

The comparison of Quality of Life in Scabies Patients Treated with 5% Permethrin Lotion and 10% Mimba Leaf Extract Lotion at Pondok Pesantren Malang

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ABSTRACT

Background: Scabies is a contagious disease caused by *Sarcoptes scabiei* characterized by itching and lesions that affects quality of human life. Permethrin 5% as standard therapy for scabies has disadvantages in terms of price and side effects. Mimba is traditional plant that has a scabicide effect, could be an alternative treatment for scabies. **Objective:** to compare quality of life of patients who were treated with 5% permethrin lotion and 10% mimba leaf extract lotion using *Dermatology Life Quality Index* (DLQI) and Skindex-29 instruments. **Methods:** This study is an experiment design with purposive sampling method. The sample was 42 male students in one of Islamic boarding school in Malang who were clinically diagnosed with scabies. The research sample consisted of two groups: group with 5% permethrin lotion therapy (21 students) and group with 10% mimba leaf extract lotion therapy (21 students). Data was collected with DLQI and Skindex-29 on day 0 before and day 14 after therapy. Data analysis used Wilcoxon test and dependent t-test for comparison before and after therapy and independent t-test for comparison of quality of life between two therapies by using SPSS 25. **Results:** Statistic test to differentiate two therapies showed p 0.670 (DLQI) and p 0.391 (Skindex-29). So, two therapies did not differ significantly in reducing DLQI and Skindex-29 scores. **Conclusion:** 5% permethrin lotion and 10% mimba leaf extract lotion are equally good in improving quality of life of scabies patients.

Keywords: Scabies, Quality of Life, Permethrin, Mimba Leaf.

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Background

Indonesia is a tropical country so parasites can grow easily. Parasites can cause skin diseases, one of which is scabies. Scabies is an ectoparasitic dermatosis with a global proportion caused by the infestation of the mite *Sarcoptes scabiei* var. *hominis* in humans (Cohen, 2020). According to Sungkar (2016), *S. scabiei* will form tunnels in the skin on a thin epidermal structure, causing the main clinical symptoms in the form of itching which usually occurs at night.

IACS (International Alliance for the Control of Scabies) in 2014 stated that around 130 million people in the world are affected by scabies with a prevalence that varies from 0.3 to 46% based on the latest literature. There are 12 lists of the most common skin diseases in Indonesia, scabies is ranked 3rd (Mayrona et al., 2018). The latest scabies prevalence data recorded by the Indonesian Ministry of Health in 2013 was 3.9–6%. This percentage is considered to have decreased compared to the previous year, namely 4.9–12.95% in 2009, and 5.60%–12.96% in 2008. Indonesia has not been able to say to be free from scabies in terms of the nature of the disease which is contagious and is often ignored by the community even though the data shows a decrease in the percentage (Ridwan et al., 2017).

The epidemiological survey of scabies disease in Islamic boarding schools in Malang City, Malang Regency, and Batu City conducted by Setyaningrum, et al (2016) showed that 80% of students had been infected with scabies and only 20% had never experienced scabies. The highest

prevalence of scabies is found in Islamic boarding schools in Malang Regency at 48.6%, in Malang Raya Islamic boarding schools at 37.30% and in Batu City at 12.4%.

Pharmacological therapy for scabies is currently very diverse. Examples of drugs used are sulfur precipitatum, benzyl benzoate, crotamiton, malathion, lindane, and permethrin. Various studies have shown that permethrin is the best scabicide in the treatment of scabies compared to other therapies (Sungkar, 2016). There are 26 studies that recommend the full application of topical permethrin from the neck to the feet, but there are 4 studies suggesting its use is limited to lesions only. According to May et al. (2019), the overall use of topical permethrin is highly recommended, but there are some drawbacks, namely in terms of reduced patient comfort, the number of lotions to be used, the price, and the side effects that arise. According to Sungkar (2016), the disadvantages of permethrin include a sticky feeling that interferes with patient comfort, especially when sweating, and side effects in the form of burning, stinging, pain, and redness. In the study of Handayani, et al (2019), there is a fairly large cost comparison between permethrin and sulfur precipitated ointment. The price of 10 g Permethrin 5% is Rp. 45,000, while the price of 15 g of sulfur precipitation ointment is only Rp. 7,500.

