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The characteristic of scabies, a neglected tropical disease: A literature review

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Abstract

Scabies is a parasitic infestation of the skin caused by Sarcoptes scabiei. Scabies is a common public health problem that occurs globally, affecting approximately 130 million individual. Despite the high prevalence of scabies, scabies is categorized into one of the Neglected Tropical Diseases (NTDs) by World Health Organization (WHO). Scabies can cause relentless itching and specific lesions, but there is also an atypical findings that can be found depending in each individuals patient. Although scabies is not fatal or life-threatening, it can be severe and persistent, and if not treat properly leading to secondary skin infections and also becomes contagious. Literature reviews on the characteristics of scabies are still very limited. Therefore, researchers are interested in conducting research about the characteristics of scabies patients.

Keywords: Scabies; Characteristic; Diagnosis; Classification

1. Introduction

Scabies is an infectious disease caused by a specific host mite, *Sarcoptes scabiei*. The mite is a small, pearl-like, translucent creature with an oval shape and four pairs of short legs. It can survive away from its host for up to 3 days in a sterile environment and up to 7 days when placed in mineral oil. The mite cannot jump or fly (1). According to the World Health Organization (WHO), there were approximately 130 million cases of scabies worldwide in 2014. Cases are often found in children with poor personal hygiene (92.6%), malnutrition (85.7%), low economic status (78.6%), and among people who show very little concern if they are infested (2).

Scabies is one of the diseases that was included in the list of neglected tropical diseases (Neglected Tropical Disease) by the WHO in 2017. The level of public awareness regarding the impact of scabies is still very low. Many people still consider scabies to be a common and neglected disease, leading to uncontrolled morbidity and an increasing prevalence because people who is not being treat properly can spread the mite into healthy people around them. If scabies is not addressed, it will adversely affect the quality of life of those affected, and it can even be said to be disruptive.

As a neglected tropical disease, literature reviews on the characteristics of scabies are still very limited. Therefore, researchers are interested in conducting research about the characterisrics of scabies patients.

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2. Review Content

2.1. Scabies

2.1.1. Definition and etiology of scabies

Scabies is a disease caused by the infestation of *Sarcoptes scabiei* var. *hominis*. The life cycle of this mite begins with an egg, followed by larva, nymph, and finally the adult mite. Infestation with scabies starts when the adult female mite moves from an infected person to a healthy individual. This female mite searches for an appropriate area to burrow into by crawling on the surface of the skin. Once located, it attaches itself to the skin's surface using its ambulacral structures and creates a hole by biting. The mite forms a narrow tunnel as an entryway into the skin. Within 30 to 60 days, this mite will reside in the tunnel within the skin. At night, it continuously attempts to extend its tunnel while laying eggs and excreting waste (3).

Scabies tends to be more prevalent in situations marked by social disruption, overcrowding, and close physical contact, especially when access to clean water is limited. It particularly affects vulnerable groups such as young children, elderly individuals who may be less mobile, and those with weakened immune systems, including people living with HIV/AIDS or other medical conditions (4).

2.1.2. Pathophysiology of scabies

Research using Human Skin Equivalent (HSE) has shown that scabies mites can burrow into the HSE, reaching the epidermal layer, which triggers an inflammatory and innate immune response. Epidermal cells such as keratinocytes and Langerhans cells interact with live mites and their products, including saliva and feces. Inflammation is the initial response and the first line of defense against mite infestation. Scabies mites stimulate fibroblast cells to secrete the anti-inflammatory cytokine interleukin-1 receptor antagonist (IL-1ra), which inhibits the activity of the pro-inflammatory cytokine IL-1. Additionally, products like the feces and saliva of scabies mites contain molecules such as intercellular adhesion molecule-1 (ICAM-1), vascular cell adhesion molecule-1 (VCAM-1), and E-selectin, which suppress extravasation in the skin, thereby disrupting the defense response (5). Scabies is often described as the worst itch, emphasizing how intensely uncomfortable the itching can be. This extreme irritation stems from the scabies mite's actions or the body's immune system reacting to the invader. Specifically, *Sarcoptes scabiei* triggers itching by activating receptors like TLR-3, 4, and 7 on nerve cells responsible for sensing pain and discomfort. This complex interaction makes scabies a uniquely distressing condition for those afflicted (6).

