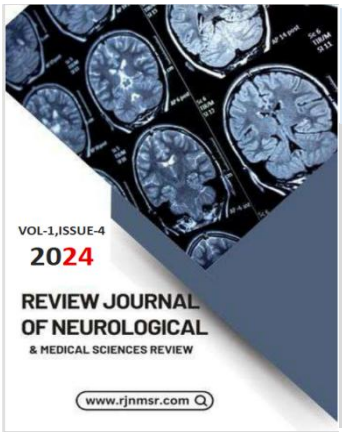

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Comparison Of Efficacy Of Topical 5% Permethrin With Topical 10% Sulphur In The Treatment Of Scabies

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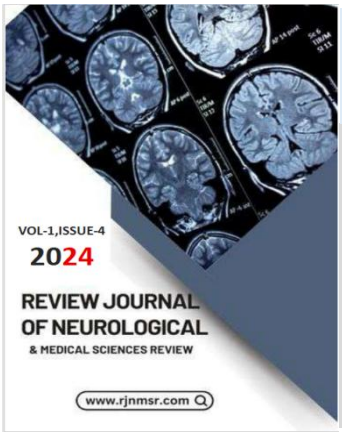
Abstract

Background: Still a major public health issue, Sarcoptes scabiei causes the widespread parasitic skin condition known as scabies. Comparative analysis of the safety and efficacy of 5% permethrin cream and 10% sulfur ointment in scabies therapy helps one to choose the best therapeutic strategy. Objectives: In patients diagnosed with scabies, topical 5% permethrin and 10% sulfur's efficacy, symptom remission, recurrence rates and side effects were compared. Methods: Two treatment groups—Group I (5% permethrin) and Group II (10% sulfur ointment) were randomly assigned sixty adult scabies patients each. Based on lesion reduction, pruritus alleviation and recurrence rates, clinical evaluations conducted at weeks 1, 2, and 4 assessed therapy success. Patient compliance and side effects of drugs were also recorded. Results: Complete cure rates for sulfur were 86% at week 4 and for permethrin were 91%. Permethrin showed faster drop in lesion count (92% vs. 87%) and pruritus (86% vs. 81%). The permethrin group had lower reinfestation rates—7%—than the sulfur (9%) group. While permethrin had less recorded side effects and greater compliance (95% vs. 87%), adverse effects were more frequent in the sulfur group, including odor-related discomfort (14%), and transitory itching increase (15%). Conclusion: Compared to 10% sulfur ointment, 5% permethrin proved faster in resolving symptoms, more tolerable and more effective. While sulfur may be used as an alternative when permethrin is contraindicated, permethrin should remain the first-line treatment for scabies due to greater compliance and reduced reinfestation rates.



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Keywords: Permethrin; Recurrence; Scabies; Sulfur.

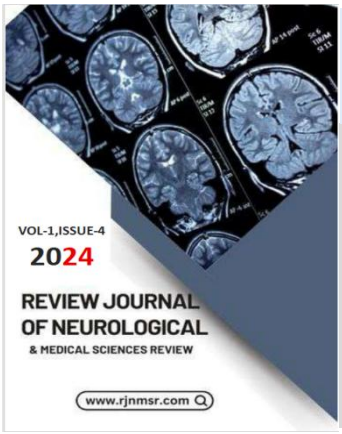
Introduction

Affecting millions globally, especially in resource-limited environments where overcrowding and inadequate sanitation help spread Sarcoptes scabiei, scabies is a highly contagious parasitic skin infestation [1-3]. With diagnosis depending on mite or their byproducts using skin scrapings, dermoscopy, or molecular techniques, the disease present with severe pruritus, nocturnal aggravation, and characteristic burrows [4]. Though several acaricidal therapies are now available, the best scabicide is still under discussion because of problems including treatment failures, toxicity, and difficulty with compliance [5]. Among the often used topical treatments, 5% permethrin cream is most preferred for its great efficacy and favorable safety profile; 10% sulfur ointment remains an alternative, especially for infants and pregnant women, despite its prolonged application schedule and possible irritation. This study intends to evaluate the efficacy and safety of topical 5% permethrin and 10% sulfur ointment in scabies therapy, so guiding ideal therapeutic options by means of their effectiveness, symptom resolution, recurrence rates, and side effects [5-6].