Expensive costs are certainly a problem considering that the majority of patients infected with scabies are people from the lower economic strata with limited levels of health knowledge (Castillo et al., 2013). Due to the lack of permethrin, natural ingredients as scabicides are used as alternative therapeutic options that are more affordable,

safe, and able to fight *Sarcoptes scabiei*. Mimba leaf (*Azadirachta indica A.Juss*) is one of the natural ingredients that is thought to have a scabicide effect. Mimba leaf extract contains azadirachtin compound which has antifeedant properties and is used as an insecticide. A study conducted by Ahadian et al (2012) showed that mimba leaf extract has a scabicial effect and is effectively used to control *Sarcoptes scabiei* mites in vitro in goats. Murniati et al. (2018) also showed that there was an effect of using mimba leaf extract solid soap on the healing process of grade II scabies lesions in the female dormitory of the Ngunut Islamic boarding school, Tulungagung.

According to Putriana and Husni's research (2018) regarding the comparison of the effectiveness of 5% permethrin cream and mimba cream with varying concentrations in rabbits, an increase in the number of dead mites was obtained from each treatment using mimba cream with a higher concentration. According to research Zainal et al. (2013) regarding the use of 10% mimba seed extract compared to 5% permethrin cream in patients with scabies, the results showed that in terms of clinical healing 5% permethrin cream was more effective than 10% mimba seed extract cream and 10% mimba seed extract cream was effective for scabies therapy was not different from 5% permethrin cream dermoscopy, this was due to the lack of patient compliance. Complaints of side effects or allergies in all study subjects were not found or were not reported in the study.

Vehiculum is a factor that can affect drug formulation, application, and subject to drug absorption (Zainal et al., 2013). Vehiculum that are easy to use can improve patient compliance in applying drugs. The lotion is a liquid preparation in the form of a suspension or dispersion used for external treatment (Sari, 2016). The lotion is a preparation that is easily washed off with water and is not sticky compared to other topical preparations. The application is fast and even on the skin because of its liquid form (Ahmadita, 2017). Easy use causes the lotion to be more widely used in pediatric patients. The evaporation of water contained in the lotion preparation provides a cooling effect after application (Asmara et al., 2012).

Skindex-29 and Dermatology Life Quality Index (DLQI) are skin disease-specific questionnaires that thoroughly assess the effect of disease on a patient's quality of life. In this regard, it is necessary to know the comparison of DLQI and Skindex-29 in scabies patients treated with 5% permethrin and scabies patients treated with mimba leaf extract.

Method

This study was conducted with an experimental design with a pre and post-test approach to determine the comparison of the quality of life of scabies patients with DLQI and Skindex-29 parameters treated with 5% permethrin lotion and 10% mimba leaf extract lotion. This research was conducted in one of the Islamic boarding schools in Malang from April to May 2021. Using purposive sampling. Acceptance criteria are male students at the Malang Islamic Boarding School aged 8-20 years, students diagnosed with scabies according to the clinical criteria of The International Alliance for the Control of Scabies (IACS) 2020 (Engelma et al., 2020), have not

received antiparasitic drugs, topical and oral antihistamines, and steroids in the previous 4 weeks (Castillo et al., 2013), 4. Willing to sign an informed consent and willing to participate in the study, understand the research procedures and side effects that may occur. For students who are under the age of 18, the signature can be represented by the leader of the Islamic boarding school (Zainal et al., 2013). While the exclusion criteria were scabies impetiginisata or crusted scabies (Jin-gang et al., 2010), a history of irritation or allergy to 5% permethrin (Zainal et al., 2013), a history of irritation or allergy to mimba leaf extract (Zainal et al., 2013), had other known inflammatory skin diseases based on physical examination and history taking (Zainal et al., 2013). The independent variables were the administration of 5% permethrin lotion and 10% mimba leaf extract lotion. The dependent variables for this study were the DLQI (Dermatology Life Quality Index) score and the Skindex-29 score.

