to 82.5%), respectively. However, it takes a lot of time and costs medication for patients, making it ineffective in the clinical setting.[8]

There are several obstacles to preparing KOH examinations using skin scrapings, namely the discomfort condition in children, which can pose a risk of injury when sampling is carried out using the skin scraping method. The skin scraping method also requires a long preparation time, so it can cause obstacles to KOH examination, especially in large group examinations, and disrupt the picture of fungal hyphae results on KOH examination, which can lead to decreased observations in KOH examination and observations under a microscope.[16]

There are some limitations to this study. The limited sampling time resulted in a small number of samples being examined. We also did not take pictures of KOH examination results with skin scrapings and tape for comparison. Further studies are needed in a larger and more heterogeneous population to determine the effectiveness of sampling for KOH examination with cellophane tape compared to skin scrapings.

Based on this research, it is concluded that there is no difference in the use of tape and skin scrapings in sampling fungi for the KOH test in tinea cases. This examination is useful in clinical conditions with limited medical equipment. More research is needed regarding the effectiveness of band sampling in the clinical setting so that the diagnosis can be made more specific and sensitive.

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