



# Clinical practice guidelines for the diagnosis and treatment of scabies in Korea: Part 2. Treatment and prevention — a secondary publication

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## Keywords

Practice guidelines; Prevention and control; Scabies; Therapeutics

Treatment should be initiated for all suspected, clinical, or confirmed cases of scabies. Patients affected should be adequately isolated, and high-risk groups with close contact histories should be treated regardless of their symptoms. Optimal treatment strategies can be selected based on age, clinical subtype, and the patient's health status. In Korea, commercially available preparations for scabies treatment include topical 5% permethrin, topical 10% crotamiton, and oral ivermectin. Topical 5% permethrin is the first-line selective treatment for both classic and crusted scabies. Alternative treatments include topical 10% crotamiton and oral ivermectin. After completing treatment, follow-up visits at 2 and 4 weeks are recommended to monitor the therapeutic response. Treatment is considered to have failed if scabies mites or burrows are detected, new clinical characteristics develop, or there is an aggravation of pruritus. Scabies itch should be adequately managed with emollients, oral antihistamines, and topical corticosteroids. Preventive measures, including personal hygiene, patient education, and environmental control, should be implemented to reduce the transmission of scabies.

## Treatment

- Treatment for scabies should be chosen based on factors such as age, clinical form, and overall health status. Additionally, close contacts should be treated simultaneously with the patient, irrespective of symptom presence.
- Topical 5% permethrin is the first-line treatment for both classic and crusted scabies. When the use of topical 5% permethrin is not feasible, alternative treatments include topical 10% crotamiton or oral ivermectin.
- Treatment is deemed unsuccessful if there is an exacerbation of pruritus, the emergence of new characteristic skin lesions such as burrows, or if mites continue to be detected after the treatment.

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When selecting an appropriate treatment for scabies infestation, it is important to consider factors such as the patient's age, the clinical form of the disease, and overall health status. Treatment should be administered simultaneously to both the patient and any close contacts, including family members living in the same household and facility staff, regardless of whether they show symptoms. In Korea, the available scabicial treatments include topical 5% permethrin cream, 10% crotamiton ointment, and oral ivermectin (Table 1, Supplement 1). Although 5%–10% sulfur ointments are not commercially available within the country, they can be specially prepared or imported as needed. Topical 5% permethrin is the first-line treatment for both classic and crusted scabies. If the use of topical 5% permethrin is not feasible, alternative options include 10% crotamiton ointment or oral ivermectin.

### Treatment of classic scabies

#### Topical 5% permethrin

Permethrin, approved by the U.S. Food and Drug Administration (FDA) for use in individuals aged two months and older (approved for ages two years and older in Korea), is typically the first-line treatment for scabies. It effectively targets all life stages of the scabies mite, including eggs, and has been shown to be more efficacious than oral ivermectin [1]. Although a single application might theoretically be sufficient to reduce the risk of treatment failure, it is recommended to apply permethrin twice, one week apart, and to schedule a follow-up visit two weeks after the initial treatment to confirm eradication. Generally, the application should remain on the skin for at least 8–12 hours; however, an *in vitro* study suggested that maintaining 5% permethrin on the skin for only 8 hours may not fully eradicate the mites [2]. Therefore, it is advisable to wait approximately 12 hours post-application before washing. Studies in the early 2000s reported an approximate 95% efficacy of 5% permethrin, while a 2020 survey in Germany indicated an efficacy rate ranging from 80% to 100% [3]. However, more recent studies in Austria and other regions have reported lower treatment efficacy than previously observed [4,5]. Although permethrin-resistant scabies mites have not been definitively identified, an increase in cases suspected to involve treatment resistance highlights the need for caution.

