

# A Comprehensive Review Study on Scabies and its Associated Impact on Psycho-Social Health of an Individual

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**Abstract:** Scabies is a common skin disorder. It is caused by a mite called *Sarcoptes Scabiei*. *Sarcoptes scabiei* is an arthropod that burrows into the skin and live and reproduce there. The class is Arachnida, subclass acari, family sarcoptidae. The mites are usually not seen with naked eye. The parasite burrows into the epidermis of the skin using it as a shelter and it leaves the eggs inside. Scabies is a disease transmitted by direct skin to skin contact with the infected person or with his items such as clothing or blankets used by the infected person and so on. After a while as an immune reaction this will cause an intense itching and skin rash especially in fingers, axilla, wrists, areola and genitalia. In this comprehensive review study, we are going to discuss the histopathology and life cycle of causative agent, disease transmission, sign and symptoms, prevention and psychosocial impact of an individual

**Keywords:** Scabies, *Sarcoptes scabiei*, Arachnida, Acari, Itching, Pruritus.

## 1. INTRODUCTION:

Scabies is a common skin disorder. It is caused by a mite called *Sarcoptes scabiei*. The mites are usually not seen with the naked eye. The parasite burrows into the epidermis of the skin using it as a shelter and it leaves the eggs inside. After a while as an immune reaction this will cause an intense itching and skin rash especially in fingers, axilla, wrists, areola and genitalia [1]. Scabies is highly contagious as it is passed most of the time by direct skin to skin contact. Sometimes sharing items like clothing, furniture and beds with an infected person will cause scabies. This way of transmission is not common because of the survival of this parasite outside of human body will only last for a few days. Scabies is manifested in all group of people irrespective of their race and ethnic. Anyone can get scabies. It does not matter how old the person is, his socioeconomic status, race [2].

## 2. Types: There are two types of scabies: Classic scabies and Crusted scabies

- **Classic scabies** is manifested by pruritus as an immune reaction, in response to the presence of mite, mite feces and eggs. It is more severe at night because the burrowing used to happen at that time. The burrow will appear as a grayish line on the skin of the patient. Symptoms usually appear in 2 to 6 weeks and can take up to 2 months in some cases, but it is possible to spread scabies prior to that. People who had scabies before, will have symptoms appearing in just a couple of days.
- **Crusted scabies** also known as Norwegian scabies is a more severe form of the classic scabies. Crusted scabies is present in the immunocompromised groups such as those with acquired immunodeficiency syndrome, the elderly and patients with down syndrome. Because resistance capacity of body of individuals in these groups are weak, the mites used to able to reproduce faster and therefore a higher number of mites will be found that can reach up to millions. Itching is minimal in this case of scabies. Crusts used to find on the skin. These patches used to turn to scales and fissures used to appear and cover the entire skin [3].

**3. Causative agent:** Scabies is a disease caused by *Sarcoptes scabiei*. *Sarcoptes scabiei* is an arthropod that burrows into the skin and live and reproduce there. The class is Arachnida, subclass Acari, family Sarcoptidae. The size of female mite is 0.3 to 0.45 mm long and 0.25 to 0.35 mm wide and can't be seen by naked eyes, while the size of a male is about half of that size of female. It has 3 pairs of legs in the larval stage and develop into 4 pairs in the nymph and adult stages

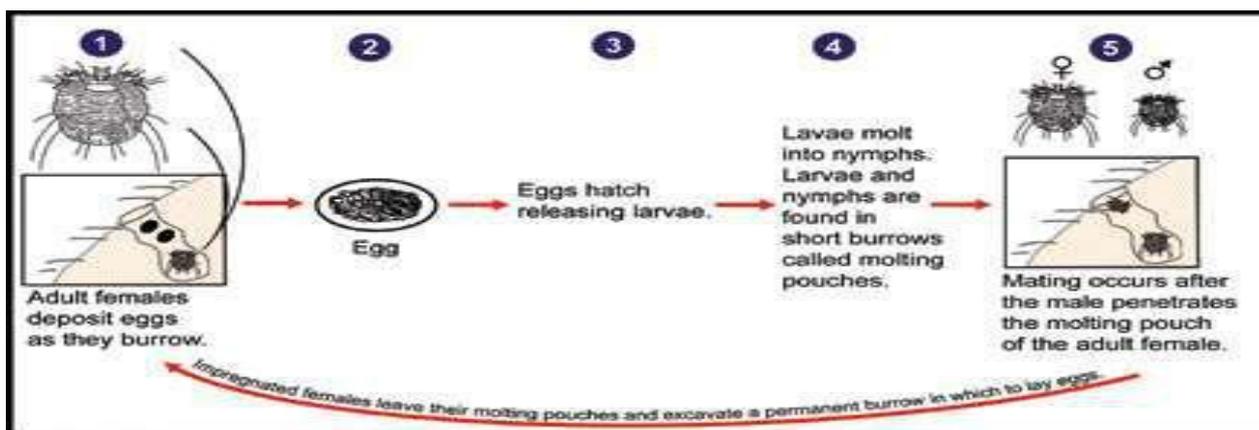
[4]. They attach to the skin of humans by the two most anterior pairs of legs, which has sucker like pads attached to it called pulvilli. There are many species of scabies and some only infest in animals

