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Original Research

# Management of common scabies and postscabetic itch in adults: Lessons learned from a single-center retrospective cohort study

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ABSTRACT

*Background:* Common scabies can be difficult to diagnose and treat. There are limited data on the clinical characteristics of patients who may benefit from combined topical permethrin plus oral ivermectin. Postscabetic itch is common, but there is scant data describing its prognosis and management.

*Objective:* This study describes the clinical characteristics and evaluates treatment outcomes of participants with common scabies treated with combined topical permethrin plus oral ivermectin and describes the prognosis and management of postscabetic itch.

*Methods:* We conducted a single-center retrospective cohort study of participants with common scabies treated with combined topical permethrin plus oral ivermectin therapy and topical permethrin only. Participants previously treated with permethrin and/or ivermectin were excluded. The primary outcome was clinical outcome at follow-up, categorized as cure, worsening, or no change. Secondary outcomes included time from treatment initiation to cure, duration of follow-up after cure, recurrence rate, frequency of postscabetic itch, and duration of postscabetic itch.

*Results:* Of 55 participants treated with combined topical permethrin plus oral ivermectin, 49 (89%) achieved cure, 5 (9%) had no change, and 1 (2%) had worsening disease. Of 48 participants treated with topical permethrin only, 46 (96%) achieved cure, 2 (4%) had no change, and 0 (0%) had worsening disease. Thirty-five participants (34%) experienced postscabetic itch for 52.5 days (interquartile range, 28–135). More participants in the older (mean: 55 years; standard deviation: 21 years; $p = .002$) combined treatment group experienced postscabetic itch than in the younger (mean: 42 years; standard deviation: 19 years) permethrin-only treatment group (42% vs. 25%; $p = .072$).

*Conclusion:* These findings support the use of combined topical permethrin plus oral ivermectin therapy in treating common scabies, highlight that postscabetic itch can persist for longer than previously reported, and reveal a potential relationship between older age and postscabetic itch.



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**What is known about this subject in regard to women and their families?**

- Scabies affects >200 million people worldwide and is transmitted via prolonged skin-to-skin contact. Two groups with a high risk of transmission are individuals who share the same bed and children and their caregivers, commonly women.
- Scabies is often diagnosed late, leading to delays in treatment. Frequently, the primary caregivers in the household, often women, encourage household members to seek health care.
- Few studies have evaluated postscabetic itch and its burden on patients.

**What is new from this article as messages for women and their families?**

- Postscabetic itch can persist for a median of 52.5 days (interquartile range, 28–135) and result in additional health care utilization.
- Women and men age ≥55 years may be more likely to experience postscabetic itch than younger individuals. Larger studies are needed to evaluate the role of aging in postscabetic itch and treatment strategies to mitigate postscabetic itch.
- Our data suggest that topical permethrin plus oral ivermectin is a safe and effective treatment for scabies affecting women and their families.

## Introduction

Scabies is an ectoparasitic dermatosis, caused by *Sarcoptes scabiei* var. *hominis*, that affects >200 million people worldwide. Scabies can be difficult to diagnose due to variable clinical signs and a lack of sensitive diagnostic tests (Anderson and Strowd, 2017; Engelman et al., 2019) and challenging to treat due to inadequate access and adherence to effective treatment (Engelman et al., 2019). In the United States, adults with common scabies are typically treated with topical permethrin or oral ivermectin (Thomas et al., 2020). A 2019 Cochrane review showed that after 2 weeks of treatment, there was no difference in efficacy or safety between the use of topical permethrin or oral ivermectin in patients with scabies (Rosumeck et al., 2019). However, combined topical permethrin plus oral ivermectin has also been used effectively (Braun et al., 2020; Prabodh and Vikas, 2016).

Although the efficacy, safety, and cost-effectiveness of combined therapy have been compared with topical permethrin monotherapy and oral ivermectin monotherapy, the clinical characteristics of patients with common scabies who may benefit from combined therapy have not yet been elucidated in the literature. Furthermore, postscabetic itch is a common phenomenon, but there remains scant primary data describing the prognosis and management of this condition. The purpose of this study was to describe the clinical characteristics and evaluate treatment outcomes of participants with common scabies treated with combined topical permethrin plus oral ivermectin and describe the prognosis and management of postscabetic itch. This study was approved by the University of California, San Francisco (UCSF) institutional review board (20-30961).

