The scourge of scabies

By Nerida Firth

Learning objectives
After reading this article you should be able to:
• Describe the cause, mode of transmission and symptoms of a scabies infestation.
• Advise on appropriate therapy for scabies and provide key counselling points.
• Understand the need for vigilant monitoring for scabies infestations in residential care facilities, and the necessity for prompt treatment to prevent large outbreaks throughout a facility.

Competency standards (2010) addressed:
6.1.1, 6.1.2, 6.3.1, 6.3.3, 7.1.4

Accreditation number:
CAP110101a

Case study
Mrs GW presents to your pharmacy with the news that the residential care facility where her mother resides is experiencing a scabies outbreak. She is seeking information about scabies, and advice regarding treatment.

Key questions to answer
What is scabies?
Scabies is an infectious dermatological condition caused by Sarcopes scabiei variety hominis, an eight-legged parasitic mite that is barely visible to the human eye. The female mite is 0.3–0.4 mm long and 0.25–0.35 mm wide, while the male is less than half that size. These mites cannot jump or fly, but they can crawl across warm skin at a rate of 2.5 cm per minute.\textsuperscript{1,2}

The scabies mite life-cycle is completed entirely on humans and consists of four stages – egg, larva, nymph and adult. Only the female mite burrows into the outer layer of skin, where she lays up to three eggs a day. The male mite spends its time searching for an unfertilised female.\textsuperscript{1–3} Two to three days after an egg is laid by a fertilised female in an epidermal burrow, it hatches into a larva which migrates to the surface of the skin. This larva moults into a nymph before becoming a mite. The entire maturation process (from egg to mite) lasts approximately 15 days.\textsuperscript{1–3} In a classic case of scabies, a patient may be infested with anywhere from five to 15 mites.\textsuperscript{2}
The characteristic symptom of scabies is intense itching due to both the infestation and a hyper-reaction to the mite and its products (egg cases and faecal pellets). On initial infestation, onset of symptoms occurs after an incubation period of 2–6 weeks, during which time sensitisation occurs as a result of an adaptive immune response. If reinfested, symptoms may develop within one to four days, as the immune system recognises the mite antigens and responds immediately.2,3,4

Crusted (or Norwegian) scabies is a more severe infestation of the Sarcoptes scabiei mite and occurs in elderly, immunosuppressed, debilitated and institutionalised patients, and in Indigenous Australian communities. A patient with crusted scabies may host thousands to millions of mites, and is covered in a scaly, crusted rash, although itching may be absent.4,5 The extent of the infestation is generally due to the compromised immunity of the patient, although cases reported in Indigenous Australian communities appear to occur even when there has been no diagnosed immune deficiency to date.4,5

Identification

Positive identification may be confirmed by microscopically examining skin scrapings for the presence of mites, or their eggs and faeces. However, as patients with classic scabies have low mite populations, a scraping of a burrow may contain no traces of mites at all.2,7 If microscopic analysis of scrapings returns a negative result, it may be practical to treat with a scabicide anyway and observe for a response to treatment.8

Identification of scabies is difficult as a patient’s symptoms may be subtle and vary from the clinical norm. Burrows are not always visible and may be obscured by scratches, and the rash may be on the trunk away from burrow sites. If the patient does not fall into a risk group, and scabies is not expected to be present, misdiagnosis may occur.3,8

Immediate and correct identification of both forms of scabies is imperative to prevent further infection. This is especially critical for patients in institutional settings such as hospitals and residential care facilities.3,8

What are the symptoms of scabies?