**Table 1.** Drugs available in Korea for the treatment of scabies

Drug (product)	FDA approval for scabies treatment	Domestic approval (class)	Usage (dosing)
Topical 5% permethrin (Omecclean, 30 g cream/tube)	Yes	Yes (prescription drug)	- Adult: 25–30 g (1 tube) - 6–12 years: 15 g (1/2 tube) - 2 months–5 years: up to 7.5 g (1/4 tube)
Topical 10% crotamiton (Uracin, 50 g ointment/tube)	Yes (only for adults)	Yes (over-the counter drug)	Adult: 25–30 g (1/2 tube)
Oral ivermectin (Stromectol, 3 mg/tablet)	No	No (orphan drug) Indication in KOEDC - Failure or nonadherent to topical treatment - Widespread institutional outbreaks	- 15–24 kg: 1 tablet - 25–35 kg: 2 tablets - 36–50 kg: 3 tablets - 51–65 kg: 4 tablets - 66–79 kg: 5 tablets - ≥80 kg: 200 µg/kg - Adult dose: 9–15 mg/d

FDA, Food and Drug Administration; KOEDC, Korea Orphan & Essential Drug Center.

### *Topical 10% crotamiton*

Crotamiton has received approval from the U.S. FDA for the treatment of scabies infections in adults, boasting an efficacy rate of about 60%. The typical regimen involves daily application for 3 to 5 days (e.g., on days 1, 2, 3, and 8), with each application left on the skin for 8 hours. Due to its relatively lower efficacy and instances of treatment failure, crotamiton is generally used as a secondary option when first-line treatments, such as topical permethrin or oral ivermectin, are not suitable. Crotamiton is favored in clinical practice for pediatric patients due to its minimal skin irritation and anti-itch properties. In Korea, its use is also sanctioned for children, though it is advised to limit extensive application in infants and young children.

### *Topical 5%–10% sulfur*

Sulfur is considered safe for use in infants under two months of age and in pregnant women. It is typically applied nightly over three consecutive days, with the final application being washed off the next day. However, its unpleasant odor and propensity to stain may deter its use. While sulfur-based formulations are not commercially available in Korea, they can be self-prepared or imported for use.

### *Topical 1% lindane*

Lindane was previously approved by the U.S. FDA; however, it is no longer produced or used due to concerns over neurotoxicity.

### *Oral ivermectin*

Ivermectin, introduced in 1981, remains the sole oral medication for treating scabies, with a half-life of 12–56 hours. Although the FDA has approved it for treating other parasitic infections such as strongyloidiasis and onchocerciasis in the U.S., clinical experience has also established its safety and efficacy for scabies. In 2001, France authorized the use of ivermectin for managing scabies outbreaks in institutional settings. It is typically employed when the first-line topical treatment, permethrin, is unsuitable or ineffective. In Korea, ivermectin is imported under the brand name Stromectol and is classified as an orphan drug, necessitating specific administrative procedures for its prescription in hospitals (Supplement 2).

Ivermectin does not eliminate scabies eggs. Therefore, for classic scabies, a dosage of 200 µg/kg is administered twice, 1–2 weeks apart, to coincide with the mite's life cycle. This is followed by an evaluation of the treatment's efficacy. Taking ivermectin with food increases its absorption [6]. Its safety in children under 15 kg and pregnant women has not been confirmed, although serious side effects are rare in infants and pregnant women who have taken it [7,8]. Consequently, it may be considered when other treatments are either unavailable or have failed. While some practices combine oral ivermectin with topical agents, the effectiveness and evidence supporting this combined approach in the treatment of classic scabies have not yet been conclusively established.

### **Treatment of crusted scabies**

- The medications used to treat crusted scabies are similar to those for classic scabies; however, the frequency of application and dosage may differ.
- Due to its high transmissibility, isolation is recommended to prevent the risk of spreading the infection.
- While some cases of scabies are treated solely with topical permethrin, in countries where oral ivermectin is accessible and approved, it is often used concurrently. For crusted scabies that is resistant to topical permethrin alone, a combination of oral ivermectin and topical

treatments may be considered. However, there are currently no standardized guidelines regarding the frequency and intervals of topical applications or their combination with oral medications for treating crusted scabies. Typically, permethrin ointment is applied daily for one week and then twice weekly until no mites or eggs are detected [9]. Ivermectin is administered on days 0, 1, 7, 8, and 14, with optional additional doses on days 21 and 28 [7]. The treatment regimens for ivermectin are categorized into three phases based on the severity of the symptoms of crusted scabies: Phase 1 includes days 0, 1, and 7; Phase 2 includes days 0, 1, 7, 8, and 14; Phase 3 includes days 0, 1, 7, 8, 14, 21, and 28 [8].