Sarcoptes scabiei var. hominis, a minute mite that burrows into the epidermis and causes severe itching, erythematous papules, and secondary bacterial infections resulting from constant scratching, is the extremely contagious parasite causing scabies [7]. Particularly in congested and resource- constrained environments where transmission occurs mostly by direct skin-to-skin contact, the disease presents a major public health concern [8-9]. Millions of people worldwide suffer from scabies; rates are more common in tropical and subtropical climates, particularly in populations of youngsters, elderly people, and immunocompromised individuals. Controlling epidemics and avoiding long-term dermatological consequences depend on efficient therapy [8-10].

First-line and alternate treatments among the available therapeutic alternatives have been respectively topical 10% sulfur ointment and topical 5% permethrin. Because permethrin, a synthetic pyrethroid, acts as neurotoxin agent on mites, causing paralysis and death, it is quite effective [10-11]. For total eradication, it requires just one or two administrations; its safety profile is good and its adverse effects are minor. Conversely, because of its keratolytic and antiparasitic qualities, topical sulfur—an earlier but still useful scabicidal agent—has been used for millennia [12]. Although sulfur is usually regarded as harmless, especially in pregnant women, babies, and individuals with sensitivity to synthetic insecticides, its longer application schedule, malodor, and possibility for skin irritation limit patient compliance [13].

Comparative study of the efficacy of 5% permethrin and 10% sulfur is required to ascertain the best treatment for scabies considering variations in their methods of action, convenience of use, and patient adherence. This study seeks to assess and compare in individuals diagnosed with scabies their therapeutic efficacy, rate of symptom remission, recurrence rates, and adverse



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effects. By evaluating these elements, this study will provide insightful analysis for dermatologists and other healthcare professionals choosing the most sensible and efficient treatment plan for scabies, especially in endemic areas and sensitive groups.

Materials and Methods

Study Design and Setting

Research was conducted at Combined Military Hospital (CMH) Abbottabad from November 2024 to February 2025, this cross sectional study sought to treat scabies using topical 5% permethrin cream and topical 10% sulfur ointment, therefore comparing their safety and effectiveness. The institutional review board granted ethical clearance, and before enrollment each subject gave informed permission.

Sample Size and Patient Selection

The study had sixty participants in all who had been diagnosed with scabies. Patients were included having either gender, eighteen years of age or above who freely volunteered to participate. Based on clinical symptoms and history, diagnosis was made; patients fit at least three of the following requirements:

- Presence of classical burrows
- Common places (interdigital spaces, wrists, axillae, genitalia, etc.) typical scabietic lesions
- Pruritus at night
- Family history of such manifestations

The exclusion criteria were:

- Less than eighteen years of age
- Known sensitivity to any one of the study drugs
- Those planning conception or those who are pregnant or lactating
- Severe systemic illnesses including cardiac, neurological, psychiatric or immunosuppressive diseases
- Abnormal liver or kidney performance
- Evolution of chronic infectious illnesses in history
- Recent use—of topical drugs or scabicidal agents

Patients were assigned at random to one of two therapy groups.

Group I (5% Permethrin Cream): Patients covered their whole body—including the neck and scalp—with the thin layer of 5% permethrin lotion. Eight hours later the cream was washed off. One week later, a second application was done if live mites were found during the follow-up.

Group II: (10% Sulfur Ointment): Patients applied 10% sulfur ointment from the neck down daily for three consecutive nights. Every twenty-four hours, the ointment was rinsed off before reapplication. If symptoms lasted, the treatment was extended for one more week.

