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Identification of Fungi on the Scalp of Male Santri Wearing Peci at the AI Islah Islamic Boarding School, Kebagusan, Ampelgading, Pemalang

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ABSTRACT

Background & Objective: Fungal infections of the scalp, particularly tinea capitis, are a common health problem in environments with poor hygiene, such as Islamic boarding schools (pondok pesantren). This study aims to identify the types of fungi infecting the scalps of male santri who regularly wear the peci (a traditional cap) at the Al-Ikhlas Islamic Boarding School in Kebagusan, Ampelgading, Pemalang. **Method:** The study used a descriptive method with a laboratory approach, involving culture on Sabouraud Dextrose Agar (SDA) medium and microscopic examination for fungal identification. **Result:** Out of 20 scalp scraping samples analyzed, 75% showed positive results for fungal infection. The most dominant fungus found was Aspergillus sp., while Candida sp. was found in only one sample (5%). No infections by Trichophyton or Microsporum were detected. Questionnaire results supported the laboratory findings, indicating that only 10.8% of santri regularly shampooed their hair, 13.5% washed their peci periodically, and 35.1% reported symptoms of scalp itching. **Conclusion:** This study demonstrates that the habit of wearing the peci without proper hygiene maintenance can be a significant risk factor for scalp fungal infections. Therefore, preventive efforts through personal hygiene education and routine examinations are needed to reduce the incidence of fungal infections in the pesantren environment.

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Introduction

Fungal infections of the scalp, such as tinea capitis, are a significant health problem in various parts of the world. Globally, the prevalence of tinea capitis varies between 0.5% and 45%, depending on environmental conditions and the population studied (Noviannisa et al., 2022). In Asia, this infection is common in tropical regions, with an average prevalence of 7%, especially in areas with poor hygiene. In Indonesia, cases of fungal skin infections, including tinea capitis, are estimated to exceed 729,000 cases, indicating a high burden of fungal disease in the country (Wahyuningsih et al., 2021). Tinea capitis dominates cases of dermatophytosis in young patients, with an increasing incidence rate (Siregar & Pertiwi, 2021). This highlights the importance of attention to scalp hygiene, especially in high-risk groups such as santri in Islamic boarding schools who often wear head coverings for long periods and have irregular hair washing habits.

The use of the peci as part of the daily attire for male santri in pesantren is a long-standing tradition. Although the peci holds cultural and religious value, prolonged wear can create unhealthy conditions for the scalp, including fungal infections. Fungi can multiply in moist and enclosed areas, such as under the peci, making it important to identify the types of fungi that can infect the scalps of male santri who wear the peci (Kertamukti, 2013).

Fungi such as Malassezia and Trichophyton can thrive in dirty and humid environments, causing problems like dandruff and scalp itching. Research shows that poor hygiene, such as infrequent washing of the peci or hair, significantly contributes to the growth of these fungi. Therefore, it is crucial to maintain the cleanliness of the peci and scalp to avoid fungal infections that can cause discomfort and further health issues (Awaluddin et al., 2022).

Another factor in skin diseases is unclean community habits and environment. A study of 19 respondents conducted at SMA X in Tangerang City showed that 18 respondents (95%) were positively infected with the fungus Pityrosporum ovale and 1 respondent (5%) was negative for dandruff infection (Afandi Putra Yuda & Seftiwan Pratami Djasfar, 2023).

Scalp fungal infections, known as tinea capitis, can have serious consequences, including permanent baldness. Dermatophyte fungi attack the outer layer of the scalp and hair shafts, causing symptoms such as itching, scaly skin, and bald patches. If left untreated, this infection can lead to severe inflammation and scab formation, which ultimately damages hair follicles. This damage can result in irreversible hair loss, leaving permanent scars on the scalp. Beyond physical problems, this condition can also cause psychological impacts for sufferers, such as stress and emotional pressure due to altered appearance. This infection can develop into more severe secondary infections. When fungi invade, they can damage skin tissue and hair follicles, triggering intense inflammation that often produces pus. If this condition is not treated, bacteria can enter the open wounds, causing secondary infections that potentially spread to other parts of the body, including the brain. In extreme cases, this infection can lead to meningitis or brain abscesses, which are medical emergencies and can be life-threatening (Ulum et al., 2018). Therefore, it is important to seek immediate medical care when symptoms of a fungal infection appear to prevent these serious complications.

Based on observations of santri at the Al Islah Plus Islamic Boarding School in Kebagusan, Ampelgading, who wear the peci daily for extended periods and have

irregular shampooing habits, their scalps become moist and dirty. Consequently, the santri at the Al Islah Islamic Boarding School in Kebagusan experience excessive shedding of dead skin on the scalp, commonly called dandruff, caused by excessive sweat gland secretion (Soeroso et al., 2021). This is due to the prolonged use of the peci in daily activities at the Islamic boarding school. Such humid environmental conditions can increase the risk of Pityriasis capitis, as found in the relationship between personal hygiene and scalp infections (Putri et al., 2020). Based on the above background, the researcher wishes to study the "identification of fungi on the scalp of male santri wearing the peci at the Al Islah Islamic Boarding School, Kebagusan, Ampelgading, Pemalang".