2.1.3. Clinical findings of scabies

Nocturnal pruritus

Nocturnal pruritus is an excessive itching at night disrupts the patient's sleep quality. This is caused by increased parasitic activity when the patient's skin temperature rises at night due to the use of warmer sleepwear and blankets (7).One study showed that the main complaint among scabies patients is itching at night, which was found in 85 patients (98.8%) out of a total of 86 scabies patients who participated as respondents (8). This aligns with the theory that the clinical manifestation of scabies is nocturnal pruritus, which is the occurrence of itching at night due to increased mite activity during this time. The itching is caused by the body's immune reaction to secretions released by the mite and typically appears 4 to 6 weeks after primary infestation. Nocturnal itching associated with scabies may be linked to the temperature of the skin. During colder months, when people tend to use pajamas and heavy blankets, the skin can become warmer, leading to increased itching. In contrast, during the summer, when individuals often sleep with lighter sheets or no coverings at all, the skin temperature is lower, resulting in less frequent and less intense itching (7). WHO also indicating that if a patient experiences reinfestation, the itching will arise within 48 hours after the mites infest the skin.

However in another literature, certain conditions can cause scabies patients not to experience itching symptoms. In patients taking corticosteroids, the clinical symptoms improve, and the itching subsides, although the mites remain in the body and are highly transmissible. In scabies patients with HIV/AIDS, for instance, there is a heightened risk of developing crusted scabies—a condition characterized by a massive number of mites and extreme infectivity—yet these patients rarely exhibit itching symptoms due to their weakened immune systems (9).

Lesion

The characteristic lesions of scabies consist of papules or vesicles at the ends of the tunnels (burrows), which are white to grayish in color, found in many areas such as the spaces between the fingers, wrists, elbows, axillary folds, periareolar region, periumbilical area, genitals, buttocks, and thighs (10). Study in Denpasar, Indonesia found that the most frequently observed efflorescence was the papule type (100%) among 50 scabies cases there (11). In addition to papules, the study also frequently identified lesions in the form of erosions and macules. Furthermore, research conducted at a boarding school also in Indonesia indicated that papules were the most commonly found lesion morphology (86%) among a total of 43 subjects in their study (12). In contrast, a study conducted in Spain reported that the most commonly found lesions were papules (92%), along with burrows (55%) (13).

The clinical presentation of scabies varies depending on the affected individual, leading to diverse or polymorphous lesions. According to existing theories, the pathological lesions in scabies consist of tunnels, known as burrows, with papules and other secondary lesions forming at the ends of these tunnels due to secretions released by the mites. There is also a rare form of scabies called Bullous scabies (BS) that primarily affects older adults.. The condition can cause lesions that cover most of the body, excluding the face and mucous membranes. A diagnosis should be considered for any bullous eruptions accompanied by papules and nighttime itching that respond well to anti-scabies treatments. Treatment for BS generally follows the same protocols as those for classic scabies (14). Very few cases also develop into nodular scabies. A study in China report that there are patients with scabies that from the physical examination found not only a burrows between their fingers but also a dense reddish-brown nodules distributed over the scrotum. However, the scrotal nodular lesions need an additional treatment for the lesions to completely disappeared (15).

2.1.4. Diagnosis of scabies

The diagnosis of scabies begins with a medical history, followed by a general physical examination and microscopic examination. The medical history is conducted to explore the itching complaints experienced by the patient and any history of contact, whether from household members or friends with similar complaints. With adequate lighting, a thorough examination of the patient's skin surface is performed as comprehensively as possible. Every detail must be carefully considered whenever a patient complains of itching in any part of their body, especially if the visible signs are minor. In addition to evaluating areas where lesions are typically found, a thorough examination should also be conducted in other areas, such as the face, to achieve an accurate diagnosis of all regions affected by the infestation (16). The misdiagnosis of scabies is common because the differential diagnosis and some atypical findings found (17). So its very important to properly made the right diagnosis and initiate treatment.