To stop reinfestation, all close acquaintances and relatives of the patients were encouraged to get therapy concurrently. Throughout the trial, patients were advised not to use antipruritic or other topical treatments.

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Outcome Assessment and Follow-Up

All individuals had baseline clinical parameters recorded. At weeks 1, 2 and 4 following treatment, a blind investigation was conducted regarding clinical assessments to evaluate efficacy and track any side effects. Efficacy was judged depending on:

- Reduction in scabietic lesions
- Visual Analog Scale (VAS) help to improve pruritus
- Absence of fresh lesions at subsequent visits

Patients were classified as:

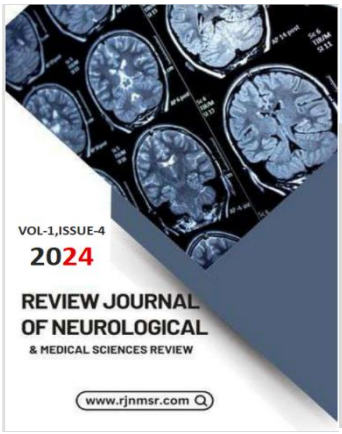
1. Cured: Not one new lesion, clinically resolved current lesions and noticeably reduced pruritus.
2. Reinfested: Initially cured but acquired new lesions at the 4-week follow-up.
3. Treatment failing: Four weeks later, persistent lesions and pruritus not significantly improved.

Every negative incident—including burning, skin irritation, allergic reactions—was recorded. Treatment effectiveness and safety were ascertained by data analysis.

Results

Caused by *Sarcoptes scabiei*, this extremely contagious parasitic skin condition causes severe itching, erythematous papules and subsequent bacterial infections (Figure 1). It is still a major public health issue, particularly in highly populated areas with inadequate resources where outbreaks are regular. The therapeutic efficacy, recurrence rates and side effects of different therapies were assessed in this study to guide medical practitioners in choosing the most sensible and workable scabies control method. The baseline data revealed that in age, gender distribution, symptom duration and nocturnal pruritus frequency both treatment groups were similar. Whereas previous scabies infections and secondary infections were similar between the two groups, the average number of lesions in the permethrin group was somewhat higher. Both groups had comorbidities including diabetes and hypertension, which might affect the results of treatment (Table 1).

Regarding treatment efficacy, permethrin showed a faster response; 63% of patients in the permethrin group attained complete cure at one week, compared to 54% in the sulfur group. With cure rates of 91% for permethrin and 86% for sulfur at four weeks, both treatments were clearly successful; permethrin showed a modest edge. Though somewhat higher in the sulfur group (9%), compared to permethrin (7%), reinfestation rates were modest in both groups. Lesion count and pruritus also showed similar pattern; permethrin reduced both symptoms faster and more dramatically than sulfur. While pruritus decrease was 86 vs. 81%, lesion reduction was 92% for permethrin against, 87% for sulfur at 4 weeks. Although both treatments were



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successful overall, permethrin was the recommended choice since it responded sooner and exhibited somewhat greater cure rates. Still a good option, but, 10% sulfur is recomended especially for people whose usage of permethrin is contraindicated (Table 2). One major disadvantage of sulfur therapy was that the odor-related irritation was experienced just in the sulfur group (14%). Furthermore more common was temporary itching increase with sulfur (15%) than with permethrin (7%). The sulfur group had somewhat increased incidence of other side effects including skin dryness, burning sensation and erythema than the permethrin group. Although both groups showed mild discomfort and allergy responses, sulfur clearly caused them. The least often mentioned side effect in both groups was contact dermatitis. Whereas 5% permethrin showed less side effects and was better accepted, 10% sulfur produced more frequent and severe adverse effects, including odor-related irritation and itching. This implied that, for increased patient compliance and comfort, permethrin might be the recommended choice (Figure 2).

