

RESEARCH ARTICLE

Relationship between personal hygiene and manifestation of mite (*Sarcoptes scabiei*) in students at islamic boarding school in Sidoarjo City

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Abstract

Scabies is a disease that attacks the skin in humans, a disease caused by the mite, included in the ovoid Arthropod organism. Personal hygiene is a way to maintain health and cleanliness of the body with self-care, therefore the better a person maintains personal hygiene, the less exposure to mites that enter the skin, if someone does not maintain personal hygiene, it will be very easy to get scabies. This study aims to determine the relationship between personal hygiene and the manifestation of mites using the burrow ink test method on students at the Islamic Boarding School in Sidoarjo City. The method used is an observational type that is analytical using a cross-sectional design. A sample of 45 samples in March 2024. The sampling method was carried out using a non-probability sampling method. The samples were examined using the burrow ink test method and continued with skin scraping examination. The results of the examination of 45 samples showed that there were 9 respondents in the good category of personal hygiene clothing cleanliness with a positive scabies examination of 27 (60%) and there were 25 respondents in the poor category of personal hygiene clothing cleanliness with a negative scabies examination of 41 (91%). The results of statistical analysis from the chi-square test, the personal hygiene variable with the manifestation of mites produced a p-value = 0.157 which means there is no significant effect. In this study it can be concluded that there is no relationship between personal hygiene using the burrow ink test method and the incidence of scabies in Islamic Boarding Schools in Sidoarjo City.

Keywords: Personal Hygiene, Scabies, *Sarcoptes scabiei*

INTRODUCTION

Scabies is a disease caused by the mite and occurs in conditions of poor human density and hygiene (Patterson, 2014). *Sarcoptes scabiei* has typical symptoms called cardinal signs. *Sarcoptes scabiei* is easily transmitted due to frequent skin contact through human contact with other humans, especially living in the same residence (Nur'Aini et al., 2019).

Scabies is a health problem that attacks human skin, this is caused by the mite, which is included in the ovoid Arthropod organism. Female mites that have been fertilized by male mites will make a

cuniculus in the top layer of skin and store their eggs in the hole, then the eggs will hatch into young mites a few days later. After that, the young mites will form a new cuniculus which is a connection from the main cuniculus in the skin layer (Mading and Sopi, 2015).

Globally, scabies is a public health problem that attacks the skin in the general public that affects around 300 million people worldwide. The population in the literature ranges from 0.2% to 71% recently (WHO, 2015). Scabies can infect everyone, namely at all ages, races and socioeconomic levels. The incidence of scabies does not only occur in developing countries but also occurs in developed countries, such as in Germany, scabies occurs in the long term. The incidence of scabies in India is 20.4% (Prabowo and Kurniawan, 2016). Australia and countries in Oceania with a prevalence of 30%, and in Malaysia 31% (Ibadurrahmi et al., 2016).

Based on the description above, this study is considered necessary to be conducted in one of the Islamic Boarding Schools in the Sidoarjo City because it shows a relationship between students' knowledge of personal hygiene and the incidence of scabies. The dormitory of the Islamic Boarding Schools located in Sidoarjo City is a modern boarding school that has been equipped with dormitory facilities, provision of water filters for clean water, health clinics and complete learning infrastructure. The management of the Islamic Boarding Schools has also conducted counseling about diseases that often occur in Islamic Boarding Schools, one of which is scabies.

MATERIALS AND METHODS

Material

Materials used in the examination burrow ink test that is use ink India (ink tunnel), and on examination of skin scrapings use 10% KOH solution. In this study, the sampling technique used is non-probability sampling, where each subject in the population does not have the same chance of being selected as a sample. The specific technique applied is purposive sampling, which is sampling based on certain criteria determined by the researcher. The location of the research was at one of the Islamic Boarding Schools in Sidoarjo City. The time of this research will be conducted in February - March 2024.

Data collection procedures

The sample size in this study was part of the students from the Islamic Boarding School in Sidoarjo City. So the total number of respondents was 45 samples. Data collection is based on several stages, namely the first stage of making a questionnaire, the second stage of preparing students which includes completing the questionnaire question sheets by students, examining the burrow ink test followed by examining skin scrapings, and the third stage of observing samples read under a microscope with 10x and 40x magnification.

Data Analysis Procedure

The collected data will be coded, which is data on a nominal scale, to determine the relationship between personal hygiene factors and the manifestation of *sarcoptes scabiei*, the cause of scabies, using the burrow ink test method on students at the Islamic Boarding School of Sidoarjo City using the chi-square statistical test.