[5]. These species which affect animals can also infest in human and causes itching, but they don't reproduce on humans, so they are self-limiting. [6][8] (Figure 1).

**4. Life cycle:** *Sarcoptes scabiei* has four stages in its life cycle. It starts with an egg, hatches into larva, molt into a nymph and then adult. Life cycle begins with the impregnated female as it lay 2-3 eggs per day as they are making tunnel like holes in the epidermis of the skin. Eggs needs three to four days to hatch into larva. The larvae migrate back to the skin and make their own smaller holes called molting pouches. The larval stage lasts roughly 3 to 4 days before it molts into a nymph. Both larva and nymph usually found in the molting pouches and they look like adult except they are smaller. Nymph molt again into a slightly larger nymph then molt again into an adult. Breeding takes place when the adult male penetrates the molting pouch of the female. The fertilized women remain fertile and capable of laying eggs for the rest of her life and after that it's called impregnated female. The female then leaves their pouches and goes back to the surface of the skin and wander until they find a convenient place to burrow in. During wandering on the skin, they attach to the epidermis by sucker like pulvilli. If not attached they die within 2-3 days in normal room temperature. After the females found its suitable place they start burrowing into the skin while laying eggs and continue lengthen that tunnel until they die after 1-2 month. Usually about 10% of the eggs gives rise to the adult mites. Male is not usually seen on the skin; they tend to make shallow tunnels on the skin to feed before they find a female burrow and breed. [6] [10] (figure 2)



Figure 1: Morphology of *Sarcoptes scabiei* [29]



Transmission occurs primarily during person-to-person, skin-to-skin contact. Occasionally transmission may occur via fomites.