## Methods

We conducted a retrospective cohort study of patients seen at the UCSF dermatology clinics between July 2012 and April 2020. The study inclusion criteria were outpatients who were age ≥18 years who were diagnosed with common scabies; were treated with combined topical permethrin plus oral ivermectin, topical permethrin only, or oral ivermectin only; and had at least 1 follow-up visit, phone call, or message during the study period. Participants age <18 years and those who were previously treated with topical permethrin and/or oral ivermectin were excluded. Scabies cases were identified by searching the electronic medical records for International Classification of Diseases, Clinical Modification, 10th Revision code B86 or 9th revision code 133.0.

Based on the International Alliance for the Control of Scabies consensus diagnostic criteria (Engelman et al., 2018), identified scabies cases were classified as *confirmed scabies* when visualization of mites, eggs, or feces on the individual or skin sample was documented; *clinical scabies* when the presence of scabies burrows on examination, typical lesions affecting male genitalia, or typical lesions plus two history features (itch and positive contact history) were documented; and *suspected scabies* when the presence of typical lesions in a typical distribution plus one history feature (itch or positive contact history) or atypical lesions and both itch and positive contact history were documented. Cure was defined as decreased clinical lesions after intervention completion based on documentation during follow-up visit, phone call, or message in the electronic medical record. Postscabetic itch was defined as participant-reported itch after cure.

The primary outcome was clinical outcome at follow-up, categorized as cure, worsening, or no change. The treatment arms were combined topical permethrin plus oral ivermectin, topical permethrin only, or oral ivermectin only. For the primary outcome analysis, participants who had previously been treated with permethrin and/or ivermectin were excluded. Secondary outcomes included time from initial visit to follow-up, time from treatment initiation to cure, duration of follow-up after cure, recurrence rate, number of participants with postscabetic itch, and duration of postscabetic itch. Fisher's exact or $\chi^2$ tests were performed for categorical data, and a two-sample *t*-test was performed with continuous data. Mann–Whitney U tests were performed to compare nonparametric continuous data, and $p < .05$ was considered statistically significant.

## Results

Of 504 participants who had an initial visit for scabies at UCSF, 125 did not have a follow-up visit, phone call, or message; 12 were seen in an inpatient setting; and 191 were age <18 years. Furthermore, 25 participants had already been treated successfully for scabies by the time of the initial UCSF visit, 19 had their scabies diagnosis changed over the course of follow-up, one declined treatment, two were treated with crotamiton, and one was prescribed permethrin because a close contact had been diagnosed with scabies but did not have scabies at the time of the initial visit.

For the primary outcome analysis, 22 participants who had previously been treated with topical permethrin and/or oral ivermectin were excluded (18 from the combined topical permethrin plus oral ivermectin group, 4 from the oral ivermectin only group). The oral ivermectin only group was not included in the analysis due to its sample size of three participants. A total of 103 participants were included in the primary outcome analysis (Fig. 1), and the participant characteristics are described in Table 1. Of note, participants treated with combined topical permethrin plus oral ivermectin were older than participants treated with topical permethrin only (mean age: 55 years; standard deviation: 21 years vs. mean age: 42 years; standard deviation: 19 years; $p = .002$; Table 1).

Eight percent of participants (8 of 103) were immunocompromised. Of those treated with combined topical permethrin plus oral ivermectin, one participant had a history of HIV infection (cluster of differentiation 4 count: 790 cells/mm$^3$), three had a his-