The diagnosis was made by the resident of PPDS for dermatology and venereal disease according to the IACS 2020 criteria. Permethrin was given 5% according to the standard for scabies treatment, applied topically in the form of a single dose of 5% lotion at night, at 19.30, and left for 8-12 hours later. rinsed, permethrin was applied once a week for two weeks. While the mimba leaf extract is the result of the extraction of mimba leaves from the garden of UPT Medica Batu material. Mimba leaf extract was made in the form of a lotion by UPT Materia Medica Batu with 96% ethanol according to the desired concentration of 10%. Mimba leaf extract is applied at night at 19.30, left for 8-12 hours then rinsed, the use is done once a week for two weeks. The questionnaire to measure the quality of life of DLQI patients consists of 10 questions. Each question has 4 answer options, namely "not at all", "a little", "a lot", or "very much" with each corresponding score of 0, 1, 2, and 3. Answers are 'irrelevant' given a score of 0. The score is obtained by adding up the scores on each question. The number of scores is to determine the different tests before and after therapy. Then the total score was categorized into several categories to determine the distribution of the patient's quality of life between the 5% permethrin lotion group and the 10% mimba leaf extract lotion. Categories "no effect" for a total score of 0-1, "small effect" for a total score of 2-5, "medium effect" for a total score of 6-10, "large effect" for a total score of 11-20, and "very large effect" for a total score of 21-30. A questionnaire was used to evaluate the effect of skin disease on a patient's quality of life. Skindex-29 consists of 29 questions. Scores for each question answered: score 1 = never, score 2 = rarely, score 3 = sometimes; score 4 = often, score 5 = always. Then the 5-point scale score is changed to a 0-100 linear scale so that the score becomes: score 1 = 0, score 2 = 25, score 3 = 50, score 4 = 75, and score 5 = 100. The value is obtained from the average of the total linear scores of 29 questions. This value is to determine the different tests before and after therapy. To determine the distribution of the quality of life of patients treated with 5% permethrin lotion and 10% mimba leaf extract lotion, the mean scores were categorized as follows: low = 37, moderate = 18-36, high = 6-17, very high = 5.

DLQI and Skindex-29 data collection on day 0 before therapy and day 14 after therapy. Data analysis used the Wilcoxon test and dependent t-test for comparison

before and after therapy and independent t-test for comparison of quality of life between the two therapies with a significance of $p < 0.05$ and using SPSS 25. This study was approved by the Research Ethics Committee of the Medical Faculty of Brawijaya university Malang with No: No.115/EC/KEPK/04/2021.

Result

The number of respondents was 46 men diagnosed with scabies who had met the criteria for the research sample and were treated with 5% permethrin lotion therapy and 10% mimba leaf extract lotion therapy. On further observation, 4 subjects dropped out. So that the research subjects there are as many as 42 people. Forty-two research subjects consisted of 21 subjects in the group given 5% permethrin lotion therapy and 21 subjects in the group receiving 10% mimba leaf extract lotion therapy (Figure 1).

Based on table 1, the average age of research subjects in the 5% permethrin group was 13.71 ± 1.06 years and in the 10% mimba leaf extract group it was 13.76 ± 0.83 years. The mean time of suffering from scabies before the intervention in the 5% permethrin group was 18.19 ± 10.78 days and in the 10% mimba leaf extract group was 20.48 ± 14.64 days.

Based on table 2, the mean total DLQI score before 5% permethrin lotion therapy was 10.71 ± 6.24 with a median of 9, after 5% permethrin lotion therapy there was a decrease in the total score to 6.43 ± 4.96 with a median of 5. The results of the Wilcoxon difference test obtained a p-value of $0.001 < 0.05$, so there was a significant difference in the total DLQI score between before and after therapy.

Table 1. The responden characteristic.

