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Identification of *Malassezia sp.* as a Cause of Dandruff Among Students at Muhammadiyah Polytechnic Makassar

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ABSTRACT

Background & Objective: Dandruff is a scalp condition attributed to the fungus *Malassezia sp*. It manifests as fine to coarse scales that are grayish or white, resulting from the shedding of the stratum corneum layer on the scalp. Factors contributing to the onset of dandruff include the proliferation of Malassezia fungi, sebaceous gland activity, and individual predisposition. This study aimed to identify *Malassezia sp*. responsible for dandruff among female students at the Muhammadiyah Polytechnic of Makassar.
Method: The research employed a laboratory observational design utilizing a purposive sampling technique. Dandruff samples were collected from 10 female students and cultured on SDA (Sabouraud Dextrose Agar) media, followed by microscopic examination of the resulting colonies.
Result: The findings revealed that none of the 10 dandruff samples contained *Malassezia sp.*; instead, contamination by *Aspergillus fumigatus* was observed.
Conclusion: Therefore, it can be concluded that *Malassezia sp*. was not identified as a causative agent of dandruff in female students at the Muhammadiyah Polytechnic of Makassar.

Keywords: *Malassezia sp,* Dandruff, Female Student.

Introduction

Dandruff, also known as pityriasis capitis, is a scalp condition characterized by excessive production of white or gray that accumulates on the hair. This disorder is often accompanied by itching and generally presents with minimal signs of inflammation, posing primarily aesthetic concerns (Primawati & Utari, 2021).

Indonesia, a tropical country with high humidity levels, provides an ideal environment for the proliferation of various microorganisms, particularly fungi (Permadi & Mugiyanto, 2018).

Some of these fungi can cause diseases, especially in tropical regions like Indonesia, where skin conditions are exacerbated by excessive moisture and sweat. One such condition is dandruff, also associated with the fungus *Malassezia sp* (Faridah Harum et al., 2017).

While *Malassezia* is a normal component of the scalp's flora, it can overgrow in environments with overactive sebaceous glands (Ergin et al., 2024). This fungus is well-known for its disease-inducing properties (Saunders et al., 2012), infecting the stratum corneum of the epidermis and frequently affecting individuals who sweat excessively, particularly impacting the scalp (Ianiri et al., 2022).

According to various studies, the global prevalence of dandruff is 50%. Data from an international US database reports that 43,833,262 individuals in Indonesia suffer from dandruff, out of a total population of 238,452,952, placing Indonesia fourth in global prevalence, following China. Additionally, the incidence of dandruff is higher in men than in women, a difference attributed to higher levels of androgen hormones in men, which increase the risk of developing dandruff (Istiqomah et al., 2016).

Although dandruff is not life-threatening, it presents a significant challenge for female students, particularly those who wear the hijab. Using unsuitable hijab materials can exacerbate sweating, resulting in a moist and unclean scalp due to dust buildup (Primawati & Utari, 2021).

A persistently damp scalp promotes the growth of *Malassezia*, the primary cause of dandruff. This can interfere with concentration during lectures due to persistent itching. Additionally, this condition can undermine female students' self-confidence, as they may feel embarrassed if others notice their condition. Excessive itching and scratching can also damage the scalp, promoting further fungal growth and worsening the infection (Yunianti, 2013).

According to Vasti (2014), the risk of dandruff is significantly higher—by 7.57%—among female students who wear the hijab compared to those who do not. Several factors contribute to the proliferation of *Malassezia* in female students who wear the hijab, including hair loss, brittleness, limpness, oiliness, and dandruff.

Objective

This study aimed to identify *Malassezia sp*., the cause of dandruff in female students of Muhammadiyah Polytechnic Makassar.

Method

This research is a laboratory-based observational study aimed at identifying *Malassezia sp.,* the causative agent of dandruff, among female students at Muhammadiyah Polytechnic Makassar. The study was conducted from May 25 to June 5, 2021, in the Microbiology Laboratory of Muhammadiyah Makassar Polytechnic. The population under investigation consisted of female students from the institution, with a sample size of 10 participants.

A random sampling technique, combined with volunteer sampling, was employed to select participants. The independent variable in this study was dandruff, while the dependent variable was the presence of the fungus *Malassezia sp.*

The procedure began by preparing Sabouraud Dextrose Agar (SDA) media and was followed by sample collection. The samples were inoculated onto the SDA media and analyzed microscopically using a 40x magnification microscope.