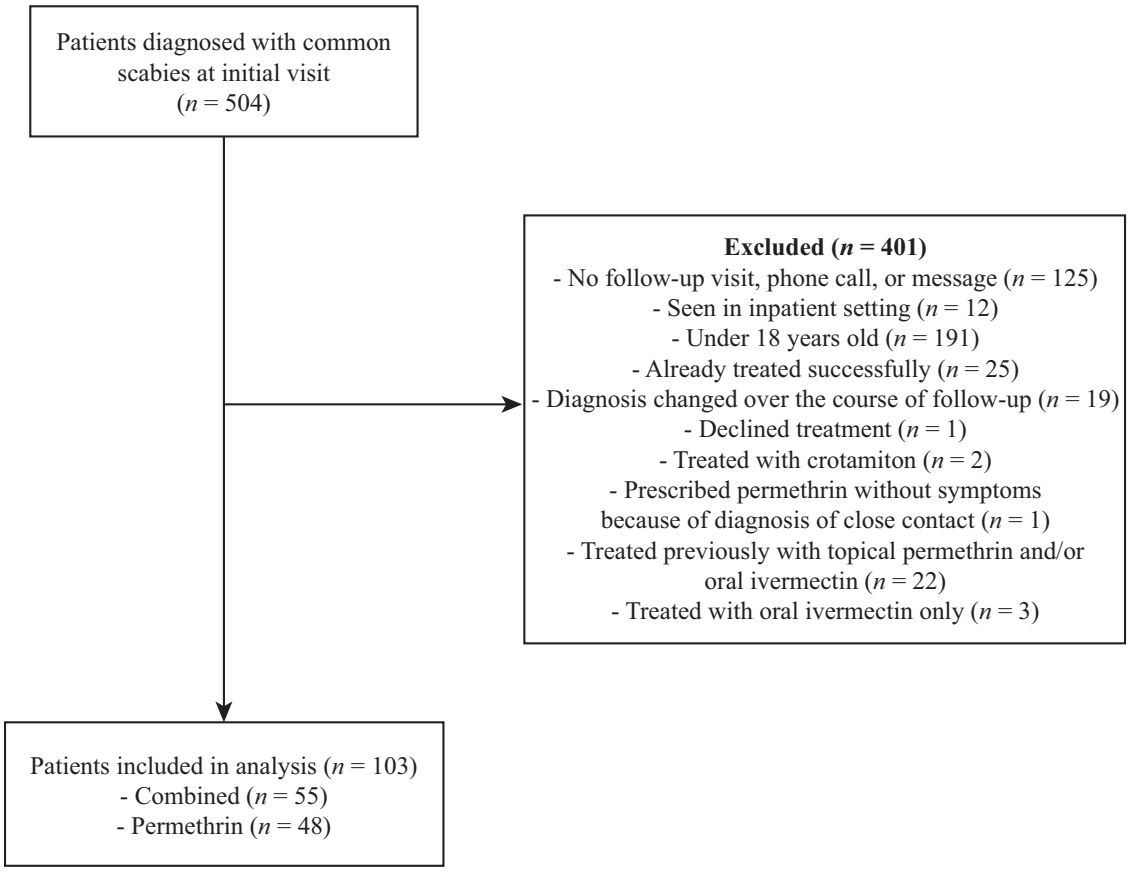


**Fig. 1.** Flowchart of study participant selection.

**Table 1**
Characteristics of participants treated for common scabies

| Characteristic | Permethrin and ivermectin | Permethrin only | *p*-value |
|---|---|---|---|
| Participants, n | 55 | 48 | |
| Mean age, y (range; standard deviation) | 55 (19–92; 21) | 42 (19–93; 19) | .002 |
| Female, n (%) | 27 (49) | 20 (42) | .45 |
| Participants with positive contact history, n (%) | 15 (27) | 15 (31) | .66 |
| History of scabies infestation, n (%) | 2 (4) | 0 (0) | .50 |
| Immunocompromised, n (%) | 6 (11) | 2 (4) | .28 |
| Duration of skin condition before referral, mo, median (interquartile range) | 3 (1–6.25) | 1.5 (1–3) | .99 |

tory of cancer, one had a history of renal transplant, and one had a history of inflammatory bowel disease on adalimumab. In the topical permethrin only treatment group, one participant had a history of HIV infection (cluster of differentiation 4 count: 1174 cells/mm$^3$) and one had a history of cancer. In participants treated with combined topical permethrin plus oral ivermectin, half of participants (53%; 29 of 55) completed two applications of permethrin with the remainder completing one (4%, 2 of 55), three (33%, 18 of 55), four (9%, 5 of 55), and nine (2%, 1 of 55) applications, and two doses of oral ivermectin (64%, 35 of 55) with the remainder completing one (25%, 14 of 55), three (4%, 2 of 55), four (5%, 3 of 55), and six (2%, 1 of 55) doses. In those treated with permethrin only, most (79%, 38 of 48) completed two applications of permethrin with the remainder completing one (6%, 3 of 48), three (10%, 5 of 48), and 4 (4%, 2 of 48) applications.