Category	Intervention	
	Permetrin 5%	Mimba leaf 10%
Age (mean+SD) (year)	13.71+1.06	13.70+0.83
Time suffering from scabies before intervention (mean+SD) (day)	18.19+10.78	20.48+14.04

SD = Standar Deviation

It can be concluded that 5% permethrin lotion therapy can reduce the total DLQI score, in other words, 5% permethrin lotion therapy can improve the quality of life of scabies patients. While the mean Skindex-29 score before 5% permethrin lotion therapy was 44.49 ± 23.61 with a median of 43.96, after 5% permethrin therapy there was a decrease in the total score to 23.73 ± 17.81 with a median of 18.10. The results of the Wilcoxon difference test obtained a p-value of $0.000 < 0.05$, there was a significant difference in the Skindex-29 score between before and after therapy. It can be concluded that 5% permethrin lotion therapy can reduce the Skindex-29 score, in other words, 5% permethrin lotion therapy can improve the quality of life of scabies patients.

Table 2. Different Test of DLQI and Skindex-29 Scores Before and After 5% Permethrin Therapy.

	mean \pm SD (Median)	p
DLQI score		
Before Intervention	10.71 ± 6.24 (9)	0.001*
After Intervention	6.43 ± 4.96 (5)	

Skindex-29 score

Before Intervention	44.49 ± 23.61 (43.96)	0.000*
After Intervention	23.73 ± 17.81 (18.10)	

SD = Standar Deviation

*significance $p < 0.05$ (Uji Wilcoxon)

Based on table 3, the mean total DLQI score before 10% mimba leaf extract lotion therapy was 10.61 ± 4.72 with a median of 9, after 10% mimba leaf extract lotion therapy there was a decrease in the total score to 5.57 ± 3.57 with a median of 6. The results of the dependent t-difference test obtained a p-value of $0.001 < 0.05$, there was a significant difference in the total DLQI score between before and after therapy. It can be concluded that 10% mimba leaf extract lotion therapy can reduce the total DLQI score, in other words, 10% mimba leaf extract lotion therapy can improve the quality of life of scabies patients. Meanwhile, the mean score of Skindex-29 before the 10% mimba leaf extract lotion therapy was 34.69 ± 19.63 with a median of 31.89, after the 10% mimba leaf extract lotion therapy there was a decrease in the total score to 18.84 ± 9.81 with a median of 18.10. The results of the Wilcoxon difference test obtained a p-value of $0.034 < 0.05$, there was a significant difference in the Skindex-29 score between before and after therapy. It can be concluded that 10% mimba leaf extract lotion therapy can reduce the Skindex-29 score, in other words, 10% mimba leaf extract lotion therapy can improve the quality of life of scabies patients.

Table 3. Different Test of DLQI and Skindex-29 Scores Before and After 10% Mimba Leaf Therapy.

	Rerata \pm SD (Median)	p
DLQI score		
Before Intervention	$10,61 \pm 4,72$	0,001*
After Intervention	$5,57 \pm 3,57$	
Skindex-29 score		
Before Intervention	$34,69 \pm 19,63$ (31,89)	0,034*
After Intervention	$18,84 \pm 9,81$ (18,10)	

SD = Standar Deviation

*signifikansi $p < 0.05$ (Uji Wilcoxon)

Based on table 4, The results of the independent t-test showed that the p-value was > 0.05 , and the difference between the DLQI and Skindex-29 scores between 5% permethrin lotion therapy and 10% mimba leaf extract lotion therapy was not significantly different. It can be concluded that 5% permethrin lotion therapy and 10% mimba leaf extract lotion were equally good in improving the quality of life based on DLQI and Skindex-29.

Table 4. Difference Test (Before and After Therapy) DLQI and Skindex-29 scores.

