

Comparison of the Effectiveness of Topical Permethrin and Oral Ivermectin as Treatments for Scabies: A Systematic Review

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DOI: <https://doi.org/10.52403/ijrr.20260952>

ABSTRACT

Background: Scabies is a common parasitic skin disease. Topical 5% permethrin and oral ivermectin are widely used, but their speed of action and dosing schedules differ.

Objective: To compare the effectiveness and safety of topical permethrin and oral ivermectin for scabies.

Methods: PubMed and ScienceDirect were searched for English-language human studies published from January 2000 to December 2024. Reference lists and Google Scholar were used to find additional reports. Studies had to compare oral ivermectin with topical permethrin and report clinical outcomes. Study selection followed PRISMA 2020.

Results: The search found 260 records. After duplicate removal and screening, 14 studies with 1,931 participants in the relevant treatment groups were included. Permethrin usually produced faster improvement during the first one to two weeks. By week four, the difference was smaller when ivermectin was given again after 7–14 days. Both treatments were generally well tolerated. Combination treatment showed a possible benefit in severe or difficult cases, but the evidence was limited.

Conclusion: Topical 5% permethrin remains the preferred option for classic scabies when

it can be applied correctly. Two-dose oral ivermectin is a useful alternative when topical treatment is difficult or many people need treatment at the same time.

Keywords: Scabies, ivermectin, permethrin, treatment, systematic review

INTRODUCTION

Scabies is a contagious skin infestation caused by *Sarcoptes scabiei* var. *hominis*. It usually causes intense night-time itching, papules, burrows, and nodules. Common sites include the finger webs, wrists, axillae, waist, and genital area. Scabies remains an important public health problem, especially in crowded homes and communities with limited access to treatment. [1]

Topical 5% permethrin is widely used because it acts directly on the mite and has a good safety record. Oral ivermectin is easier to give when topical treatment is difficult, during outbreaks, or when many close contacts must be treated. However, the first dose of ivermectin has little effect on mite eggs, so a second dose is often needed. Trials have reported different cure rates because they used different schedules, follow-up times, and definitions of cure. This review therefore compared the available clinical studies of oral ivermectin and topical permethrin.

MATERIALS & METHODS

This systematic review was prepared in line with the PRISMA 2020 statement. [2] The review question was whether oral ivermectin is as effective and safe as topical permethrin for people with scabies.

Search Strategy

PubMed and ScienceDirect were searched for studies published from 1 January 2000 to 31 December 2024. The main search terms were “scabies”, “oral ivermectin”, “topical permethrin”, “clinical trial”, and “comparative study”. The PubMed search combined these terms with human and English-language filters. ScienceDirect was searched with the same clinical terms and year limits. Google Scholar and the reference lists of eligible articles and systematic reviews were used only for citation searching. The final search was checked on 18 September 2026.

Inclusion Criteria

Studies were included when they met all of the following criteria:

1. Participants had a clinical or microscopic diagnosis of scabies;
2. Oral ivermectin was compared directly with topical permethrin, alone or as part of a combination group;
3. The study was a randomized trial or prospective comparative study; and

4. The report gave a clinical outcome such as cure, lesion clearance, reduction in pruritus, or adverse events.

Exclusion Criteria

Studies were excluded if they met any of the following criteria:

1. They were reviews, case reports, animal studies, or laboratory studies;
2. They did not compare oral ivermectin with topical permethrin;
3. They reported a duplicate study population, could not be retrieved, or had published concerns about data integrity.

Titles and abstracts were screened first. Full texts were then checked against the eligibility criteria. For each included study, the author, year, design, sample size, treatment schedule, follow-up, cure result, and adverse events were extracted. Because the treatment schedules and definitions of cure differed, the findings were summarized descriptively rather than pooled in a new meta-analysis. The search identified 260 records: 24 from PubMed, 228 from ScienceDirect, and 8 additional unique reports from citation searching. Eleven duplicate records were removed. Of 249 screened records, 227 were excluded by title and abstract. Twenty-two reports were sought, 2 could not be retrieved, and 20 full texts were assessed. Six full texts were excluded: 3 because of published data-integrity concerns, 2 because the intervention or comparator was not eligible, and 1 because it used a duplicate study population. Fourteen studies were included (Figure 1).