The median time from initial visit to follow-up clinic visit, phone call, or message was 18 days (interquartile range [IQR], 12.5–28 days). There was no significant difference in cure rate between participants treated with topical permethrin plus oral ivermectin and participants treated with topical permethrin only (Table 2). There was no significant difference in time from treatment to cure, duration of follow-up after cure, and duration of postscabetic itch.

Of the five participants who had no change with combined therapy, three were ultimately given another diagnosis (prurigo nodularis [n = 2] and Sezary syndrome [n = 1]) and two had insufficient follow-up for assessment. Of the two participants who had no change with permethrin therapy, one had been reinfested by untreated family members and one had incomplete treatment at the time of follow-up. No side effects were reported for either treatment group. In the combined therapy group, none of the participants age ≥65 years died within 6 months of therapy.

Of the 18 participants who were treated with combined topical permethrin plus oral ivermectin and had been excluded from the primary outcome analysis, 15 (83%) were cured with combined therapy. Of the two participants who had no improvement with combined therapy, one did not follow permethrin treatment guidelines and the other had insufficient follow-up for assessment. The only participant whose rash worsened on follow-up had been reinfested by their partner.

About one-third of the 103 participants (n = 35; 34%) experienced postscabetic itch that persisted for a median duration of

**Table 2**
Clinical outcomes of participants treated for common scabies

| Outcome | Permethrin and ivermectin (n = 55) | Permethrin only (n = 48) | *p*-value |
|---|---|---|---|
| Clinical outcome at follow-up, n (%) | | | .44 |
| Cured | 49 (89) | 46 (96) | |
| Worsened | 1 (2) | 0 (0) | |
| No change | 5 (9) | 2 (4) | |
| Clinical outcome at follow-up by diagnosis, n (%) | | | |
| Confirmed scabies | 30 (55) | 17 (35) | .36 |
| Cured | 30 (100) | 16 (94) | |
| Worsened | 0 (0) | 0 (0) | |
| No change | 0 (0) | 1 (6) | |
| Clinical scabies | 12 (22) | 22 (46) | .59 |
| Cured | 11 (92) | 21 (95) | |
| Worsened | 1 (8) | 0 (0) | |
| No change | 0 (0) | 1 (5) | |
| Suspected scabies | 13 (24) | 9 (19) | .05 |
| Cured | 8 (62) | 9 (100) | |
| Worsened | 0 (0) | 0 (0) | |
| No change | 5 (38) | 0 (0) | |
| Time from treatment to cure, days, median (IQR) | 21 (14–42) | 28 (14–29) | .63 |
| Duration of follow up after cure, months, median (IQR) | 0.5 (0–2) | 0 (0–0) | 1.00 |
| Recurrence, n (%) | 4 (7) | 3 (6) | 1.00 |
| Participants with postscabetic itch, n (%) | 23 (42) | 12 (25) | .072 |
| Duration of postscabetic itch, days, median (IQR) | 56 (28–135) | 55 (36.5–149.3) | .62 |

IQR, interquartile range

52.5 days (IQR, 28–135 days) and had a median of one follow-up visit (IQR, 1–2 visit) exclusively for postscabetic itch. Five participants were treated with narrow-band ultraviolet B therapy, and the remaining 35 participants were treated with a combination of gentle skin care (n = 18; 51%), gabapentin (n = 3; 9%), doxepin (n = 2; 6%), topical corticosteroids (n = 29; 83%), oral antihistamines (n = 7; 20%), bleach bath (n = 1; 3%), permethrin (n = 3; 9%), and ivermectin (n = 1; 3%).

Forty-one of 55 participants (75%) treated with combined therapy had a recommendation documented to launder clothing/linens in hot water and high heat or seal them in a plastic bag for 3 to 7 days, and 15 of 41 participants (37%) had documentation that these fomite control measures were performed. Thirty-four of 48 participants (71%) treated with permethrin only had been given fomite control recommendations during their visit, and 9 of 34 participants (26%) had documentation that they performed these fomite control measures.