Results

Based on the result from research conducted on ten dandruff samples collected from female students at the Muhammadiyah Polytechnic Makassar, utilizing the fungal culture method with Sabouraud Dextrose Agar (SDA) media and microscopic examination of the developing fungal colonies, the results displayed in Table 1 were obtained.

TABLE 1. Results of microscopic observations for identification of *Malassezia sp*., the causative agent of dandruff among female students at Muhammadiyah Makassar Polytechnic.

Sample Code	Check up result	Information
A	Negative (-)	*Malassezia sp* not found.
B	Negative (-)	*Malassezia sp* not found.
C	Negative (-)	*Malassezia sp* not found.
D	Negative (-)	*Malassezia sp* not found.
E	Negative (-)	*Malassezia sp* not found.
F	Negative (-)	There is no colony
G	Negative (-)	There is no colony
H	Negative (-)	There is no colony
I	Negative (-)	There is no colony
J	Negative (-)	There is no colony

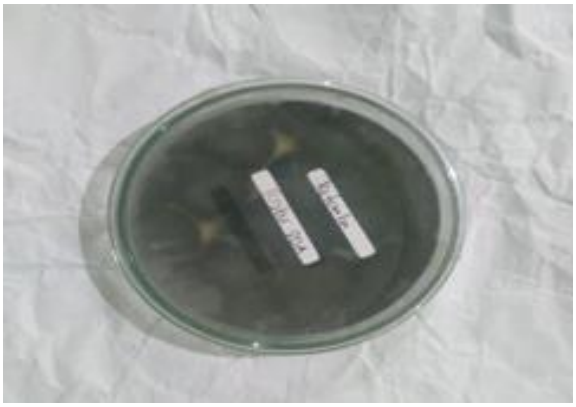

FIGURE 1. Check up result

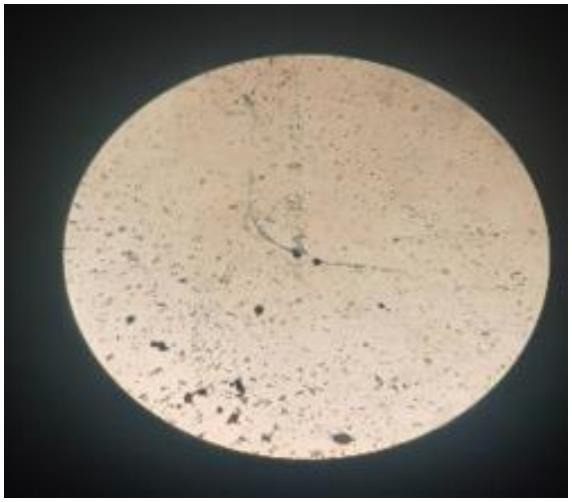

FIGURE 2. *Aspergillus fumigatus*

Discussion

Based on the findings from the culture of ten dandruff samples collected from students at Muhammadiyah Makassar Polytechnic, no *Malassezia sp.* fungus was detected, resulting in a negative (-) outcome. However, another fungus, *Aspergillus fumigatus*, was identified. This may be because the growth of *Malassezia sp***.** is influenced by several external factors such as temperature, nutrition, pH, and humidity. The optimal temperature for *Malassezia sp***.** growth ranges from 25°C to 32°C. In contrast, *Aspergillus sp.* is commonly found indoors and outdoors, thriving at room temperatures between 25°C and 37°C. The light and small

nature of mould spores allow them to be easily spread by the wind with dust, potentially causing contamination.

The growth of *Malassezia sp*. on media is further influenced by its classification within the microbiota, as it requires lipids (fats) as a carbon source. *Malassezia sp*. typically thrives on SDA media supplemented with olive or other oils.

In samples A and E, *Aspergillus fumigatus* was identified, displaying macroscopic characteristics of dark green colouration with grayish, coarse fibers and white edges. Microscopically, it showed septate hyphae, round and swollen conidia at the tips of single conidiophores.

Previous research conducted by Khairunnisak (2018) found *Malassezia furfur* in 3 out of 36 towel samples, the remaining 33 samples did not show Malassezia furfur but supported the other fungal species when cultured on SDA media. Only 3 samples show Malassezia furfur growth based on macroscopic and microscopic examinations.

Conclusion

Based on the findings of the conducted research, it can be concluded that among the 10 dandruff samples analyzed, no *Malassezia sp*. was identified as a causative agent of dandruff in female students at the Muhammadiyah Makassar Polytechnic.

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Conflict of Interest

There is no conflict of interest in this research.

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