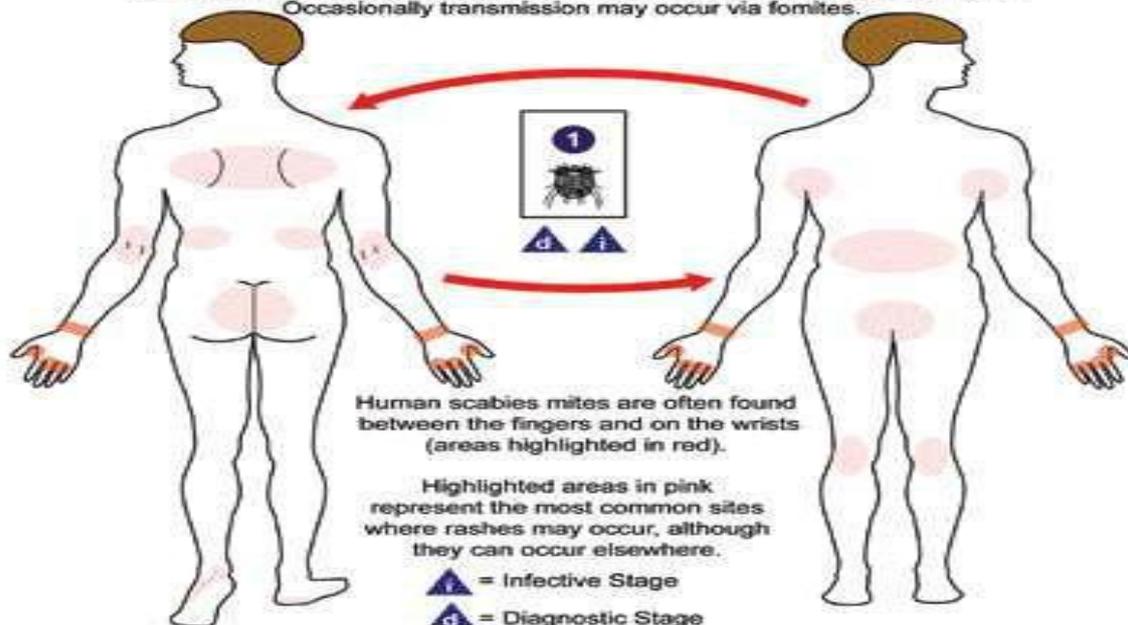


Figure 2: Life cycle of scabies mite [30]

### 5. Transmission:

Scabies usually transmitted through direct skin to skin contact with prolonged period. This usually occur among family members and sexual partners. It occurs primarily by the transferring of impregnated female. Less often classical scabies can be transmitted via fomites via clothing, bedding, or any other object. While crusted scabies can spread easily by fomites due to higher parasite burden. Scabies can be epidemic in very crowded

### 6. Sign and Symptoms:

When an individual is infected with scabies, the mite burrows the skin, so the signs and symptoms take time before begins. In an infected person, the body needs time to develop the reaction and due to that the symptoms arise within 2 to 6 weeks. In case of previously infested patients, the symptoms arise within 1 to 4 days. Also, there are two clinical variants of scabies, the classic scabies and crusted scabies [11]. In classic scabies the main feature is itching and pruritus that become very severe and usually become worse at night. The mite, mite eggs, and mite feces causing pruritus because of the delayed-type hypersensitivity reaction. Also, affected areas becomes scratched and excoriated because of itching, so it can lead to secondary bacterial infection in these areas and can lead to sepsis, which is very serious life-threatening condition that develops when the infection spread into blood.

Another obvious sign of scabies is rash (figure 3) which causes little bumps that often form a line and they are multiple small, erythematous papules. Also, the Burrows (serpiginous lines, thin, red, gray or brown) (figure 4) are a characteristic finding, but sometimes they are not visible because of the excoriation or any secondary infection. Also, the rash can develop to scaly patches that look like eczema. Moreover, the sores developed from scratching rash.



Figure 3



Figure 4

Figure 3: Rash in scabies infection [29]; Figure

### 4: Burrows (serpiginous lines, thin, red, gray or brown) in scabies infection [29]

The distribution of rash involves in many areas ( figure 5), particularly in sides and webs of the finger, flexor aspects of the wrists, anterior and posterior axillary folds, peri areolar skin (especially in women), waist, periumbilical skin, extensor surface of the knees, male genitalia.

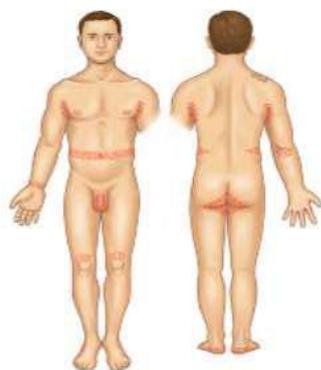


Figure 5



Figure 6

Figure 5: The distribution of rashes [29]; Figure 6: Nodular scabies [29]

Nodular scabies which is a type of classic scabies. The main characteristics feature is skin nodules rather than rash and the usual sites are axillary folds, genitalia, groin and buttocks (figure 6) [12]. In case of crusted scabies (which is also known as keratotic scabies, boeck scabies, scabies crustosa and norwegian scabies) numbers of mites can reach up to 4,000 and more, comparing with the classic scabies which are around 10–20 mites. It is a serious condition of the scabies and can occur when the person have weak immune system due to a disease condition or elder age. Also, the patient has many crusts on the skin, and it look grayish and can easily crumble with the touch [13].

### 7. Histopathology:

Histopathologic findings in scabies are epidermal spongiosis (intercellular edema) and mixed infiltrate in the dermis layer with lymphocytes, eosinophils and histiocytes. In case of crusted scabies thickness in stratum corneum occurs. Biopsy specimen can indicate the mites and eggs and they look pink, pigtail-like structures in the stratum corneum [14][15]

### 8. Diagnosis and deferential diagnosis:

Diagnosis of scabies is not an easy tusk because of the clinical features of scabies could be like other diseases which may confuse the physicians. But, by the right way of following the diagnostic procedure, the physician eventually can reach to the right diagnosis. In case of scabies, we can divide the diagnostic procedure into two phases.