With 95% of patients in the 5% permethrin group finishing therapy, the compliance rate was greater than in the sulfur group—87%. Because of lengthier application duration and unpleasantness, the sulfur group had somewhat larger rate of patients missing one dose—8% vs. 3%. The sulfur group (5%) also showed increased frequency of discontinuation due to unpleasant effects than the permethrin (2%), thereby supporting the theory that sulfur treatment may be less acceptable. Recurrence rates in the sulfur group were just marginally higher during the 8-week follow-up. Comparatively to 85% in the sulfur group, 90% of individuals treated with permethrin showed no recurrence. While severe recurrence was noted in 3 and 5% respectively, mild recurrence was noted in 7 of permethrin patients and 10% of sulfur patients. With higher compliance and reduced recurrence rates overall, 5% permethrin suggests that it would be a more practical and effective choice for scabies treatment. Still, 10% sulfur is a good substitute especially in cases when permethrin is prohibited (Table 3).

The variations in symptom severity (mild, moderate, and severe) following scabies treatment indicated that as treatment went on, mild symptoms—became much more common, culminating at about 80–90%, signifying the change from more severe symptoms to milder discomfort. Starting from around 50% and declining below 20%, moderate symptoms exhibited a consistent drop indicating good symptom alleviation. Confirming the efficacy of both treatments in eradicating severe scabies manifestations, severe symptoms showed fast decrease, falling to almost 0% by the second phase of treatment (Figure 3).

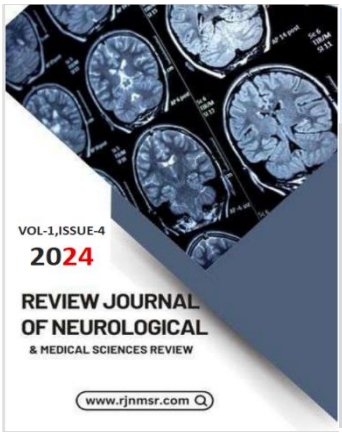

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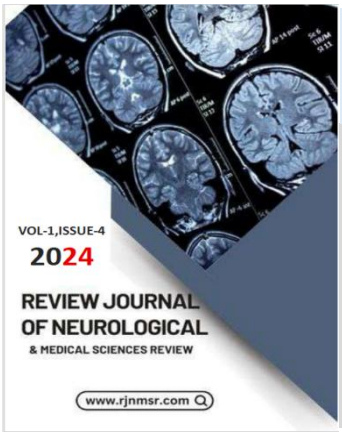
Figure 1: Scabies lesions with characteristic burrows and erythema on hand

Table 1: Baseline Characteristics of Study Participants

Characteristic	5% Permethrin (n=30)	10% Sulfur (n=30)
Age (years)	32.8 ± 9.7	34.5 ± 9.5
Male/Female	17/13	14/16
Duration of Symptoms (weeks)	3.4 ± 1.0	3.7 ± 1.4
Nocturnal Pruritus (%)	89	86
Family History (%)	74	70
Number of Lesions (Mean ± SD)	12.8 ± 3.2	11.5 ± 3.6
Previous Scabies Infection (%)	19	22
Associated Secondary Infection (%)	14	13
Comorbidities (Diabetes, Hypertension) (%)	31	29

Table 2: Treatment outcomes at different follow-up intervals

Follow-up Time	Complete Cure (Permethrin) %	Complete Cure (Sulfur) %	Reinfestation (Permethrin) %	Reinfestation (Sulfur) %	Reduction in Lesion Count (Permethrin) %	Reduction in Lesion Count (Sulfur) %	Reduction in Pruritus Score (Permethrin) %	Reduction in Pruritus Score (Sulfur) %
1 Week	63	54	-	-	52	48	42	38
2 Week	82	73	-	-	78	71	67	61



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4 Weeks	91	86	7	9	92	87	86	81