At the initial visit, participants had used a variety of therapies, including permethrin monotherapy, oral ivermectin monotherapy, topical or oral antibiotics, topical or oral antifungals, topical or systemic corticosteroids, and oral anti-histamines. Referring providers (n = 103) included 14 non-UCSF dermatologists (13.6%), 15 internists (14.6%), 1 allergist/immunologist (1%), 1 emergency medicine physician, (1%), 1 endocrinologist (1%), 10 family medicine physicians (10%), 5 general nurse practitioners (4.9%), 1 adult oncology nurse practitioner (1%), 1 transplant surgeon (1%), 1 plastic surgeon (1%), 6 providers of unknown specialty (5.8%), and 20 were self-referred (19.4%). About one-quarter of the 103 patients (n = 27; 26.2%) were established UCSF Dermatology Clinic patients.

## Discussion

Our data support that combined topical permethrin plus oral ivermectin therapy is effective in treating common scabies, consistent with the results of a randomized trial and case study demonstrating the efficacy of this regimen and a network meta-analysis showing its superior cure rate (Braun et al., 2020; Prabodh and Vikas, 2016; Thadanipon et al., 2019). Although our study sample size was small and underpowered to detect a difference between treatment groups, the majority of participants who had failed permethrin and/or ivermectin achieved cure with combined therapy (n = 15 of 18; 83%). These findings suggest that topical permethrin plus oral ivermectin combined therapy is a reasonable treatment regimen for patients who have previously failed permethrin or ivermectin.

To our knowledge, this is the first study to evaluate postscabetic itch. Our data show that regardless of scabies treatment regimen, postscabetic itch can persist for several months, result in additional health care utilization, and require escalation of therapy to narrow-band ultraviolet B therapy and systemic agents. Published guidance report that postscabetic itch can persist for 4 to 6 weeks (Chosidow, 2006; Johnston and Sladden, 2005), but no primary data are provided or referenced. Our data show that postscabetic itch can persist for longer than previously reported. Patients diagnosed with scabies should be counseled that itch can persist for several months after the infestation has been treated. Health care providers should be aware that topical corticosteroids, and sometimes escalation to systemic agents or phototherapy, may be needed to treat postscabetic itch.

Our data suggest a trend toward increased frequency of postscabetic itch in participants who received combined topical permethrin plus oral ivermectin therapy compared with those who received topical permethrin only (42% vs. 25%; $p = .072$). Because participants who received combined therapy were older by a mean of 13 years compared with those who received permethrin therapy, we hypothesize that age-related physiologic changes, such as immunosenescence and impaired epidermal barrier repair, may contribute to this observed trend (Berger and Steinhoff, 2011). Larger studies are needed to better understand the relationship between aging and postscabetic itch.

In our study, there was inconsistent documentation on recommendations to implement fomite control measures, although nearly three-quarters of the study participants were given these recommendations. Although experiments by Mellanby (1944) support the minimal role of fomite-mediated transmission in common scabies and highly effective public health interventions for scabies in endemic settings have not implemented fomite control measures (Romani et al., 2015; 2019), this does not preclude their importance in the clinical care setting. Studies are needed to better evaluate the impact of fomite control measures in treating common scabies in nonendemic settings. U.S. Centers for Disease Con-

trol and Prevention (2018) guidelines for the treatment of scabies advise implementation of fomite control measures.

This study has several limitations. Due to the nature of a chart review, data for all participants were not uniformly available. Selection bias is a possibility since participants who achieved cure may have been less likely to follow up and therefore would not have been included in the analysis. Additionally, outcome misclassification is a potential bias because the primary outcome measure was, at times, dependent on participant self-report when follow-up was not in-person. Severity of disease (e.g., number of lesions or severity of itch) could not be assessed. As mentioned earlier, the study sample size is small and underpowered to detect a difference between treatment groups.

## Conclusion

Our findings support the use of combined topical permethrin plus oral ivermectin therapy as an effective and safe treatment for common scabies. Our study is the first to describe the prognosis and management of postscabetic itch. Future larger studies are needed to evaluate the role of aging in postscabetic itch, treatment strategies for mitigating postscabetic itch, and the relevance of fomite control measures in clinical disease management of scabies.

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Study approval: The author(s) confirm that any aspect of the work covered in this manuscript that has involved human patients has been conducted with the ethical approval of all relevant bodies.

## Conflicts of interest

None.

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