- The presumptive diagnosis (History and physical examination).
- The definitive diagnosis (investigations).

The first thing is taking the history and followed by the physical examination. In the history, the most important point is looking for any member of the family with similar symptoms of scabies. While in the physical examination, examine the patient's skin from head to toe looking for signs of mites, including the characteristic burrows [16][19]. History and physical examination both are not enough to make the diagnosis, and the misdiagnosis may occur because some of the symptoms of the scabies are much similar to other conditions, such as [16]:

- a. Impetigo: bacterial infection involves the superficial skin.
- b. Eczema: a common rash that often occur without obvious cause.
- c. Folliculitis: infection and inflammation of hair follicles
- d. Dermatitis herpetiformis: a chronic blistering skin condition.
- e. Immunologically mediated disease:
- f. Bullous pemphigoid: an acute or chronic autoimmune skin disease.
- g. Flea bites: fleas are tiny and irritating insects.

The second step is laboratory investigation which helps in the definitive diagnosis. These are mainly microscopic examination. Microscopic examination mainly consists of skin scarping and Skin biopsy. Other important examinations are Ink burrow test and Dermatoscopy.

In case of skin scarping, the skin from the affected area is scrape with the help of scalpel and examine the sample under the microscope, looking for mites, eggs, or fecal matter. If the skin scarping results are negative, a skin biopsy used to perform in order to confirm the diagnosis [17] [18]. Dermatoscopy is the examination of the skin by using a handheld dermatoscope to allow visualization of specific signs indicate to scabies. It is an accurate method for diagnosis of scabies when performed by trained practitioner. Finding small, dark triangular structures at one of the ends of the burrows which indicates to presence of the mites [19].

The last test which is the simplest test is the ink burrow test. This test help to identify the burrow which caused by the scabies mites. The method is to apply special ink on the area of skin that appears to be burrow, then wiping the ink away with an alcohol pad. If the patient infected with scabies, the S pattern of the burrow will appear across the skin

[16]. By these two phases of diagnosis, the physician can diagnose the scabies properly and treat the patient.

### 9. Treatment and management:

Oral ivermectin and topical permethrin used to be the first-line treatments in the United States, United Kingdom, and Australia. Malathion, topical sulfur, Benzyl benzoate, crotamiton, topical ivermectin and lindane are examples of other treatment agents. Permethrin is a synthetic agent disrupt the neurotransmission of the insect, by impairs the function of its voltage-gated sodium channel. In adult patient, 30 g is enough for single application. After 8-14 hours, it's should be removed by washing shower or bath. Skin irritation is a potential adverse effect [28] [22]. Oral ivermectin is alternative to permethrin. By meta-analysis and systematic review of randomized trials, topical permethrin and oral ivermectin appeared to have similar effective[23].The administration is easy. It is useful when there are large scabies outbreaks, where the topical treatment can be impractical. It is not recommended as a first-line treatment for lactating

and pregnant women and kids who weigh less than 15 kg. Most reports of severe side effect have occurred in patients with helminthic infections. Benzyl benzoate is commonly used in low-income countries because its low cost. It is very irritant and shouldn't be used in children. Topical sulfur primarily used in treat neonate and pregnant women and this is also relatively inexpensive. Lindane may cause systemic toxicity, so it is not commonly use due to its side effect. This is contraindicated in children under 2 years of age, as well as lactating and pregnant women, due to the possibility of severe fever. It is commonly used when the other therapies failed or contraindicated. This is relatively low-cost treatment but there is concern about resistance of this treatment. Only a thin layer (i.e. 30 g of cream) is applied to the entire patient body. Other useful agent is Crotamiton, but it is less effective than permethrin. Another agent uses to be prescribed is Malathion. But disadvantages involve for Malathion is flammability of its components and relatively high cost [21] [22]. For the crusted scabies combination treatment between permethrin plus oral ivermectin is preferred as the first-line treatment. Due to lindane toxicity, it is contraindicated in patients with crusted scabies. A topical scabicide (e.g. permethrin) is one of the most common treatment for the scabies. It's smeared on the infected patient and removed after 8-14 hours.