Objective

To determine the presence and potential for fungal infection on the scalps of male santri who routinely wear the peci, and to understand the relationship between this habit and the emergence of scalp health disorders.

Method

This research is a descriptive study with a laboratory approach aimed at identifying fungal species on the scalps of male *santri* wearing the *peci* at the Al-Ikhlas Islamic Boarding School, Kebagusan. The research population consisted of all 37 male *santri* who routinely wear the *peci*. Sampling was done using purposive sampling technique based on inclusion and exclusion criteria. Scalp scraping samples were cultured on Sabouraud Dextrose Agar (SDA+) medium, followed by macroscopic and microscopic examination. Primary data was obtained from questionnaires and laboratory identification results, while secondary data came from books, journals, and *pesantren* data. The research was conducted from September 2024 to June 2025. Sample collection took place in the dormitories of the Islamic Boarding School, and examinations were carried out at the Microbiology Laboratory of AAK Pekalongan. Research instruments included a questionnaire sheet and laboratory equipment such as a microscope, sterile scalpel, SDA+, and reagents like 10% KOH and 1% LPCB.

Data analysis was performed descriptively by calculating the percentage of fungal identification results using the formula: (%) = (number of positive samples / total number of samples) × 100. The research results showed that 75% of samples were positive for fungal infection, with the most dominant type being *Aspergillus* sp. Furthermore, questionnaire data indicated that most *santri* had poor hygiene habits, such as infrequent hair washing and infrequent *peci* washing. These results indicate a relationship between personal hygiene behavior and the risk of scalp fungal infection. This research emphasizes the importance of personal hygiene education and routine health checks to prevent fungal infections in the *pesantren* environment.

Results

The research was conducted on 20 male santri who wear the peci at the Al-Ikhlas Islamic Boarding School, Kebagusan. From all the scalp scraping samples examined through the culture method on SDA (Sabouraud Dextrose Agar) medium, the examination results showed fungal growth in most samples.

Based on the results of the examination of scalp scraping samples from male santri wearing the peci at the Al-Ikhlas Islamic Boarding School, Kebagusan,

conducted at the Microbiology Laboratory of AAK Pekalongan using the culture method with Sabouraud Dextrose Agar (SDA) medium, the following results were obtained:

TABLE 1. Results of Microscopic Examination of SDA Medium in *Santri* Wearing the *Peci*

No	Result	Total	Presentage	Description
1	Positive	15	75%	Superficial fungi found
2	Negative	5	25%	No superficial fungi found
	Total	20	100%	

Based on Table 1, it is known that out of 20 scalp scraping samples, 15 samples (75%) showed superficial fungal growth. The most dominant fungal type found was *Aspergillus sp*., with colonies characterized by white, yellowish to greenish coloration, cotton-like texture, and irregular colony surface.

TABLE 2. Colony Morphology Recap and Fungal Identification Results

Sample Code	Morphology on Media			Identification Result
	Color	**Form and Texture**	**Surface**	
S1	White	Fine, cotton-like	irregular	*Aspergillus Sp.*
	Yellow	Fine, cotton-like	irregular	*Aspergillus Sp.*
S2	Whitish-yellow	Fine, cotton-like	irregular	*Aspergillus Sp.*
S3	White	Fine, cotton-like	irregular	*Aspergillus Sp.*
	Yellow	Fine, cotton-like	irregular	*Aspergillus Sp.*
	White	bulat keras	irregular	*Aspergillus Sp.*
S4	White	Fine, cotton-like	irregular	*Aspergillus Sp.*
S5	White	Fine, cotton-like	irregular	*Aspergillus Sp.*
	Yellow	Fine, cotton-like	irregular	*Aspergillus Sp.*
S6	Whitish-yellow	Fine, cotton-like	irregular	*Aspergillus Sp.*
S7	White	Fine, cotton-like	irregular	*Aspergillus Sp.*
	Whitish-yellow	bulat keras	irregular	*Aspergillus Sp.*
S8	Whitish-yellow	Fine, cotton-like	irregular	*Aspergillus Sp.*
	White	Fine, cotton-like	irregular	*Aspergillus Sp.*
S9	Yellow	Fine, cotton-like	irregular	*Aspergillus Sp.*
	White	Fine, cotton-like	irregular	*Aspergillus Sp.*
S10	Yellow	Fine, cotton-like	irregular	*Aspergillus Sp.*
	Whitish-green	Fine, cotton-like	irregular	*Aspergillus Sp.*
	White	Fine, cotton-like	irregular	*Aspergillus Sp.*
S11	-	-	-	-