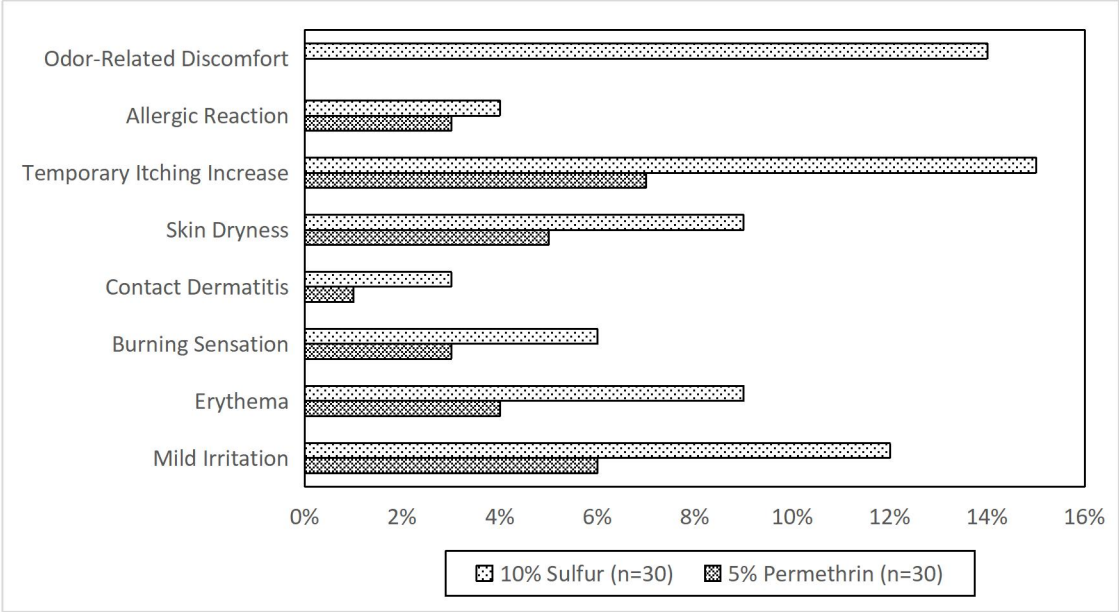
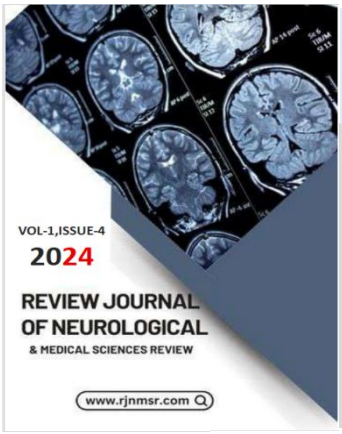


Figure 2: Adverse events observed during treatment

Table 3: Compliance rate and recurrence of scabies post-treatment

Parameter	5% Permethrin (n=30)	10% Sulfur (n=30)
Compliance Rate		
Completed Treatment (%)	95	87
Missed One Dose (%)	3	8
Discontinued Due to Adverse Effects (%)	2	5
Recurrence of Scabies (4-Week Follow-Up)		
No Recurrence (%)	90	85
Mild Recurrence (%)	7	10
Severe Recurrence (%)	3	5