#### **10. Precaution during treatment period:**

During the treatment, some important precautionary steps should be taken. All parts of the skin under neck should be included in the local application of agents. If the infected patient is young (up to age 2 years), then the scalp, face, and the neck should be included in the area of application by treating agent. All people who have a direct contact with the infected patient should be treated, even if asymptomatic. If the patient washes his/her hand during the treatment period, then the scabicide should be reapplied. To avoid reinfection, the patient clothes need to be washed or clean (preferable at 60-degree C). The pruritus may persist for up to 4 weeks (sometimes months) after the treatment, so the patient should be informed. To control the pruritus, use corticosteroids and oral antihistamines [20].

#### **11. Complication:**

Secondary bacterial infection, usually local but sometimes cause systemic complications.

Group A streptococcal infections can occur which may cause an acute poststreptococcal glomerulonephritis. Staphylococcus aureus infections cause impetigo, ecthyma, and furuncle. In crusted scabies, it may lead to sepsis, especially in older adult and immunocompromised patients. Postscabietic pruritus may last days or weeks (sometimes months), due to hypersensitive reaction to scabies mites and product. Patients rarely develop generalized urticaria. Psychologic issues such as embarrassment and delusion of parasitosis can occur. Generalized lymphadenopathy commonly occurs in crusted scabies. [24] [25].

**12. Prevention:** Scabies is a disease transmitted by direct skin to skin contact with the infected person or with his items such as clothing or blankets used by the infected person and so on. Symptoms associated with scabies sometimes do not appear for two months after the infection for those who are infected by scabies for the first time but can transmit the disease even if there are no symptoms associated with scabies. The most effective way of transmitting scabies is by direct skin to skin contact for a prolonged period [25]. Effective treatment for scabies is usually suggested to all members of the family for patient infected with scabies, especially those with direct skin to skin contact with the patient, to prevent any possibility of re-exposure of scabies again in people around the patient. The items that have been used within 3 days before treatment should be washed with hot water, whether they are clothing or blanket and so on. People with scabies and their close contacts, including family members should be treated with them as soon as possible and aggressively to prevent the spread of scabies. The room used by the patient with scabies should be cleaned with an electric vacuum cleaner after use. Items that can not be washed it should be placed in a closed place and inside a plastic bag and left for a few days in order to prevent the mites from eating which leads to their death. To prevent outbreaks of scabies there should be an early detection of scabies, implementation of isolation practices and appropriate control, in addition to treatment. There should be a high indicator of uncertainty in institutions when there is a non-diagnosed skin rash and that could be scabies, even in the absence of some signs or symptoms associated with scabies for example no itching. There should be a comprehensive examination of all patients and staff and search for any possibility of matching the symptoms of any person with the symptoms associated with scabies. The doctor who will do the skin tests should be qualified and experienced in the determination of scabies. Proper control and isolation are very important by wearing gloves and gowns and avoiding direct skin contact when helping patients with scabies. [25] [26] [27].

#### **13. CONCLUSION:**

Scabies is a well-known condition manifested in the skin and it is caused by the transmission of impregnated sarcoptes scabiei female. There are two types of scabies, the classic one and a more severe type called crusted scabies (Norwegian). Scabies mostly transmitted through prolonged direct skin to skin contact which usually occur in crowded places. The most Symptoms are rash, itching and a secondary bacterial infection due to stretching. Diagnosis is done by taking the history and doing the physical examination, then the investigations will give the definitive diagnosis. Oral

ivermectin and topical permethrin used to be the first-line treatments. Malathion, topical sulfur, Benzyl benzoate, crotamiton, topical ivermectin and lindane are examples of other treatments. The complication of scabies includes secondary bacterial infection, Postscabietic pruritus and psychologic issues. The generalized lymphadenopathy is common complication in crusted scabies. Scabies is transmitted by direct skin to skin contact with the infected person or with his items such as clothing or blankets used by the infected person and so on. The most effective way of transmitting scabies is by direct skin to skin contact for a prolonged period. The items that have been used within 3 days before treatment should be washed with hot water, whether they are clothing or blanket and so on. People with scabies and their close contacts, including family members should be treated with them as soon as possible and aggressively to prevent the spread of scabies. Items that cannot be washed it should be placed in a closed place and inside a plastic bag and left for a few days in order to prevent the mites from eating leading to their death.

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