	Mean \pm SD	p
DLQI score		
Permetrin 5%	4.26 ± 5.81	0.670
Mimba leaf extract 10%	$5.04 \pm 5,69$	
Skindex-29 score		
Permetrin 5%	20.77 ± 20.37	0.391
Mimba leaf extract 10%	15.85 ± 16.23	

SD = Standar Deviation

P = t-independen

Discussion

This study was followed by scabies patients aged 12-17 years with a mean age of 13 years. This is supported by research conducted by Lasa et al. (2015) that the high prevalence of scabies in children aged 10-19 years. The systematic review conducted by Romani et al. (2015) on 48 studies of scabies in various developing countries with lower-middle economies showed that the prevalence of scabies in the general population was highest in Papua New Guinea, Panama, and Fiji, while the prevalence of scabies in children was mostly found in Panama. According to Sungkar (2016), scabies is more common in children than adults. This happens because the immune system in children is lower than in adults, so they are more susceptible to disease. In addition, it can also be caused by a lack of cleanliness and high levels of play activities that cause exposure to occur more easily due to close contact.

Based on the results of the independent t-test in Table 4, it can be seen that there is no significant difference ($0.670 > 0.05$) in the difference in DLQI scores between 5% permethrin lotion therapy and 10% mimba leaf extract lotion therapy. In addition to using the DLQI instrument, this study also used the Skindex-29 instrument to strengthen the results of the DLQI. Measurement of the quality of life of patients with the Skindex-29 instrument based on the independent t-test in Table 5.8 showed insignificant results ($0.391 > 0.05$) between 5% permethrin lotion therapy and 10% mimba leaf extract lotion therapy. The use of the Skindex-29 instrument showed results relevant to the DLQI instrument. This shows that 5% permethrin lotion therapy and 10% mimba leaf extract lotion are equally good in improving the quality of life.

The life cycle of *Sarcoptes scabiei* consists of eggs, larvae, and nymphs to become adult mites. The life cycle of mites begins with mating between females and males on the skin surface or in skin tunnels. The male mite will die after mating, but sometimes it can survive several days in the tunnel. The female mite lays 2-3 eggs daily in the skin tunnel. Only 10% of the eggs produced by female *Sarcoptes scabiei* can become mature eggs. Within 3-5 days, the eggs turn into larvae. The larvae will exfoliate to turn into nymphs. Then the nymphs turn into adult mites (Wardhana et al., 2016; Sucipto, 2011; Sungkar, 2016). According to Risadani et al. (2017) 5% of permethrin acts at all stages of the parasite life cycle. This can happen because the sodium channel that is the target of 5% permethrin is in various organs. Similar to mimba leaves, the drug can also act on the entire cycle of *S. scabiei*. This is because AZA contained in mimba leaves can interfere with the process of metamorphosis through inhibition of the hormone ecdysone which functions as a developmental hormone. So the change from eggs to larvae, larvae to nymphs, or nymphs to adults is disrupted through the process of changing the skin of the mites which is inhibited (Murniati et al., 2018). AZA also has an antifeedant effect and is an inhibitor of egg hatchability (Indiati and Marwoto, 2018). Mimba leaf lotion 10% meets the requirements for scabies treatment because it can kill at all stages of the scabies mite. According to Khartikeyan (2009), the treatment for scabies sufferers is comprehensive, namely that all family members must be treated and meet the treatment requirements such as being effective at killing all stages of the scabies mite, not causing irritation or toxicity,

odorless or damaging to clothes and easy to obtain, and cheap (Khartikeyan, 2009). Death throughout the mite's life cycle can reduce the symptoms of scabies. The main symptom of scabies is itching, especially itching that occurs at night (pruritus nocturia) or when the patient sweats due to hot weather. Itching is felt by scabies sufferers all over the body even though the mites do not infest other skin areas. This happens because itching is a result of skin sensitivity to the excretion and secretion of mites in the form of saliva, schibala, and eggs (Marminingrum, 2018).