- The removal of the thick crust associated with crusted scabies aids in treatment. Consequently, keratolytic agents such as 5%–10% salicylic acid, 10% urea, and 5% lactic acid, which are not typically used in treating classic scabies, can be employed to enhance drug penetration and improve treatment efficacy.
- If secondary bacterial infections with organisms such as *Streptococcus pyogenes* or *Staphylococcus aureus* are present, appropriate antibiotics should be administered [9].

### Precautions in scabies treatment

- Simultaneously treat individuals who have been in contact with or are cohabitating with a scabies patient.
- For classic scabies, thoroughly apply the medication from the neck down to the feet, covering all skin areas. This includes under the nails and in skin folds, such as the groin. After applying the medication, it should remain on the skin for an adequate period (at least 8 hours) before it is washed off.
- For infants, young children, and certain older adults with scalp or facial involvement, the treatment should be applied over the entire body, including the face and scalp.
- Wearing plastic gloves during application is recommended, as excessive absorption of the medication through the palms can cause numbness, tingling, or a stinging sensation.

### Treatment failure

Typically, itching from scabies subsides about three days after the application of scabies treatment. However, if itching persists or worsens without improvement, initially improves but then intensifies again, or if new burrows or skin lesions emerge, or mites are still detected within 7–14 days post-treatment, treatment failure should be considered. It is important to note, however, that persistent itching alone should not be immediately considered a sign of treatment failure. Itching may continue for several weeks due to hypersensitivity reactions to the mites or their waste products, even after all mites have been eliminated.

Common causes of treatment failure include improper treatment, continued close contact with untreated infected individuals, inadequate disinfection of clothing and bedding, and the use of topical steroids during treatment. Drug resistance is also suspected as a potential factor. Treatment failure can occur even with highly effective ointments if the treatment is not applied thoroughly or if instructions are not followed carefully. However, if instructions are followed diligently and the medication is applied thoroughly, most cases of recurrence are due to reinfection from untreated carriers of scabies [10].

### Treatment for children, pregnant women, and institutional outbreaks

#### Children

Permethrin is approved by the FDA as a first-line treatment for children over 2 months old and

has well-established safety data. However, in Korea, it is only approved for use in children aged 2 years and older [6,11]. For children, unlike adults, the application should cover all areas of the body except around the eyes and mouth, including the face [12]. Crotamiton may be considered a second-line treatment, although it is less effective and requires a longer treatment duration than permethrin [13]. Sulfur ointment is safe for use in very young infants under 2 months old; however, it is not commercially available in Korea. Lindane is contraindicated in children [5]. The safety of ivermectin has not been established for children weighing less than 15 kg [6].

***Pregnant and breastfeeding women***

Permethrin is considered safe for use in pregnant and breastfeeding women and is recommended as a first-line treatment by the Centers for Disease Control and Prevention (CDC) [6]. However, it is not approved for use in pregnant and breastfeeding women in Korea. Therefore, it is important to adhere strictly to the recommended dosage and application guidelines to avoid any potential risks. When applied, less than 2% of the permethrin dose is absorbed systemically [14]. While it is unclear whether permethrin is excreted into breast milk, it is advisable to pause breastfeeding for five days after its application. Sulfur ointment is also considered safe for pregnant and breastfeeding women, but it is not commercially available in Korea. Lindane, on the other hand, is contraindicated for use in pregnant and breastfeeding women [15]. The safety of ivermectin during pregnancy has not yet been established [6].