Scabies is characterised by intense itching and a red papular rash. The thin, slightly elevated, wavy grey-white burrows are specific for scabies, but are rarely visible to the naked eye and are often absent. The burrows are commonly found in finger webs, between toes, in the flexures of the wrist and elbow, the armpits, groin, buttocks, the lower abdomen, male genitals and the area surrounding the nipples in women.2,8 Infestation of the face, head, palms and soles is not often seen in adults, but is common in infants.4

Itching is often worse at night when the patient is in bed or after a hot bath, as the body is warmer and the mites are more active. This intense itching may disrupt sleep.3 Scratching often leads to secondary bacterial infections. Nodules may develop on the elbows and on the penis and scrotum and manifest as firm, dull red or brownish masses. These lesions may persist for months after successful scabicalid treatment.3 Thick crusting and scaling of the skin is characteristic of crusted scabies, although it is sometimes misdiagnosed as psoriasis.3

How is scabies transmitted?

Transmission of scabies is by direct skin contact with an infested person. The scabies mite cannot fly or jump, so being in close proximity does not lead to transmission. A dislodged mite uses heat and odour to find a new host. For the stimuli to be strong enough, close skin contact of approximately 20 minutes is thought to be required. Examples of this include holding a baby, sleeping in the same bed and sexual intercourse.3,6 Brief contact such as a quick handshake is generally not sufficient for transmission.

Crusted scabies is more easily transmitted than classic scabies due to the presence of large numbers of mites.3,5 In these cases, brief skin-to-skin contact as well as fomites (items such as bed linen, towels and undergarments, with which an infested person has been in contact) can also transfer the parasitic mite.5 The higher the parasite burden, as is the case with crusted scabies, the greater the risk that mites will be shed into fomites. The scabies mite can survive off a human host for up to 24–36 hours in an average room environment.3,4,9 However, conditions of higher humidity and lower temperature may prolong this period.11 Therefore, fomites should be viewed as infectious for a conservative 2–3 days after being in contact with an infested person.6,7

Scabies cannot be caught from animals.3 The scabies mite that causes mange in cats and dogs cannot reproduce on humans. While these mites may cause local irritation on a human for several days, the infestation is self-limiting and does not need treatment.1,3,8

How can transmission be prevented?

Immediate diagnosis of scabies must be made to prevent spread. Anyone who has had close physical contact with the patient should be notified and treated with a topical scabicide. For the patient to have crusted scabies, where even minimal contact is a concern, then all contacts should be notified. All clothes, bed-linen and towels with which the patient has come into contact in the 72 hours before diagnosis must be laundered in a hot wash (at least 60°C), placed in a hot dryer for 30 minutes, or dry-cleaned. Items that cannot be washed should be sealed in a plastic bag and left for seven days and then laundered.2,5,6,8,12

Minimising close physical contact between the patient and others in closed community or institutional settings is recommended to prevent further spread. This includes excluding a young patient with classic scabies from school or childcare, or assigning a specific cohort of staff to attend to patients with crusted scabies in aged care facilities and hospitals.1,2,4,14,15 Patients diagnosed with crusted scabies in these aged care facilities and hospital settings may need to be isolated due to the difficulty associated with effective treatment.3,5,8,14,15

When is treatment of scabies recommended, and for whom?

On confirmation of a scabies diagnosis, all of the patient’s close physical contacts and members of the affected household (and their close physical contacts) must be
Counselling points for effective use of permethrin 5% cream \(^{1,4}\)

- Apply topically to dry skin from the neck down at night after bathing
- Leave cream on overnight (or for 8–12 hours) and wash off the next morning
- Suitable for adults and children over the age of six months
- Treatment of choice for pregnant and lactating women
- Reapply treatment in seven days to ensure complete eradication of newly hatched mites.

Recommended permethrin doses – approximate amounts for a single treatment \(^{12}\)

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult</td>
<td>up to one tube</td>
</tr>
<tr>
<td>5-12 years</td>
<td>up to half a tube</td>
</tr>
<tr>
<td>1-5 years</td>
<td>up to one-quarter of a tube</td>
</tr>
<tr>
<td>&lt;1 year</td>
<td>up to one-eighth of a tube</td>
</tr>
</tbody>
</table>

Counselling points for effective use of benzyl benzoate 25% emulsion \(^{1,4}\)

- Test on small area of skin for 10 minutes before using
- Apply topically to dry skin from the neck down at night after bathing
- Leave treatment on for 24 hours and wash off well
- For children under two years of age, dilute 1 part emulsion with 3 parts of water
- For children between two and 12 years of age, dilute emulsion with equal parts of water
- Reapply treatment in seven days to ensure complete eradication of newly hatched mites.

