



The Permethrin Use and Personal Hygiene Practices on the Incidence of Recurrent Scabies in the Regional Technical Implementation Unit (UPTD) X Trenggalek, Indonesia

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ABSTRACT

Introduction: Scabies is an infectious skin disease caused by infection with the parasite *Sarcoptes scabiei* var. *hominis*. This study examined the relationship between permethrin use and personal hygiene practices on the incidence of scabies in the Regional Technical Implementation Unit (UPTD) X Trenggalek, Indonesia.

Methods: This was an observational analytic study with a cross-sectional design, utilizing medical records and questionnaires collected from July to August 2023 in Trenggalek, Indonesia. The samples were the medical records of UPTD X Trenggalek, Indonesia.

Results: Twenty-seven respondents were employed in this study. The highest number of respondents was males, totaling 63% of all respondents. The age of the majority of respondents ranged from 2 to 11 years old, with 48.1% of all respondents. The majority of respondents (74.1%) use permethrin as recommended. There was a significant relationship ($p=0.000$) between the personal hygiene variable and the incidence of scabies, with a correlation coefficient between the two variables ($r=0.581$). There was a significant relationship ($p=0.001$) between the personal hygiene variable and the incidence of scabies, with a correlation coefficient between the two variables ($r=0.537$).

Conclusion: A significant relationship was found between permethrin use and personal hygiene on the incidence of scabies, which was observed simultaneously with a strong correlation.

Highlights:

1. Scabies is ranked third out of the 12 most common skin diseases in Indonesia.
2. The main assessments for scabies, based on the World Health Organization (WHO), include the use of 5% permethrin cream.

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Introduction

Scabies is an infectious skin disease caused by the parasite *Sarcoptes scabiei* var. *hominis* that forms tunnels in the host's skin, resulting in symptoms that include intense itching, particularly at night.^{1,2} It is a common health issue in developing countries, with a prevalence that remains relatively high, affecting approximately 300 million cases annually worldwide.³ Scabies disorders are ranked 3rd out of the 12 most common skin diseases in Indonesia.⁴ In 2008, the prevalence of scabies was shown to be 5.6% to 12.95%.²

The incidence of scabies in developing countries is associated with lower-middle-income economic conditions, characterized by low levels of personal hygiene behavior, difficulty accessing clean water, and high population density. The four factors that contribute to a high incidence of scabies disease are poor hygiene practices. Poor hygiene conditions can facilitate the onset of various skin diseases and infectious diseases in a person.^{3,5}

The results of a literature study conducted by Azizah (2011) found scabies disease research was generally (>75%) performed in boarding schools or educational institutions that assimilate their students, in health care facilities (>10%), only a small part of which conduct research in the community, the prevalence of the disease in the community was small (average <15%).⁶

The primary assessments for scabies, as recommended by the World Health Organization (WHO), include the application of 5% permethrin cream. Permethrin, in the form of 5% cream, is the scabicide of choice in the management of scabies due to its high cure rate and low toxicity.^{6,7} In the management of scabies, two conditions must be considered: (1) all family members must be treated simultaneously; (2) personal hygiene behavior must be improved.⁸ One of the factors that causes the high prevalence of scabies in boarding schools is the significant relationship shown between poor personal hygiene and the incidence of scabies.^{5,9}

This study examined the relationship between permethrin use and personal hygiene practices on the incidence of scabies in the Regional Technical Implementation Unit (UPTD) X Trenggalek, Indonesia. The results are expected to help reduce the prevalence of scabies and educate the public about this condition.^{5,9}

Methods

This was an observational analytical research method using questionnaires on 27 respondents who were recorded in medical records at UPTD X. The questionnaire contained questions related to the personal hygiene behavior of respondents who experienced scabies, including aspects such as frequency of bathing, use of personal hygiene products (e.g., soap and antiseptics), habits in changing and washing clothes, sharing of personal items (such as towels and bedding), cleanliness of the living environment, and frequency of changing bed linens. These questions aimed to assess the hygiene

practices that might influence the occurrence or recurrence of scabies.

In addition to personal hygiene, the questionnaire also included variables such as permethrin use as a recommended treatment for scabies. This variable was measured by asking whether the respondent used permethrin cream during treatment, the frequency of its use, and whether its application followed standard guidelines (e.g., applying it to the entire body from the neck down, leaving it on overnight for 8–14 hours, and repeating the application after 7 days if needed). Proper use was defined as adhering to these guidelines.

The answers from the questionnaire were scored and categorized to assess the level of personal hygiene. Respondents were classified as having good personal hygiene if they met 75% or more of the recommended hygiene practices, such as bathing at least twice a day with soap, not sharing personal items, and regularly washing clothes. Conversely, those who met less than 75% of these practices were categorized as having poor personal hygiene. These operational definitions were essential for analyzing the relationship between hygiene behavior, adherence to treatment, and the persistence or recurrence of scabies symptoms. This study was conducted from October 2022 to October 2023 and received ethical clearance from the Ethics Committee for Health Research, University of Muhammadiyah Malang, Malang, Indonesia.