***Treatment in institutional outbreaks***

Mass treatment for scabies is recommended in areas where it is endemic or for managing outbreaks in closed community settings [7]. In situations involving suspected transmission within a community or institution, such as healthcare facilities or nursing homes, it is advisable to treat all individuals at risk, regardless of whether they exhibit symptoms. Oral ivermectin is the preferred option for mass treatments due to its ease of administration compared to topical treatments. Typically, a single dose of oral ivermectin is administered at 200 µg/kg [16], and evidence suggests that a second dose one week later may improve treatment efficacy (Table 2) [17].

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## Scabies-related itching

- The itching associated with scabies can significantly affect quality of life and may continue for some time even after all mites have been eradicated. This necessitates proactive management from the onset.
- Moisturizers, oral antihistamines, and topical steroids can help alleviate itching associated with scabies.

**Table 2.** Summary of drugs for scabies treatment in children, pregnant and breastfeeding women

Drugs	Use in children	Use in pregnancy	Use in breastfeeding
Topical 5% permethrin	Safe in children ≥2 months (FDA)	Approved	Not recommended
Topical 10% crotamiton	Safe in children	Not recommended	Not recommended
Oral ivermectin	Not approved in children <15 kg or 5 years of age	Only recommended in France	Only recommended in France

FDA, Food and Drug Administration.

### **Mechanism of itching in scabies patients**

The itching associated with scabies infection is thought to involve multiple immunological mechanisms, including hypersensitivity reactions to the mites and their secretions [18]. The innate immune response, primarily driven by the complement system, plays a significant role, with substantial involvement of mast cells. The T-cell-mediated response varies between classic scabies and crusted scabies: a Th1 response is predominant in classic scabies, while a Th2 response prevails in crusted scabies. Notably, in crusted scabies, there is an observed infiltration of CD8+ T-cells within the dermis and increased apoptosis of keratinocytes, which can exacerbate the itching [19].

Additionally, the increased expression of Toll-like receptors-3, -4, and -7 in peripheral nerves due to scabies mites, along with the activation of protease-activated receptor-2 by proteases secreted by the mites, and certain IgE-mediated allergic reactions are considered direct causes of scabies-related itching. Immune responses involving macrophages, prostaglandins, and leukotrienes also contribute to the itching. Furthermore, secondary bacterial infections may exacerbate the itching through interleukin-31 expression and Toll-like receptors activation [20].

### **Treatment of itching in scabies patients**

Many scabies patients experience severe itching, which disrupts their sleep and diminishes their quality of life, necessitating proactive itch relief treatment. For patients with concurrent skin or systemic conditions that induce itching, such as atopic dermatitis or chronic kidney disease, intensive treatment from the start is advised. These conditions may foster an environment conducive to mite survival due to compromised barriers or immune abnormalities, potentially exacerbating the itching associated with scabies [21].

Standard approaches typically include moisturizers, topical corticosteroids, and oral antihistamines as the first line of treatment. Moisturizers help restore the skin barrier and prevent dryness, which aids in relieving itching [7,18,22]. Antihistamines are commonly chosen for initial treatment, with first-generation antihistamines also aiding in improving sleep for scabies patients [23]. Topical steroids can help manage inflammatory itching; however, their use should be limited to areas of intense itch. Topical calcineurin inhibitors, such as tacrolimus and pimecrolimus, are effective, particularly for nodular scabies lesions [24]. While systemic steroids are generally avoided due to potential side effects like immunosuppression or increased blood glucose, short-term use may be considered when severe itching persists after mite eradication [25]. Narrow-band UVB phototherapy is considered a safe option, even for pregnant women and children [26].

In some cases, contact dermatitis may occur after applying topical scabicides. Should this happen, treatment with oral antihistamines and topical steroid ointments is recommended [18,27]. If traditional treatments do not alleviate the itching associated with scabies, alternative therapies, including protease-activated receptor-2 inhibitors, Th2 cytokine inhibitors, transient receptor potential channel modulators, and gabapentin-class antidepressants, might be considered [20]. While these medications are not typically used in everyday practice, research has demonstrated their efficacy in relieving itching.