RESULTS AND DISCUSSION

Results

1. Personal Hygiene

The following aspects of personal hygiene of respondents at Islamic Boarding Schools in Sidoarjo City:

Table 1. Frequency distribution of respondents based on personal hygiene of students at Islamic Boarding Schools in Sidoarjo City

Personal Hygiene	Category	Frequency	Percentage	P-value
Body Cleanliness	Good	4	8.8%	0.157
	Not good	10	22.2%	
Cleanliness of Clothes	Good	5	11.1%	0.157
	Not good	12	26.6%	
Cleanliness of Bed	Good	4	8.8%	0.157
	Not good	11	24.4%	

Table 1 above shows that of the 45 respondents obtained, the majority (11.1%) had good personal hygiene and clothing cleanliness, while (26.6%) had poor personal hygiene and clothing cleanliness with the results of the chi-square statistical test using SPSS with a significance level of $\alpha = 0.05$, p-value of 0.157 was obtained.

2. Burrow Ink Test Examination (Manifestation of *Sarcoptes scabiei*)

The following is the Burrow Ink Test examination on students at Islamic Boarding Schools in Sidoarjo City:

Table 2. Frequency distribution of respondents based on Burrow Ink Test and Skin Scraping examinations on students at Islamic Boarding Schools in Sidoarjo City

Personal Hygiene	Scabies Examination	Frequency	Percentage	P-value
Body Cleanliness	Positive	3	6.6%	0.157
	Negative	10	22.2%	
Cleanliness of Clothes	Positive	4	8.8%	0.157
	Negative	13	28.8%	
Cleanliness of Bed	Positive	4	8.8%	0.157
	Negative	11	24.4%	

Table 2 above shows that of the 45 respondents obtained, the majority (8.8%) is personal hygiene, cleanliness of clothing and cleanliness of bed with a positive scabies examination with statistical test results using SPSS with a significance level of $\alpha = 0.05$, a p-value of 0.157 was obtained, while (28.8%) is personal hygiene, cleanliness of clothing with a negative scabies examination with statistical test results using chi-square SPSS with level of significance $\alpha = 0.05$ obtained a p-value of 0.157.

3. The relationship between personal hygiene and the manifestation of *Sarcoptes scabiei*

The relationship between personal hygiene and manifestation of *Sarcoptes scabiei* which was examined through the Burrow Ink Test on students at Islamic Boarding Schools in Sidoarjo City:

Table 3. Distribution frequency respondents and Personal hygiene relationship with manifestation mite *Sarcoptes scabiei* use method burrow ink test on students at the Islamic Boarding School in Sidoarjo City

Personal Hygiene	Category	Inspection Scabies				Amount		P-value
		Negative		Positive		N	%	
		N	%	N	%			
Body Cleanliness	Good	14	31.1%	7	15.5%	21	46.6%	0.157
	Not Good Enough	20	44.4%	13	28.8%	33	73.2%	
Cleanliness of Clothes	Good	18	40%	9	20%	27	60%	0.157
	Not Good Enough	25	55.5%	15	35.5%	41	91%	
Cleanliness of Place	Good	15	33.3%	8	17.7%	23	51%	0.157
	Not Good Enough	22	48.8%	15	33.3%	37	81.1%	

Table 3 above shows that out of 45 respondents, there were 9 respondents in the good personal hygiene category with a positive scabies examination of 27 (60%) with the results of the chi-square

statistical test using SPSS with significance level $\alpha = 0.05$ obtained a p-value of 0.157 and there were 25 respondents in the poor personal hygiene category with a negative scabies examination of 41 (91%) with the results of the chi-square statistical test using SPSS with a significance level of $\alpha = 0.05$ obtained a p-value of 0.157.

Chi-Square Test Analysis

In this study, the chi-square test analysis was used to find the relationship or influence of the independent variable personal hygiene with the dependent variable, namely the manifestation of mites. Chi-square test analysis table of the relationship between personal hygiene and the manifestation of *Sarcoptes scabiei* mites using the burrow ink test method on students at Islamic Boarding Schools in Sidoarjo City.

Table 4. Chi-square test analysis

Variable	P-value	Information
Personal hygiene, body hygiene against the manifestation mites	0.157	There isn't any connection
Personal hygiene, cleanliness of clothes against the manifestation mites	0.157	There isn't any connection
Personal hygiene, bed cleanliness against the manifestation mites	0.157	There isn't any connection

Based on the Table 4, it shows the results of the chi-square statistical test using SPSS with a level of significance $\alpha = 0.05$ obtained p-value. $0.157 > 0.05$ which means there is no significant influence. In this study, the hypothesis can be taken H_0 is accepted, and H_1 is rejected. Therefore, it can be concluded that there is no relationship between personal hygiene using the burrow ink test method and the incidence of scabies at Islamic Boarding Schools in Sidoarjo City.