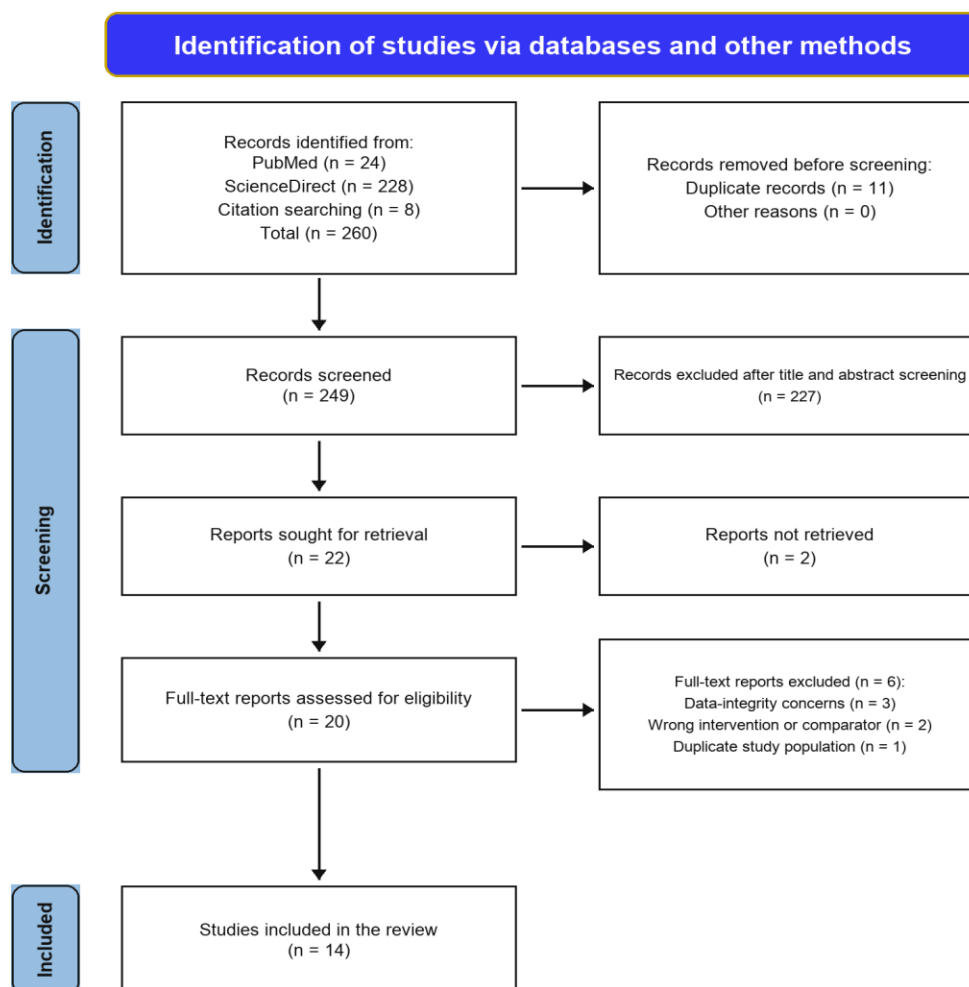


Figure 1. PRISMA 2020 flow diagram for study selection.

Table 1. Characteristics of the included studies

No.	Author	Study design	Year
1	Usha and Gopalakrishnan Nair [4]	Randomized comparative trial	2000
2	Das et al. [12]	Randomized comparative trial	2006
3	Bachewar et al. [5]	Randomized open-label trial	2009
4	Mushtaq et al. [9]	Randomized comparative trial	2010
5	Sharma and Singal [6]	Double-blind randomized trial	2011
6	Chhaiya et al. [7]	Randomized open-label trial	2012
7	Saqib et al. [10]	Randomized assessor-blind trial	2012
8	Manjhi et al. [11]	Randomized comparative trial	2014
9	Kanwar et al. [13]	Randomized comparative trial	2016
10	Abdel-Raheem et al. [8]	Randomized comparative trial	2016
11	Wankhade et al. [14]	Randomized comparative trial	2016
12	Dey et al. [15]	Randomized comparative trial	2022
13	Goraya et al. [16]	Randomized controlled trial	2023
14	Tripathy et al. [17]	Prospective comparative study	2024