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## **Prevention and infection control**

- Scabies patients require contact precautions or isolation until 24 hours after the final application of treatment.
- Close contacts should receive a single preventive treatment, even if they are asymptomatic,

- and should then be monitored for the development of symptoms over a 6-week period.
- The patient's clothing, bedding, and linens must be laundered and dried using heat. Additionally, medical equipment and items, as well as the surrounding environment that the patient has touched, should be disinfected with alcohol or other standard methods.
  - When a case of scabies is identified, it is essential to isolate the patient, manage contacts, and control the environment to prevent transmission (Table 3).

**Patient contact precautions and isolation**

Effective management of scabies patients is essential to prevent transmission and ensure optimal treatment outcomes. For classic scabies, it is important to adhere to contact precautions throughout the treatment period. Patients should avoid close contact with others until 24 hours after the final treatment application or until a physician confirms that the risk of transmission has decreased. At home, physical contact between the scabies patient and other household members should be minimized, and sharing personal items should be avoided. In healthcare settings, patients may be isolated in a single room or placed in cohort isolation, depending on the resources available at the institution. For crusted scabies, which is highly contagious, more stringent precautions are necessary. Contact tracing and disinfection measures should be expanded. Patients should remain in single-room or cohort isolation until a physician confirms that the risk of transmission has decreased. Healthcare providers, caregivers, and family members should continue to observe contact precautions.

**Table 3.** Recommended measures for scabies prevention

	Classic scabies	Crusted scabies
Isolation	- Maintain contact precautions for up to 24 hours after the last treatment or until the doctor determines that the infectiousness has subsided.	- Isolate in single rooms or cohorts until the doctor determines that the infectiousness has subsided.
Contact management	- Administer preventive treatment once. - Medical staff, employees, caregivers, and family members should wear disposable gloves and gowns and perform hand washing before and after contacting the patient. - Observe for symptoms for 6 weeks, considering the incubation period.	
Room management	- For rooms used by scabies patients, clean daily using a dedicated vacuum cleaner or disposable absorbent cloth during the isolation or treatment period. - For rooms that have been vacated or after a patient has been discharged, clean and disinfect using standard methods. - Empty the vacuum cleaner bag daily, clean the dust collection tube, and dispose of the absorbent cloth as infectious medical waste.	
Item management	- Disinfect diagnostic equipment such as dermoscopes, blood pressure cuffs, stethoscopes, and wheelchairs using standard methods before they are used by another patient. - Clean beds, sofas, etc. with a vacuum cleaner. - Put items that cannot be laundered in a plastic bag and store them for at least 7 days before reuse. - Discard any remaining medication used by scabies patients.	
Laundry management	- Machine wash in hot water at 50°C for 10–20 minutes and dry at a high temperature. - Laundry handlers should wear disposable gloves and gowns. - For items that cannot be laundered, store them in a plastic bag for at least 7 days and dry them at 50°C or higher. - Manage all laundry the patient uses for at least 3 days before treatment and change the patient's clothing, bedding, and towels daily.	
Patient's home management	- Clean the entire house with a vacuum cleaner daily during the isolation or treatment period. - Machine wash and dry contaminated clothing, bedding, towels, etc. in hot water at 50°C for 10–20 minutes. - For items that cannot be laundered, store in a plastic bag for at least 7 days and dry at 50°C or higher.	



### Contact management

Given the potential for asymptomatic latency lasting several weeks, it is essential to manage contacts of scabies patients effectively. When a case occurs within a family, all close contacts, including cohabitants and family members, should undergo simultaneous treatment, regardless of whether they exhibit symptoms [7,27,28]. Generally, both children and adults can return to daycare, school, or work the day after treatment. However, in some instances, their return may be postponed until the completion of treatment is confirmed.

Close contacts should receive a single preventive treatment and be monitored for symptoms over a 6-week period. For hospitalized scabies patients, healthcare staff, caregivers, and family members must wear personal protective equipment, including disposable gloves and gowns, during contact with the patient and adhere to hand hygiene practices. Healthcare personnel who have been in contact with scabies patients may return to work the day after receiving preventive treatment. Any staff member who develops symptoms should immediately stop working, undergo diagnostic testing, and receive treatment if diagnosed [21,23,27–32].