Discussion

Research on the relationship between personal hygiene and the manifestation of mites using the burrow ink test method on students at Islamic boarding schools in Sidoarjo City is explained in three stages, namely personal hygiene, Burrow Ink Test and Skin Scraping (Manifestation of mites) and the relationship between personal hygiene and the manifestation of mites which are explained as follows.

Personal hygiene or personal hygiene is an important factor in maintaining health and preventing disease. In the context of students, maintaining good personal hygiene can contribute to optimal health, students can be said to be healthy if they can maintain good personal hygiene, while poor personal hygiene will facilitate the occurrence of various skin diseases that attack the body, one of which is scabies. Personal hygiene aspects or personal hygiene in this study includes aspects of body hygiene, aspects of clothing hygiene, and aspects of bed hygiene.

Based on the results of the research and data collection summarized in Table 1, it shows that of the 45 respondents obtained, the majority (11.1%) had good personal hygiene and clothing cleanliness, while (26.6%) had poor personal hygiene and clothing cleanliness. With the results of the chi-square statistical test using SPSS with a significance level of $\alpha = 0.05$, the value obtained was P-value 0.157. The results obtained show that (26.6%) of students have poor personal hygiene regarding aspects of body cleanliness such as how many times a day to shower, bathing using bar soap who take turns with friends, use towels alternately and use toothbrushes alternately, while in terms of clothing cleanliness, such as wearing sarongs, shirts, trousers alternately, and aspects of bed cleanliness, such as drying them in the sun pillowcases, sheets, and blankets in the sun and wash them regularly. Students who do not have good hygiene and borrow items alternately can increase the risk of scabies in Islamic boarding schools because personal hygiene plays an important role in transmission through indirect contact so that it can affect the incidence of scabies.

These results are in line with research conducted by Zakiudin and Shaluhiah, 2016 where are the results the study shows that the behavior.personal hygiene of students at Islamic boarding schools in the region Brebes Regency with a good category received 42.0%, less than with a less than good

category of 58.0%. The risk experienced by male and female students living in Islamic boarding schools has a tendency to contract skin diseases due to a lack of concern for personal hygiene which causes the spread of this disease to be very high, where the cause is living together with a group of people such as in Islamic boarding schools is indeed very risky to easily contract various skin diseases, especially scabies, transmission occurs if a person's personal hygiene and environment not well maintained. And there are still Islamic boarding schools that are growing in a slum environment, dirty bathrooms and toilets, an environment that humidity and poor sanitation (Akmal et al., 2013).

Burrow Ink Test and Skin Scraping Examination (Manifestation of mites)

On the development of technology in the health sector, especially to diagnose scabies, several methods can be used to detect the presence of mites on the skin layer. Some commonly used methods include: Burrow Ink Test, this method involves using ink to identify the tunnels or passages made by mites in the skin layer. The ink is used to fill in the tunnels, which are then clearly visible on the skin after the ink dries; Microscopy, microscopic examination involves taking a sample of the skin (such as a scraping) and examining it under a microscope to look for mites, eggs, or mite feces. This is a fairly sensitive and specific method; Dermatoscopy, this method uses a tool called a dermatoscope to examine the skin in detail. Dermatoscopy can help see the structure of the skin and detect signs of scabies that may not be visible to the naked eye); PCR (Polymerase Chain Reaction), this method is a molecular technique that can detect scabies mite DNA. PCR is very sensitive and can provide fast and accurate results, although it often requires special laboratory facilities; Skin Scraping Examination: This method involves taking a sample from the skin surface using a special tool to detect the presence of mites or eggs. This examination is practical and relatively easy to do in a clinic or hospital. Each method has its own advantages and limitations, and the choice of method often depends on clinical conditions and available facilities (Lestari et al., 2017).