### Severity of crusted scabies

<table>
<thead>
<tr>
<th>Severity of crusted scabies</th>
<th>Frequency of dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less severe</td>
<td>days 1 and 8</td>
</tr>
<tr>
<td>Moderately severe</td>
<td>days 1, 2 and 8</td>
</tr>
<tr>
<td>Severe</td>
<td>days 1, 2, 8, 9 and 15, with 2 further doses on days 22 and 29 for extremely severe cases</td>
</tr>
</tbody>
</table>

Irrespective of the topical treatment chosen, correct use and vigilant adherence is imperative for successful treatment. Important practice points that should be emphasised to all patients include:

- Reapply treatment to hands if they are washed during treatment period.
- Pay particular attention to ensure complete coverage of hands and genitalia. A nailbrush should be used to ensure medicament is applied under nails.
- Apply treatment to the face, scalp, neck and ears in infants (under two years old), older adults (over 55 years of age), immune-compromised patients, patients who have experienced treatment failure previously or those with atypical or Norwegian (crusted) scabies.
- Take care to avoid spreading treatment into eyes and onto mucous membranes.
- All family members and close physical contacts should be treated simultaneously to reduce chances of re-infection.\(^{6,12,11}\)

Crusted scabies requires a more vigorous treatment regimen due to the high mite population, and involvement of a dermatologist or an infectious diseases physician is recommended. Patients may be treated with regular applications of a scabicide, or oral ivermectin. The standard dose of ivermectin for patients aged five years and over is 200 µg/kg, while the frequency of dosing depends on the severity of the case.\(^{9}\)

Patients should be warned that itching may continue for up to three weeks after successful treatment. It is important that patients do not reapply treatment after the first two applications.\(^{3}\) Instead, they may apply a moderately potent topical corticosteroid to the rash two to three times a day.\(^{9}\) Cool baths may be soothing, and avoiding hot baths may prevent worsening of itch. Concurrent application of a simple emollient may also provide some relief.\(^{29}\)

Scabies nodules may last for months after the infestation is eradicated; however, a topical corticosteroid may be useful to minimise their size. In the case of persistent nodules, intralesional corticosteroids are sometimes administered to hasten resolution.\(^{9}\) Secondary infections should be treated as for impetigo, with either dicloxacillin or flucloxacillin.\(^{9,11,13}\)
Is follow-up treatment necessary?
All scabicides have a higher success rate if repeat applications are used on two occasions, seven days apart. If treatment with permethrin fails, then benzyl benzoate should be used.9

Is treatment necessary if patient is asymptomatic?
Anyone with symptoms of scabies after contact with a patient diagnosed with either classic or crusted scabies should be treated with the same regimen as the patient.12 Asymptomatic persons who have had close physical contact with a diagnosed patient should be informed of their possible exposure and advised to undertake pre-emptive treatment.3,8,11,12 Similarly, these people should notify their close physical contacts to warn them of the possibility of infection and need for treatment.3,8,11,12,15

What are the consequences if scabies is left untreated?
Left untreated, the red papules that form around the burrow entrances may develop into vesicles and bullae. With time these may become secondary scabies lesions, which include excoriations, eczematisation, crusts and secondary infections.2,3 Streptococcus pyogenes that resides on the skin is primarily associated with secondary bacterial infections, as is Staphylococcus aureus.3,4 Cellulitis, boils and lymphangitis can result as a consequence of these infections. Acute post-streptococcal glomerulitis is an observed consequence of secondary infections of scabies with S. Pyogenes. The high incidence of rheumatic fever in indigenous communities is suggested to be attributable to this same secondary infection.3,4 Both streptococci and staphylococci bacteria have been cultured from mite faecal pellets and skin burrows, suggesting that the mites themselves may contribute to secondary infection.4