RESULT

Fourteen studies with 1,931 participants in the relevant treatment groups were included. Most studies were single-centre randomized trials from South Asia. Sample sizes ranged from 68 to 369 participants in the relevant

groups. The studies compared one or two oral doses of ivermectin, usually 200 µg/kg, with one or more applications of topical permethrin, usually 5%. Follow-up ranged from one to eight weeks. The outcome definitions were not uniform: some studies

required complete lesion clearance, while others combined lesion improvement, reduction in pruritus, and negative microscopy.

The overall pattern was consistent. Permethrin usually produced faster improvement during the first week. In the Cochrane analysis of earlier trials, oral ivermectin had a lower rate of complete clearance at week 1 (risk ratio 0.65, 95%

confidence interval 0.54–0.78), but there was little clear difference by week 2 or week 4. [3] Individual trials showed the same pattern. Chhaiya et al. reported week-1 cure rates of 74.8% with permethrin and 30.0% with oral ivermectin, but both groups were close to complete clearance after retreatment. [7] Usha and Gopalakrishnan Nair also found that a second dose of ivermectin increased the cure rate from 70% to 95%. [4]

Table 2. Treatment schedules and main findings

No.	Study	Relevant n	Oral ivermectin	Topical permethrin	Main finding
1	Usha 2000 [4]	85	Ivermectin 200 µg/kg; repeat if needed	Permethrin 5%; repeat if needed	Permethrin cleared disease faster; two ivermectin doses reached a similar late cure rate.
2	Das 2006 [12]	100	Ivermectin on days 1 and 14	One permethrin 5% application	At week 4, clinical improvement was 96% with ivermectin and 90% with permethrin.
3	Bachewar 2009 [5]	68	Single ivermectin dose; repeat if needed	Single permethrin application; repeat if needed	Permethrin gave better early clearance; the difference became smaller after retreatment.
4	Mushtaq 2010 [9]	100	Single ivermectin dose; repeat at week 2 if needed	Single permethrin application; repeat if needed	Both worked; permethrin had a slightly higher cure rate at week 4.
5	Sharma 2011 [6]	120	One or two ivermectin doses	One permethrin 5% application	Permethrin improved lesions faster; week-4 clearance was similar.
6	Chhaiya 2012 [7]	210	Single ivermectin dose; repeat if needed	Single permethrin 5% application; repeat if needed	Week-1 cure was 30.0% with ivermectin and 74.8% with permethrin; rates were similar by week 3.
7	Saqib 2012 [10]	120	Single ivermectin dose	Single permethrin 5% lotion application	No clear difference in complete clearance at weeks 1 or 2.
8	Manjhi 2014 [11]	120	Single ivermectin dose	Single permethrin 5% application	Permethrin improved lesions more at week 1; pruritus improvement was similar.
9	Kanwar 2016 [13]	199	Oral ivermectin	Topical permethrin	Ivermectin and permethrin had comparable efficacy at the final follow-up.
10	Abdel-Raheem 2016 [8]	107	Ivermectin on days 1 and 7	Permethrin lotion for five nights	No clear difference by week 2; both regimens were effective.
11	Wankhade 2016 [14]	150	Single ivermectin dose	Single permethrin application; combination arm also studied	Permethrin acted faster; combination treatment had the highest final cure rate.
12	Dey 2022 [15]	90	Two-dose ivermectin regimen	Permethrin 5%; combination arm also studied	Permethrin showed faster improvement; the difference at day 28 was small.
13	Goraya 2023 [16]	369	Oral ivermectin	Permethrin 5% and a combination arm	Efficacy was 67.5% with ivermectin, 70.7% with permethrin, and 84.6% with combination treatment.
14	Tripathee 2024 [17]	93	Single ivermectin dose	Permethrin 5% twice in one week	Both were safe; local burning or erythema was uncommon.

Abbreviations: n, number of participants in the relevant treatment groups.