The burrow ink test method is an examination method carried out by applying ink to the part suspected of being the scabies cuniculus. Examination of the burrow ink test and skin scrapings to diagnose scabies is quite informative. There is an explanation and additional details regarding the procedure and the advantages and disadvantages of each method: The burrow ink test has a procedure, the first is that India ink is applied to the suspected papule or skin lesion, the second is that the ink is left for 20–30 minutes to give the ink time to enter the cuniculus or tunnel made by *Sarcoptes scabiei*, the third after that, the ink is cleaned using alcohol, If there is a cuniculus, the ink will show a typical pattern in the form of a zig-zag line indicating the presence of *Sarcoptes scabiei* under the skin. The advantages are simple and economical which requires simple tools and materials and can detect tunnels effectively to detect the presence of cuniculus in the skin. However, the weakness is that positive results are not always visible and not all cases of scabies produce a clear picture on the burrow ink test and the limitations of detection and cannot always detect *Sarcoptes scabiei* if the number is small or if the cuniculus is not deep enough. In addition, there is a procedure for skin scraping, which is the surface of the suspected skin is scraped using a sterile tool to obtain a sample, then the skin sample is examined under a microscope to detect the presence of *Sarcoptes scabiei*. The advantage is high accuracy with this examination is generally very accurate in detecting *Sarcoptes scabiei* and directly obtaining samples where samples are taken directly from the skin and examined for the presence of parasites. But it also has a weakness, namely the possibility of bleeding if the scraping is done too hard, it can cause bleeding or irritation to the skin, besides the technique and experience require skill and experience to perform the procedure correctly and effectively. Overall, the combination of these two tests can provide a more comprehensive picture in diagnosing scabies. The burrow ink test can provide an early indication if there is a cuniculus, while skin scraping is a more definitive confirmation method with direct identification of the parasite. Both have their place in clinical practice and are often used together to obtain more accurate results (Ferdinand et al., 2014).

In this study, skin scraping sampling is done in the morning. However, the time of sampling can affect the results of the examination, especially in the burrow ink test and skin scraping. Here are some considerations related to the time of sampling and tips to improve the accuracy of the diagnosis of scabies, namely the time of sampling in the morning there is a weakness, namely the mite more active at night, so morning sampling may not always reflect optimal mite activity. Lower mite activity in the morning can lead to less representative results. While evening sampling has the advantage of providing more accurate results, evening sampling is recommended because mites are more active and burrow into the skin during the night. This can increase the likelihood of finding clearer signs of scabies. Alternatives if night is not possible, then sampling is done in the morning, that is, if sampling is not possible at night, make sure to take samples in the morning of the lesion pathognomonic. These include thin, small, thread-like tunnels, are grayish-white in color, and range in length from 1 to 10 mm. Pathognomonic lesions focus on areas where tunnels and papules or vesicles are clearly visible. These tunnels can usually be found between the fingers, wrists, and ankles, which are common areas for scabies. Tips to improve the diagnostic accuracy of pathognomonic lesion identification are to make sure to identify typical scabies lesions, such as small tunnels and papules that indicate the movement of mites within the stratum corneum. The quality of the sample used ensures that the sampling technique is carried out carefully to avoid irritation or damage to the skin. Use of additional methods consider using additional methods such as the burrow ink test to support the results of skin scraping examinations, especially if sampling is done in the morning. By paying attention to the time of sampling and the method used, the accuracy of the diagnosis of scabies can be improved, helping in more effective identification and treatment.

Based on the research results and data collection summarized in Table 2, it shows that from the 45 respondents obtained, most (8.8%) are personal hygiene, clothing cleanliness and bed cleanliness with positive scabies examination, while (28.8%) are personal hygiene, clothing cleanliness with negative scabies examination with chi-square statistical test results using SPSS with levels of significance $\alpha = 0.05$ obtained a p-value of 0.157. These results are in line with research conducted where the research results are shows that of the total 127 respondents, 24 respondents (18.9%) were diagnosed with scabies by a doctor, while 103 respondents (81.1%) were not diagnosed with scabies. This study noted an increase in the incidence of scabies by 18.9%, with the most common location of lesions being between the fingers.

Previous research conducted the Hidayatullah Islamic Boarding School in Samarinda showed a high prevalence of scabies, which was 42.2% of 83 samples. The results of Jihan's study showed that although there was a decrease in prevalence from 42.2% to 18.9%, the incidence of scabies at the Hidayatullah Islamic Boarding School in Samarinda remained significant and still needed further attention. These results indicate a decrease in the prevalence of scabies from 2013 to 2024, but the incidence of scabies is still quite high. This decrease could indicate effective control efforts, but there are still many cases that need to be addressed. Further supervision and intervention may be needed to further reduce the prevalence of scabies and ensure adequate hygiene and care conditions in the Islamic Boarding School environment.

The Relationship Between Personal Hygiene and The Manifestation of Mites Using The Burrow Ink Test Method on Students at Islamic Boarding Schools in Sidoarjo City

Based on the results of the research and data collection summarized in Table 3, it shows that out of 45 respondents, there were 9 respondents in the good category of personal hygiene clothing cleanliness with a total of 27 (60%) positive scabies examinations and there were 25 respondents in the poor category of personal hygiene clothing cleanliness with a total of 41 (91%) negative scabies examinations.