Sample Code	Morphology on Media			Identification Result
	Color	**Form and Texture**	**Surface**	
S12	Whitish-green	Cotton-like	irregular	*Aspergillus Sp.*
S13	Whitish-green	Cotton-like	irregular	*Aspergillus Sp.*
S14	-	-	-	-
S15	-	-	-	-
S16	Whitish-yellow	Cotton-like	irregular	*Aspergillus Sp.*
	Whitish-green	Cotton-like	irregular	*Aspergillus Sp.*
S17	Whitish-yellow	Cotton-like	irregular	*Aspergillus Sp.*
	Whitish-red	Cotton-like berlendir	irregular	*Candida Sp.*
S18	Whitish-yellow	Cotton-like	irregular	*Aspergillus Sp.*
	Yellow	Cotton-like	irregular	*Aspergillus Sp.*
S19	-	-	-	-
S20	-	-	-	-
Kontrol -	-	-	-	-

TABLE 3. Percentage of Fungal Genus Identification Results

Genus	Result	Presentage
Candida Sp.	1	0,5%
Microsporum Sp.	-	0%
Trichophyton Sp.	-	0%
Aspergillus sp.,	15	75%

To support the laboratory fungal identification results, the researchers also collected primary data through questionnaires from all respondents. The questionnaire results showed that all santri were daily peci users and had lived in the dormitory for more than 6 months. However, only a small portion maintained good personal hygiene habits. Only 10.8% of santri reported shampooing their hair regularly every three days, and a mere 13.5% washed their peci regularly. Meanwhile, approximately 35.1% of the total respondents reported experiencing scalp itching. Not a single santri was taking antifungal medication at the time of the study. This indicates that the majority of santri have suboptimal personal hygiene, which potentially serves as a major risk factor for active fungal infections on the scalp.

Discussion

This study was conducted to identify the types of fungi infecting the scalps of male santri who routinely wear the peci at the Al-Ikhlas Islamic Boarding School, Kebagusan. Based on laboratory examination results using the culture method on Sabouraud Dextrose Agar (SDA) medium, it was found that out of 20 samples examined, 15 samples (75%) showed fungal colony growth.

The most frequently found fungus in this study was Aspergillus sp., identified in almost all positive samples. The macroscopic colony morphology of this fungus was characterized by white to yellowish color, a fine cotton-like texture, and an irregular surface. These characteristics are consistent with mycological descriptions of Aspergillus sp. colony traits.

The high prevalence of Aspergillus sp. in this study can be explained by several environmental factors and the habits of santri in the pesantren. One primary factor is the prolonged use of the peci without regular washing. Continuously worn peci create a warm and moist condition on the scalp, which is an ideal environment for fungal growth. Furthermore, some santri also have the habit of sharing peci, towels, and combs, which can potentially become media for fungal transmission. Poor personal hygiene, including infrequent hair washing or changing the peci, also contributes to the high rate of this fungal infection.

This finding supports various previous research results stating that the pesantren environment, which tends to be crowded, humid, and has limited sanitation, is a primary risk factor for skin infections. Rasyid et al. (2024) mentioned that poor personal hygiene is significantly associated with increased incidence of skin diseases in the pesantren environment. Additionally, research by Utari & Taufiq (2024) also showed that Aspergillus species can be found as a cause of dandruff or pityriasis capitis among inhabitants of crowded institutions like prisons and dormitories.

Unlike dermatophyte fungi such as Trichophyton or Microsporum, which are known as the main causes of tinea capitis, the presence of Aspergillus sp. as a cause of scalp infection in large numbers is an interesting finding. This indicates that Aspergillus sp., although classified as a saprophytic or opportunistic fungus, can also cause scalp disorders if environmental conditions are favorable. This suggests that non-dermatophyte fungal infections also play an important role in the pathogenesis of scalp disorders in specific communities like pesantren.

Clinically, infections caused by Aspergillus sp. can cause complaints such as itching, dandruff, and scalp flaking. If not treated properly, the infection can develop into more serious conditions, such as skin inflammation or even superficial abscesses. Therefore, these research results reinforce the importance of personal hygiene education, increased awareness of the importance of personal item cleanliness, and routine scalp examinations in the pesantren environment (Noviannisa et al., 2022).

Furthermore, these results also provide a scientific basis for pesantren to implement stricter health policies, such as mandating regular peci washing, restricting the sharing of personal items, and conducting regular health checks by medical personnel. The use of herbal antifungal shampoos can also be an alternative preventive measure.

Thus, the results and discussion of this research contribute to the understanding of fungal infection risk factors among santri and the collective prevention efforts that can be implemented in dormitory-based educational environments.

Conclusion

This study found a high prevalence (75%) of scalp fungal infections, predominantly Aspergillus sp., among male santri regularly wearing the peci. The primary contributing factors were identified as poor personal hygiene practices, including infrequent peci washing and low hair washing frequency. These findings

highlight a significant correlation between prolonged peci use without adequate hygiene and the risk of superficial fungal infections in this community.

Preventive interventions are necessary and should include health education on hair and peci hygiene, training on regular cleaning of personal items, and periodic scalp examinations by medical or school health personnel. The pesantren should consider implementing stricter health policies, such as mandating regular peci washing and limiting the sharing of personal belongings. Further research could explore the efficacy of preventive measures like the use of antifungal shampoos in this specific population.

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