Itching can affect the quality of life of scabies patients. According to Jannic et al. (2018) itching in scabies can interfere with sleep in 90% of patients. Sleep disturbances can have adverse effects on health, social functioning, emotions, and well-being. According to Sungkar (2016), itching in scabies patients can also inhibit productivity and reduce the patient's academic achievement. Sudarsono in the book Sungkar (2016) reports that the learning achievement of students at a pesantren in Medan is lower after being infected with scabies. In 2008 as many as 15.5% of students at a pesantren in Aceh Province experienced a decrease in their report cards compared to before suffering from scabies (Sungkar, 2016). From this explanation, it can be seen that itching greatly reduces the patient's quality of life, so therapy that can provide an improvement effect on itching can improve the patient's quality of life. In a systematic review conducted by Strong et al. (2010) on 22 randomized clinical trials regarding scabies therapy, it was found that permethrin was superior in reducing persistent pruritus commonly experienced by scabies sufferers during and after therapy compared to crotamiton or gamma benzene hexachloride. This is also following the research of Manjhi et al. (2014) in a book by Sungkar (2016) about testing the effectiveness of permethrin 5%, single dose ivermectin, gamma benzene hexachloride 1%, and benzyl benzoate on 240 people with scabies in 1 use. The study showed that permethrin reduced the severity of pruritus the most among other therapies by 90%. Similar effects were also found in therapy using mimba. Putriana and Husni (2018) literature state that the mimba plant can reduce itching due to scabies. However, there is no scientific data that explains the anti-pruritic effect of mimba, although this may be related to anti-inflammatory activity because the pathophysiology of itching is thought to be related to the inflammatory response. Delayed hypersensitivity reactions to mite allergens result in skin inflammation resulting in lesions and itching (Hay et al., 2012). Other symptoms of scabies are lesions in the form of rashes and tunnels. Tunnel predilection is in the skin that has a thin stratum corneum, such as between the fingers, wrists, penis, mammary areola, peri-umbilical folds, breast folds, waist, lower intergluteal buttocks, thighs, and anterior and posterior axillary folds. The tunnel looks like a fine grayish-white line that winds and is elevated when compared to its surroundings. The length of the tunnel is about 2-15 mm and at the end, there are small papules or vesicles (Sungkar, 2016). Because one of the predilections for scabies is between the fingers, which are easily visible to others, this can lead to decreased self-confidence. Low self-confidence can affect the patient's social relationships. So therapy that can affect repairing lesions can improve the patient's quality of life. Research by Manjhi et al. (2014) in a book by Sungkar (2016) about the effectiveness test of permethrin 5%, single dose

ivermectin, gamma benzene hexachloride 1%, and benzyl benzoate on 240 scabies patients in 1-time use showed that 5% permethrin reduced lesions the highest among other therapies by 88.33%. Similar effects also occur in therapies using mimba leaf extract. According to Murniati et al. (2018) there is an effect of the use of mimba leaf extract solid soap (*Azadirachta indica* A.juss) on the healing process of grade II scabies lesions in the girls' dormitory of the Ngunut Islamic boarding school, Tulungagung.

The results of improving the quality of life obtained from the analysis were obtained because the therapeutic effect between 5% permethrin lotion and 10% mimba leaf extract lotion could eradicate the existing mites thereby providing symptomatic improvement in patients. This is supported by the research of Wardani et al. (2018) which showed that 10% mimba leaf extract cream, 10% brotowali stem extract cream, and a combination of brotowali and mimba extract cream had comparable efficacy to 5% permethrin cream in a 2-week observation of scabies patients.

Conclusion

In a comparative study of quality of life using the DLQI and Skindex-29 instruments between 21 scabies patients treated with 5% permethrin lotion and 21 scabies patients treated with 10% mimba leaf extract lotion in one of the Islamic boarding schools in Pakis Malang, it can be concluded as follows: lotion Permethrin 5% improved the quality of life of scabies patients with both DLQI and Skindex-29 measurements significantly after 2 weeks of therapy compared to before therapy. Mimba leaf extract lotion 10% improved the quality of life of scabies patients with both DLQI and Skindex-29 measurements significantly after 2 weeks of therapy compared to before therapy. Permethrin 5% lotion and 10% mimba leaf extract lotion were equally good in improving the quality of life of scabies patients as measured by DLQI and Skindex-29.

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