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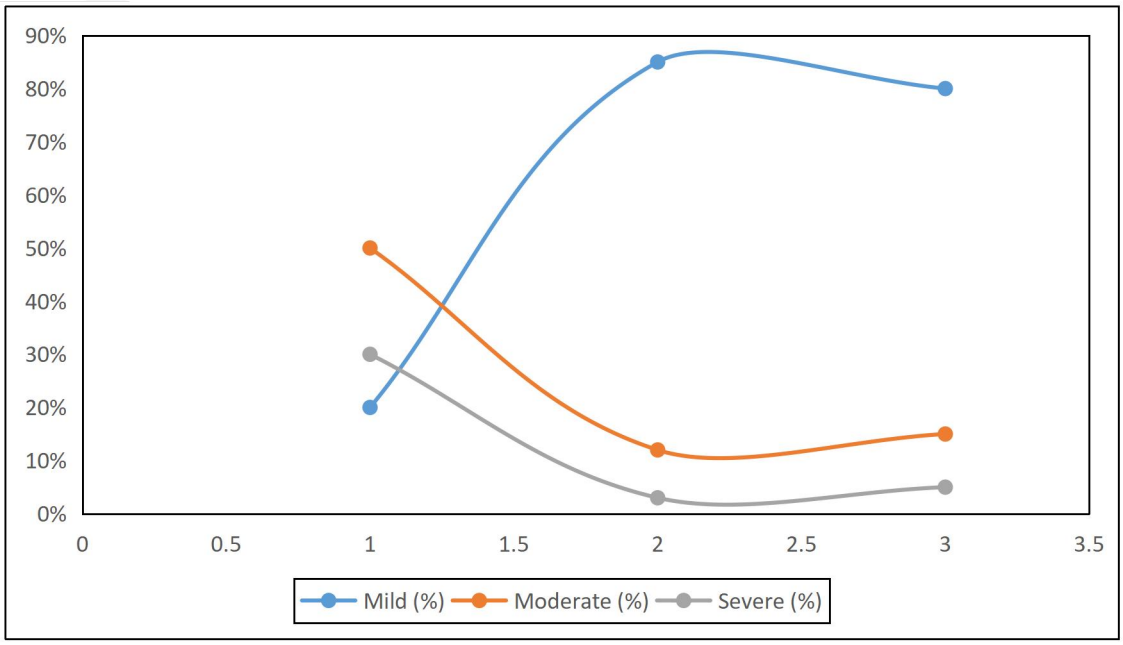

Figure 3: Severity of symptoms before and after treatment

Discussion

The present study evaluated the safety and efficacy of topical 5% permethrin cream and 10% sulfur ointment in the treatment of scabies. Although both treatments were successful, 5% permethrin showed greater response rate, faster lesion clearance, lower recurrence rates and better patient compliance than 10% sulfur ointment, our results imply. Still a good choice, nevertheless, sulfur ointment is particularly useful in situations when permethrin is contraindicated.

Indicating great efficacy in eradicating *Sarcoptes scabiei* infection, total cure rate at four weeks was 91% for permethrin and 86% for sulfur. These results line up with earlier studies showing permethrin is among the most powerful scabicidal drugs available. With minimum reinfection risk when administered correctly, Mila-Kierzenkowska et al. (2017)[11] revealed that permethrin had an overall cure rate surpassing 90% in many randomized controlled studies. Likewise, it came to the conclusion that because of its great efficacy, simplicity of application, and extended residual activity against mites permethrin stays the gold standard for scabies therapy [14-15].

Our investigation confirms these findings: compared to sulfur ointment, permethrin produced faster symptom alleviation. Comparatively to 54% in the sulfur group, 63% of patients in the permethrin group attained total cure at one week. The neurotoxic impact of permethrin on the mites—which essentially paralyzes and kills them within hours of application—helps to explain this fast response. On the other hand, sulfur ointment needs several administrations spread over several days, which might help to explain slower symptom relief. Previous investigations, including one by Ertugrul and Aktas,

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(2022)[10], showed similar findings; permethrin-treated patients reported notable improvement within few days, whereas sulfur-treated patients needed a longer treatment time for equal alleviation [10, 16].

The rate of pruritus and lesion decrease is vital indicator of therapy effectiveness in scabies. Comparatively to 87 and 81%, respectively, permethrin displayed a 92% decrease in lesion count and 86% decrease in pruritus at the four-week follow-up. These findings underline how much better permethrin relieves symptoms.

Because of residual sensitivity to mite antigens, the most upsetting symptom of scabies—pruritus—often lasts several weeks following therapy. The faster pruritus relief in the permethrin group, however, points to permethrin not only eradicating mites successfully but also maybe having a lesser inflammatory response than sulfur, which has been linked with irritation and aggravation of itching [17-19]. This is further supported by the steady change in symptom severity, whereby mild symptoms became prevalent following treatment and notable decrease in moderate and severe symptoms thereby validating the clinical improvement observed in both groups.