Data Analysis

The validity and reliability of the questionnaire were tested among participants who did not meet the inclusion criteria of the main study. The data were then processed using the International Business Machines Corporation (IBM) Statistical Package for Social Sciences (SPSS) version 26.0.¹⁰ The validity test revealed that all questionnaire items had a Pearson correlation value (r count) greater than the r table value (r table=0.312, n =30, α =0.05), indicating that the items were valid. The reliability test yielded a Cronbach's Alpha value of 0.821, indicating that the questionnaire exhibits high internal consistency and was considered reliable. Data analysis used to interpret the results included univariate, bivariate, and multivariate analyses.

Results

Characteristic Overview

This study was conducted in UPTD X Trenggalek, Indonesia, with 27 respondents. The distribution of characteristics by sex, age, permethrin use, personal hygiene, and scabies incidence is presented in Table 1. Based on the distribution of respondents in Table 1, the highest number of respondents was males (63%). The age of the majority of respondents ranged from 2 to 11 years, with 48.1% of all respondents.

The majority of respondents (74.1%) used permethrin as recommended. Personal hygiene was considered sufficient by the majority of respondents in the category,

with 63% of all respondents. The incidence of scabies in the majority of cured categories was 59.3% of all respondents.

Table 1. Characteristics of respondents

Characteristics	F	%
Gender		
Female	10	37.0
Male	17	63.0
Age		
2-11 years old	13	48.1
12-25 years old	10	37.0
>25 years old	4	14.9
Permethrin Use		
Not following the recommended application guidelines	7	25.9
Following the recommended application guidelines	20	74.1
Personal Hygiene		
Poor	0	0.0
Sufficient	17	63.0
Good	10	37.0
Repeated Occurrence of Scabies		
Repeated	11	40.7
Recovered	16	59.3

Source: Research data, processed

Cross-Tabulation of Permethrin Use with the Incidence of Scabies

Based on Table 2, it was found that seven respondents experienced repeated scabies despite using permethrin, but not following the recommended application guidelines. Meanwhile, four respondents used permethrin according to the recommended application guidelines. Sixteen respondents recovered from scabies by using permethrin following the recommended application guidelines.

Table 2. Cross-tabulation of permethrin with the incidence of scabies

Permethrin Use	Incidence of Scabies		
	Repeated	Recovered	Total
Not following the recommended application guidelines	7	0	7
Following the recommended application guidelines	4	16	20
Total	11	16	27

Source: Research data, processed

Cross-Tabulation of Personal Hygiene with the Incidence of Scabies

Based on Table 3, it was found that 11 respondents experienced repeated incidences of scabies despite maintaining sufficient personal hygiene, while six respondents who had recovered from scabies also maintained sufficient personal hygiene, and 10

respondents recovered from scabies with good personal hygiene.

Table 3. Cross-tabulation of personal hygiene with the incidence of scabies

Personal Hygiene	Incidence of Scabies		
	Repeated	Recovered	Total
Poor	0	0	0
Sufficient	11	6	17
Good	0	10	10
Total	11	16	27

Source: Research data, processed

Relationship between Permethrin Use and the Incidence of Scabies

Based on Table 4, a significant relationship ($p=0.000$) was found between permethrin use and the incidence of scabies. The correlation between personal hygiene and the incidence of scabies had a value of $r=0.581$, indicating a sufficient correlation between the two variables.

Table 4. Correlation test of permethrin use, personal hygiene, and the incidence of scabies

Independent Variable	Dependent Variable (Incidence of Scabies)		
	Correlation Test	Value	Approximate Significance
Permethrin use	Koef contingency	0.581	0.000
Personal hygiene	Koef contingency	0.537	0.001

Source: Research data, processed

Relationship between Personal Hygiene and the Incidence of Scabies

Based on Table 4, a significant relationship ($p=0.001$) was found between personal hygiene and the incidence of scabies. The correlation between personal hygiene and the incidence of scabies had a value of $r=0.537$, indicating a sufficient correlation between the two variables.

Table 5. Correlation test of permethrin use and personal hygiene on the incidence of scabies

Independent Variable	Dependent Variable (Incidence of Scabies)		
	Correlation Test	Value	Approximate Significance
Permethrin use	Regression	0.733	0.000
Personal hygiene			

Source: Research data, processed

Relationship between Permethrin Use and Personal Hygiene on the Incidence of Scabies

Based on Table 5, a significant relationship ($p=0.001$) was found between permethrin use and personal hygiene in terms of the incidence of scabies when used simultaneously or in combination. The correlation between permethrin use and personal hygiene on the incidence of scabies had a value of $r=0.733$, indicating a strong relationship between the two variables.