### Environmental management

Scabies mites can survive off a human host for 48–72 hours, but they generally cannot live longer than 3 days in the environment. They are killed by exposure to temperatures above 50°C for 10 minutes. In households where a scabies case has occurred, any clothing, bedding, or towels used by the patient within the past three days should be machine-washed in hot water (above 50°C) for 10–20 minutes and dried on high heat. Items that cannot be washed should be sealed in plastic bags for at least seven days, then tumble-dried at high heat for 10–20 minutes at temperatures of 50°C or higher.

In healthcare facilities and nursing homes, patient rooms must be cleaned daily during isolation periods. This cleaning should be performed using either a dedicated vacuum cleaner or disposable absorbent cloths. The bags or containers of the vacuum cleaner should be emptied and cleaned daily, with disposable bags being replaced as needed. Additionally, the interior of the vacuum should be sanitized. Absorbent cloths used in the cleaning process must be disposed of as medical waste. Shared medical equipment, including dermoscopes, blood pressure cuffs, stethoscopes, and wheelchairs, must be disinfected with either alcohol or diluted bleach after each patient use.

Laundry from scabies patients requires careful handling on treatment days. It should be sealed in a plastic bag and placed in a designated contaminated laundry bin. Subsequently, it should be machine-washed at a temperature of 50°C or higher for 10–20 minutes and then heat-dried. Staff responsible for handling this laundry must wear personal protective equipment, which includes disposable gloves and gowns, and ensure that the patient's laundry is kept separate from other items. Additionally, medical waste from scabies patients should be disposed of in dedicated containers.

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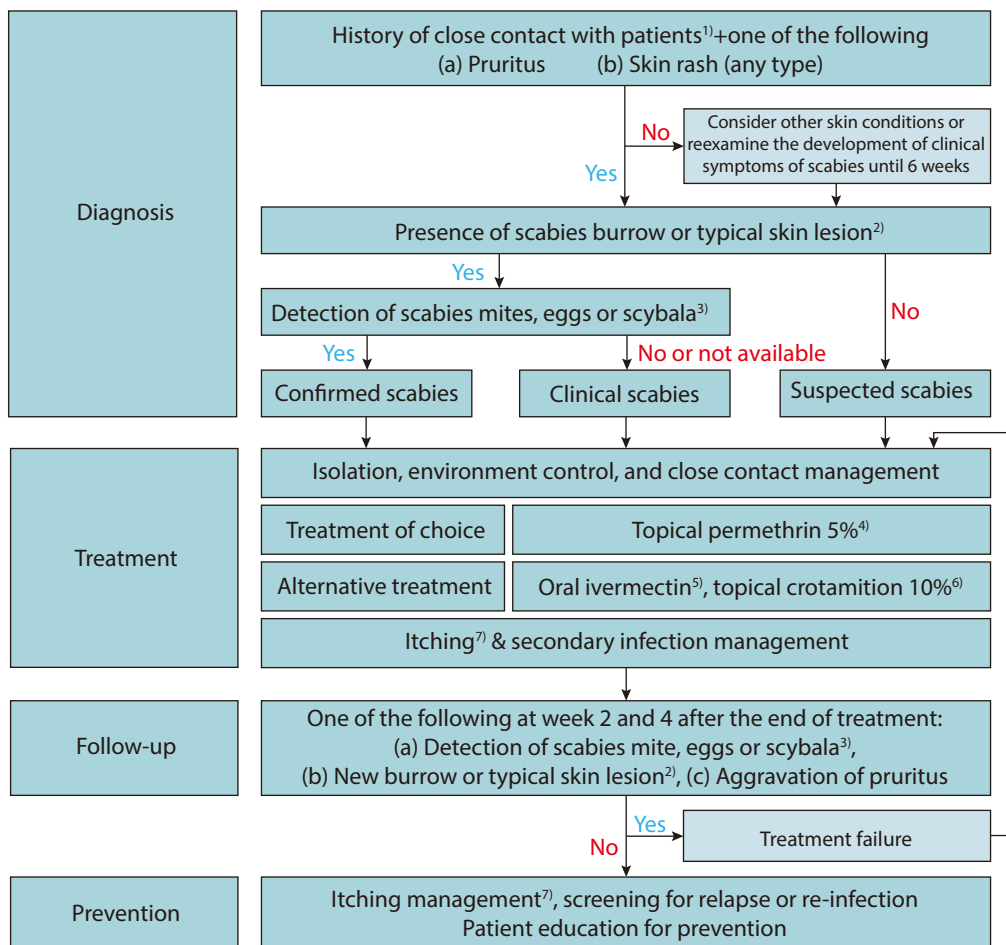
## Conclusion