From an environmental health perspective, untreated scabies increases opportunistic spread of infection and is particularly problematic in an aged care facility or hospital. In these closed community settings it is common for numerous cases to be encountered simultaneously.1,2,4

Does this scabies outbreak mean that the residential aged care facility is of poor quality?
Scabies outbreaks in residential facilities and hospitals are not an indication of poor quality, just as scabies is not a result of poor hygiene or poor standards of care.4,8

Case study
Mrs GW should be advised that her mother, the other residents and staff at the residential care facility should all be treated immediately. All residents should be assessed to determine whether any have crusted
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scabies in an attempt to determine the source of the outbreak. Mrs GW should treat herself and her family with topical permethrin, and wash all fomites in a warm wash cycle. She should also be advised that anyone who has had close contact with her family since she visited her mother should be notified and advised to discuss the need for treatment with their pharmacist.

Key learning points

Scabies infestations are quickly spread through prolonged, direct contact. Therefore, immediate identification of cases is imperative, as is correct adherence to prescribed treatment. Permethrin is the treatment of choice due to its high level of efficacy and low level of toxicity, and is suitable in pregnant and lactating patients. Once identified, everyone who has had close physical contact with the infested patient or their fomites must be treated immediately, even if they are asymptomatic. This prompt action will reduce the chance of further transmission, and of previously treated patients being reinfected. Closed community settings, such as residential care facilities and hospitals, are common settings for scabies outbreaks because transmission is fast, and the majority of residents fall into the risk category for crusted scabies.

References


Questions

1. **Which statement is incorrect with regard to crusted (Norwegian) scabies?**
   a) Crusted scabies predominantly affects the elderly, immunosupressed or institutionalised patients.
   b) Patients with crusted scabies are infected with the Sarcoptes scabiei mite, as are patients with classic scabies.
   c) Patients with crusted scabies are treated with both ivermectin and a topical scabicide.
   d) A patient with crusted scabies is generally infested with twice as many mites as patients with classic scabies.

2. **Which statement is correct with regard to the symptoms of a scabies infection?**
   a) Scabies is characterised by intense itching, red papules and thin, wavy grey-white burrows may also be present.
   b) Scabies nodules do not develop on the elbows, penis and scrotum.
   c) The itching associated with scabies is due to the presence of the mite, and ceases three to seven days after application of a scabicide.
   d) Thick scaling and weeping nodules are characteristic of crusted (Norwegian) scabies.

3. **Which statement is correct with regard to transmission of the scabies mite?**
   a) Scabies can be caught from animals.
   b) Crusted scabies can be transmitted via brief, close contact and fomites.
   c) Dislodged scabies mites use sight and hearing to find a new host, and therefore close contact is required for these stimuli to be strong enough.
   d) The scabies mite can jump from one person to another.

4. **Which statement is correct with regard to treatment options for scabies?**
   a) Poor patient compliance is a limitation to the use of benzyl benzoate 25% emulsion.
   b) Permethrin is approved for use in all age groups.
   c) Treatment should be reapplied 21 days after initial application of a scabicide to ensure complete eradication of the scabies mite.
   d) Permethrin is not a suitable treatment for pregnant and lactating women.

5. **Which statement is not an appropriate counselling point for patients?**
   a) Reapply treatment to hands if they are washed during treatment period.
   b) Pay particular attention when applying treatment to hands and genitalia. A nailbrush should be used to ensure medicament is applied under nails.
   c) In most cases treatment needs to be applied to the entire body, including face, scalp, neck and ears and left on for an advised period of time (permethrin: 8–12 hours; benzyl benzoate: 24 hours).
   d) All family members and likely contacts should be treated simultaneously to reduce chances of re-infection.