DISCUSSION

The main finding is simple: topical permethrin tends to work faster than a single dose of oral ivermectin. This early difference matters when itching is severe or rapid control is needed. By week 4, however, the gap becomes smaller when ivermectin is repeated after 7–14 days. The result is in line with the Cochrane review, which found better clearance with permethrin at week 1 but no clear difference at later follow-up. [3] The treatment schedules explain part of this result. Permethrin is applied directly to the skin and acts on mites at several stages. Ivermectin acts through the bloodstream and has little effect on eggs. New mites can therefore hatch after the first dose. A second dose is needed to kill these mites before they reproduce. Comparing one dose of ivermectin with two applications of permethrin can make ivermectin appear less effective than it is when used as a complete two-dose course.

Correct use is also important. Permethrin must cover the whole recommended skin area and stay on long enough. Hands should be treated again if they are washed during the treatment period. Oral ivermectin is easier to give, but patients must return for the second dose. In both groups, close contacts should be treated at the same time. Clothes and bedding should also be managed according to local guidance. If these steps are missed, reinfestation may be mistaken for drug failure. [1]

Persistent itching does not always mean that live mites are still present. Post-scabetic itch can continue for several weeks after successful treatment. A new burrow, a new typical lesion, or a positive microscopic examination gives stronger evidence of active infestation. This difference was not handled in the same way across the included studies, which makes direct comparison difficult.

Combination treatment needs careful interpretation. The trials by Wankhade et al. and Goraya et al. reported better outcomes when oral ivermectin and topical permethrin were used together. [14,16] The combination

may be useful in crusted, severe, or difficult-to-treat scabies. The evidence is not strong enough to recommend it for every uncomplicated case. It adds cost and treatment burden, and several studies did not use blinded outcome assessment.

Both treatments were generally well tolerated. Permethrin mainly caused short-lived burning, stinging, or redness. Ivermectin was linked to occasional headache, dizziness, nausea, or abdominal discomfort. Serious adverse events were rare in the included studies. Safety reporting was incomplete in several trials, so small differences may have been missed.

Oral ivermectin remains useful when topical treatment is hard to apply, when many contacts need treatment, or during institutional and community outbreaks. Permethrin is still preferable for people in whom oral ivermectin is not advised, including some pregnant patients and children weighing less than 15 kg. The final choice should also consider age, pregnancy, other illness, cost, drug access, and the patient's ability to follow the schedule. [1]

Treatment failure has many possible causes. A 2024 systematic review found that failure was more common after one dose of ivermectin than after two doses. [18] Poor application, missed second doses, untreated contacts, and reinfestation are common reasons. These factors should be checked before resistance is assumed.

This review has several limitations. Most trials were small, open label, and conducted at one centre. The regimens, diagnostic methods, follow-up periods, and definitions of cure varied. Some studies repeated treatment only in non-responders, while others repeated treatment in every patient. These differences prevented a reliable new meta-analysis. The database search also included only English-language reports and ended in December 2024.

In practice, 5% permethrin is a good first choice when it can be applied correctly. Oral ivermectin is a practical alternative, but two doses are usually needed for a fair comparison. Future trials should compare

complete regimens, use the same definition of cure, record contact treatment and adherence, and separate active scabies from post-scabetic itch.

CONCLUSION

Topical 5% permethrin usually gives faster early improvement and remains the preferred treatment for classic scabies when it can be applied correctly. Oral ivermectin is an effective alternative, especially when topical treatment is difficult or many people need treatment at the same time. A second ivermectin dose after 7–14 days is important. Combination treatment may help in severe or difficult cases, but it should not be used routinely without a clear reason.

Declaration by Authors

Ethical Approval: Not applicable

Acknowledgement: None

Source of Funding: None

Conflict of Interest: No conflicts of interest declared.

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How to cite this article: I Gusti Ayu Devina Putri Aryana, Ni Nyoman Indra Lesthari. Comparison of the effectiveness of topical permethrin and oral ivermectin as treatments for scabies: a systematic review. *International Journal of Research and Review.* 2026; 13(9): 568-574. DOI: <https://doi.org/10.52403/ijrr.20260952>