The Scabies Eradication Public Health Project Committee of the Korean Dermatological Association has developed clinical practice guidelines specifically designed for Korean patients. These guidelines are based on medical evidence, consensus among domestic scabies specialists, and external validation. They provide a comprehensive overview of the epidemiology, clinical symptoms, diagnosis, treatment, follow-up, prevention, and management of scabies in Korea. Additionally, a clear and concise diagnostic and treatment algorithm is included to aid



healthcare professionals in making quick decisions during scabies consultations (Fig. 1). We hope these guidelines will serve as a reliable and practical resource for the treatment and prevention of scabies, ultimately contributing to improved public health.

These guidelines should be applied based on the healthcare provider's knowledge and clinical experience, taking into account each patient's specific circumstances, clinical subtypes, and



**Fig. 1.** Proposed algorithm for the diagnosis and treatment of scabies in Korea. <sup>1)</sup> One of the following: (a) Skin contact with an individual diagnosed with scabies, (b) sexual contact with an individual diagnosed with scabies (especially nodular scabies), (c) brief direct contact with linens (such as towels, clothing, and bedding) used by an individual diagnosed with scabies (especially crusted scabies); <sup>2)</sup> One of the following: (a) Typical erythematous papules or vesicles in a typical distribution including the periumbilical area, inner thigh, buttock, axilla, inner forearm, (b) multiple nodules in genital area or axilla, (c) multiple papules, vesicles, or pustules in the palmoplantar distribution of an infant; <sup>3)</sup> Light microscopy, dermoscopy, or other high-resolution imaging techniques including could be used; <sup>4)</sup> In general, apply on the whole body, except the face and scalp, at least 30 minutes after taking a shower. For treatment of infants and older adults, it should be applied to the lesion on the scalp and face; the recommended doses are as follows: 25–30 g (1 tube) for adults, 15 g (1/2 tube) for ages 6–12 years, and up to 7.5 g (1/4 tube) for ages 2–5 years; cleansed out after at least 8–12 hours of application. Application is repeated after 7–10 days. For crusted scabies, 5% permethrin cream should be applied daily for a week, then twice weekly until any mite or egg is not identified. However, 5% permethrin cream is not permitted for use in patients aged <2 years and pregnant or lactating women in Korea; therefore, Centers for Disease Control and Prevention guidelines recommend using 5% permethrin cream in patients older than 2 months and pregnant or lactating women; <sup>5)</sup> For classic scabies, the recommended dose is 200 µg/kg twice weekly; For crusted scabies, ivermectin is administered on days 0, 1, 7, 8, 14, 21, and 28. Safety in patients who are pregnant or weigh <15 kg is not established; <sup>6)</sup> Apply repeatedly for 3–5 days (i.e., days 1, 2, 3, and 8), and leave on for at least 8 hours; it can be used for children and pregnant or lactating women cautiously; <sup>7)</sup> Emollients, H1 antihistamines, topical or systemic steroids (in selected cases), topical calcineurin inhibitors, and narrow-band ultraviolet B could be used.

the available healthcare environment. Additionally, we anticipate further research on scabies involving Korean patients, which will facilitate the development of systematic clinical guidelines supported by new clinical evidence.

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### Supplementary materials

Supplementary materials are available from: <https://doi.org/10.12771/emj.2024.e72>.

Supplement 1. Methods of administering drugs to treat scabies

Supplement 2. Ivermectin supply flow chart

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