Discussion

Based on the results, a significant relationship ($p=0.000$) was found between permethrin use and the incidence of scabies, with a sufficient correlation. This is similar to a study that found the basic therapy for scabies patients to be the use of topical treatment in the form of 5% permethrin ointment, due to the rapid rate of efficacy experienced by most scabies patients for 8-12 hours.⁸ However, Aggarwal, *et al.* (2014) found that the lowest cure value was permethrin cream.¹¹ This is due to non-compliance with the use of the drug and the application of the wrong cream despite the guidelines for leaving permethrin cream on the skin for 8-12 hours.⁷

Several factors can affect the efficacy and effectiveness of permethrin drugs, one of which is the mechanism of action of permethrin cream.⁵ Compliance with drug use and the duration of application of the drug may also affect efficacy. The independent and unsupervised application of topical scabies medications leads to improper application of the lesions, and the cream is not exposed to the rest of the body, resulting in treatment failure, recurrence, and repeated infection.¹² If the application of 5% permethrin cream is less than 8 hours, it may cause incomplete healing of the lesion. In addition, resistance to permethrin drugs will limit drug tolerance, hence it will affect the efficacy and effectiveness of treatment.^{12,13}

The use of permethrin 5% cream is reported to be well-tolerated, according to a previous study, with minimal systemic absorption, no irritation, reactions, allergies, or other adverse effects.¹⁴ However, it is possible for side effects to occur after treatment, such as erythema, burning, and muscle spasms caused by the effect of permethrin on the central nervous system.¹¹ Concerning the results of the study, the success in permethrin use in the treatment of scabies can be viewed from several things, including how to use, the location of the application, and the frequency of use.¹⁵ Permethrin has mild side effects, but misuse can lead to skin irritation.^{8,9}

If the permethrin cream is sticky, the application becomes uneven, which can lead to a prolonged recovery or recurrence of scabies.¹³ This aligns with the study by Sungkar (2016), where when researchers applied permethrin 5% cream to all research subjects to ensure the application of the cream evenly and correctly, the recurrence of scabies was low.¹⁶

Based on the results of the study, a significant relationship ($p=0.001$) was found between personal hygiene and the incidence of scabies, with a sufficient

correlation. This is similar to a study that reported a significant relationship ($p=0.0000$) between the personal hygiene of students and the incidence of scabies at Al Falah Islamic Boarding School in Liang Anggang, Indonesia. This aligns with a study that found the incidence of scabies to be influenced by several risk factors, including personal hygiene.¹³ A similar study at Amanatul Ummah Islamic Boarding School, Surabaya, Indonesia (2020) using a cross-sectional approach with a sample of 100 students, found that there was a relationship between personal hygiene of students and the incidence of scabies ($p=0.000$).⁴ In another study, Retna (2021) found that 56 students (66.7%) were positive for scabies and 28 students (33.3%) were negative. There was also a relationship between personal hygiene and the incidence of scabies in Al Hikam Islamic Boarding School, Bangkalan, Indonesia.⁶

Based on the results of the study, the majority of respondents' personal hygiene fell into the category of sufficient, who experienced recurrent scabies.¹⁷ This proves that other factors can affect the incidence of scabies. It is noted that the factors that influence the incidence of scabies are not only personal hygiene factors but also other factors such as economic level, level of knowledge, misdiagnosis, sexual relations, and age.^{17,18} Nurhidayat (2022) concluded that there was a significant relationship between knowledge, attitudes, personal hygiene behavior, and environmental sanitation with the incidence of scabies in students at Miftahul Amin Islamic Boarding School, Ciamis, Indonesia.¹¹

Studies have shown that poor personal hygiene does not fully explain the incidence of scabies. Factors such as socioeconomic status, overcrowded living conditions, and limited access to health education also play significant roles. A study by Gebremeskel, *et al.* (2019) found that low economic level and lack of knowledge significantly increase the risk of scabies infection, even when personal hygiene is maintained.⁹ Similarly, a study in Indonesia revealed that environmental factors like household crowding and poor sanitation contribute to scabies outbreaks, demonstrating that multiple variables interact to influence scabies incidence.¹⁹

Strengths and Limitations

The strength of this study lies in several variables which were compared to see the relationship between the variables. The limitation was that this study had a wide range of personal hygiene variables. Hence, it had to be broken down into indicators to identify the core of the problem. Additionally, the small sample size, resulting from limited patient availability, might affect the generalizability of the results.

Conclusion

A significant relationship ($p=0.001$) was found between permethrin use and personal hygiene on the incidence of scabies. The correlation between permethrin use and personal hygiene on the incidence of scabies was a strong one.

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Conflict of Interest

The authors declared there is no conflict of interest.

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Ethical Clearance

This study had received ethical clearance from the Ethics Committee for Health Research, University of Muhammadiyah Malang, Malang (No.E.5.a/329/KEPK-UMM/X/2023) on 10/24/2023.

Authors' Contributions

Designed the study and drafted the manuscript, collected data and performed background literature review, performed statistical analysis: APA. Supervised results and discussion: APA, FT, and DH. All authors reviewed and approved the final version of the manuscript.

Data Availability

N/A.

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