Often blamed for scabies recurrence are environmental reinfection, poor treatment adherence or incorrect administration of topical medicines. Recurrence rates in our study were much higher in the sulfur group (9%) than in the permethrin group (7%). These rates are in line with earlier studies by Hay et al. (2012)[20], who found that whilst sulfur needed continuous treatment to have comparable results, permethrin-treated people had reduced reinfestation rates because of its residual activity.

Incomplete removal of mites and eggs is one possible cause of the somewhat greater reinfestation rate with sulfur, hence requiring longer treatment duration for total efficacy [21]. Though its mechanism is yet unknown, sulfur ointment is thought to have keratolytic and antibacterial effects that indirectly influence mite survival. Sulfur does not, however, destroy mite eggs as efficiently as permethrin, which could increase reinfestation risk [22].

The best therapy for scabies is selected in great part on treatment safety and patient compliance. Our study found that 5% permethrin was better tolerated and had less side effects than 10% sulfur ointment. Whereas permethrin had reduced rates of skin irritation, erythema and burning sensation, odor-related discomfort (14%) and transient itching increase (15%) were much higher in the sulfur group. These results are in line with Sharquie et al. (2012)[12], who claimed that sulfur-based therapies usually result in skin dryness, irritation and significant odor-related pain, hence lowering compliance. With a greater risk of missed doses and termination owing to adverse effects in the sulfur group, our study's compliance rate for permethrin (95%) was higher than that of sulfur (87%). In a study by Thomas et al., similar patterns were shown whereby permethrin was preferred for its simplicity of use and single-application schedule whereas sulfur was linked with increased dropout rates due of lengthier application time and negative side effects.

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Our results support the first-line treatment for scabies—5% permethrin—especially in general populations, healthcare environments and endemic areas, where fast symptom alleviation and great compliance are vital. Still, 10% sulfur is a good substitute in some contexts, including: Pregnant and nursing women, for whose permethrin safety information is lacking, patients suspected of permethrin resistance [23]. Low-resource environments, in which sulfur is sometimes more reasonably priced and readily available than permethrin. Effective therapy depends on good patient education to maximize results and stop reinfestation. Environmental decontamination—e.g., hot water washing bed sheets, clothes and towels—should be stressed to remove remaining mites and eggs. Patients and household members should also receive simultaneous treatment.

Although our study tracked patients for four weeks, prolonged follow-up (8–12 weeks) would give a more complete picture of recurrence rates. Small sample size: Larger multicenter studies are required to confirm our results given just 60 participants. Lack of molecular testing for scabies mites: Future research should include dermoscopic or PCR-based validation of scabies infestations to improve diagnosis accuracy.

Conclusion

This study showed faster symptom resolution, higher cure rates (91% vs. 86%), lower reinfestation rates (7% vs. 9%), and improved patient compliance (95% vs. 87%) suggesting 5% permethrin is better than 10% sulfur ointment in the treatment of scabies. By week 4, permethrin outperformed sulfur (81% and 87%, respectively) greatly lowering pruritus (86%), and lesion count (92%). While permethrin was better tolerated, adverse effects—especially odor-related discomfort (14%), and transitory itching increase (15%), were more common in the sulfur group. Permetrin is still the first-line treatment for scabies given its fast effect, single-application schedule and reduced recurrence risk. However, when permethrin is contraindicated, though, sulfur is a good substitute.

Conflict of Interest

None.

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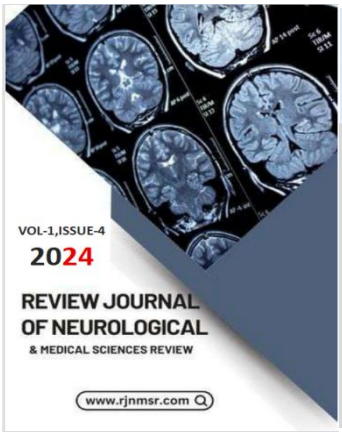

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