The results of chi-square statistical test using SPSS with a significance level of $\alpha = 0.05$ obtained a p-value of $0.157 > 0.05$ which means there is no significant effect. In this study, the hypothesis can be taken H_0 is accepted, therefore it can be concluded that there is no relationship between personal

hygiene using the burrow ink test method and the incidence of scabies in Islamic Boarding Schools in Sidoarjo City. These results are in line with research conducted where the research results show that there is a correlation between personal hygiene and the incidence of scabies at the Al-Ikhlās Pedurungan Lor Islamic Boarding School ($p=0.374$). Similar results were shown in the studies of Nadiya et al., 2020 and Dewi et al., 2015. There is no relationship that can be caused by other factors that are uncontrollable causal factors. Scabies is not only caused by personal hygiene but there are other influencing factors such as room density, gender, socio-economic status, and immunity. Previous research by Nurhidayat et al., 2022 at the Miftahul Amin Islamic Boarding School, Ciamis Regency reported that the dominant risk factors for scabies are environmental sanitation, attitude, and knowledge. Another study by Hilma and Ghazali, 2014 at the Mlangi Nogotirto Gamping Mlangi Slemano Yogyakarta Islamic Boarding School also stated that there is a correlation between the incidence of scabies and the frequency of contact.

Another factor that can affect the incidence of scabies in the Islamic Boarding School of Sidoarjo City is because of the density of the rooms. The rooms in the Islamic Boarding School of Sidoarjo City are 5x7 square meters in size with a total of 24 residents. According to the Decree of the Minister of Health of the Republic of Indonesia No. 829/Menkes/SK/VII/1999 concerning the requirements. Housing health, the ideal bedroom area is at least 8 square meters and it is recommended not to sleep more than 2 people. Based on this, a room size of 35 square meters is ideally occupied by 6 people. This shows that the rooms of the Islamic Boarding School of Sidoarjo City are classified as very dense. As a result, the spread of mites will be easier for people who live in a densely populated environment such as an Islamic Boarding School, namely with direct contact between students who are exposed and students who are not exposed. Based on the observation survey, it was found that the students' rooms were filled with cupboards, in addition, many of the students' clothes were dried not outside the room but in the room and placed on the cupboard door mixed with each other's clothes. In addition, in filling out the personal hygiene questionnaire on bed cleanliness, boarding school students did not use their own bedding but slept together with their friends in one. Room density can affect the possibility of direct contact with scabies sufferers to be higher. Research that supports these factors is research conducted by Nisa and Rahmalia, 2019 there is a relationship between room occupancy density and the incidence of scabies.

CONCLUSIONS

This study aims to determine the relationship between personal hygiene and the manifestation of mites using the burrow ink test method on students at Islamic Boarding Schools in Sidoarjo City. Distribution of respondents based on personal hygiene of students at Islamic Boarding Schools in Sidoarjo city as many as 45 respondents, it was found that the majority (11.1%) had good personal hygiene in terms of clothing cleanliness, while (26.6%) had poor personal hygiene in terms of clothing cleanliness with the results of statistical tests, chi-square using SPSS with a significance level of $\alpha = 0.05$, a p-value of 0.157 was obtained. Distribution of respondents based on the burrow ink test examination on students at Islamic Boarding Schools in Sidoarjo City, that of the 45 respondents obtained, the majority (8.8%) were personal hygiene, cleanliness of clothing and cleanliness of bedding with positive scabies examinations, while (28.8%) were personal hygiene, cleanliness of clothing with negative scabies examinations with the results of the chi-square statistical test using SPSS with a significance level of $\alpha = 0.05$, a p-value of 0.157 was obtained. The results of statistical analysis of the chi-square test, the personal hygiene variable with the manifestation of mites produced a p-value ($0.157 > 0.05$) which means there is no significant effect. In this study, it can be concluded that there is no relationship between personal hygiene using the burrow ink test method and the incidence of scabies in Islamic Boarding Schools in Sidoarjo City. For further researchers, it is expected that they will read and search a lot about personal hygiene questionnaires on various platforms such as books in libraries and official websites in the health sector, because of the lack of

references about personal hygiene questionnaires that I have obtained.

Author Contribution

Annisa Pricilya Wideistianti: Conceptualization, writing draft, writing review dan editing; Yauwan Tobing Lukiyono, Ary Andini, Endah Prayekti: Data curation, formal analysis.

Conflict of Interest

There is no conflict of interest in this study.

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Data Availability

We thank all respondents involved in this research project.

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