International Alliance for the Control of Scabies (IACS) classification for the diagnosis of scabies

In 2020, the International Alliance for the Control of Scabies (IACS) established three levels of categorization for diagnosing scabies. First, confirmed scabies (Level A) requires direct visualization of the parasite or its products. Then, clinical scabies (Level B) and suspected scabies (Level C) are diagnosed based on clinical symptoms exhibited by the patient. This classification system is primarily used for early diagnosis rather than determining the severity of infection or choosing treatment options. To enhance clarity, the 2020 IACS criteria further divide each category into several subcategories. For Level A, requiring direct visualization, the following subcategories exist: Subcategory A1 involves finding parasites via microscope examination, Subcategory A2 pertains to visualizing parasites using high-powered imaging devices, and Subcategory A3 focuses on identifying mites using dermatoscopy. For Level B, it is divided into Subcategory B1, which includes discovering scabies burrows; Subcategory B2, which observes typical lesions on male genitalia; and Subcategory B3, which notes typical lesions in a classic distribution accompanied by itching and skin contact history. For Level C, it is categorized into Subcategory C1, indicating the presence of typical lesions in usual locations plus one symptom of itching or contact history, and Subcategory C2, which involves the presence of atypical lesions or unusual distributions alongside two symptoms of itching and skin contact history. These classifications help streamline the diagnostic process and ensure consistent application across various settings (18).

Table 1 International Alliance for the Control of Scabies (IACS) Classification

A. Confirmed Scabies	
A1	Visualization of mites, eggs, or feces on skin samples using light microscopy
A2	Visualization of mites, eggs, or feces on an individual using high-powered imaging devices
A3	Visualization of mites on an individual using dermoscopy
B. Clinical Scabies	
B1	Identification of burrows
B2	Typical lesions on male genitalia
B3	Typical lesions in a typical distribution and two history features
C. Suspected Scabies	
C1	Typical lesions in a typical distribution and one history feature
C2	Atypical lesions in an atypical distribution and two history features
History features	
H1	Itching
H2	Positive contact history

(18)

2.1.5. Treatment of scabies

The tratment managment of scabies through medical means is broadly divided into two categories: topical and oral. Treatment options like topical permethrin cream or oral ivermectin can be administered directly to patients to help eliminate the infestation (19). Scabies mites can be found anywhere on the skin. Therefore, the topical medication, permethrin cream, should be applied to all areas of the body, itchy or not, except for the head in adults (20). But, recent studies indicate that there is decreasing efficacy of permethrin cream that has been the standard treatment of choice (21). In a large group of patients where giving detailed instructions isn't practical, oral ivermectin might be considered as an alternative solution (22). This approach ensures effective treatment without relying on individual compliance with topical applications. Managing scabies should involve treating not just the affected individuals but also everyone who has been in close contact with them. It's important to use anti-scabies treatments effectively.

2.1.6. Personal hygiene in scabies

Personal hygiene is one of the easiest efforts that people can undertake to prevent scabies. In addition to being influenced by the community's knowledge of personal hygiene, it can also be assessed by the level of cleanliness in the environment, the availability of clean water, and overall sanitation. The better an individual's personal hygiene, the lower the risk of developing scabies. Various ways to maintain personal hygiene can include establishing habits such as keeping the skin clean, washing hands regularly, trimming nails, changing into clean clothes, not sharing towels with others, and frequently changing bed sheets and pillowcases (23). Without efforts to change behaviors and promote a clean lifestyle within the community, scabies will be difficult to prevent and may easily recur. Research conducted (24–26) all found that male scabies patients outnumber female patients, similar to the findings of this study. It is also assumed that males are more susceptible to scabies and its transmission compared to females due to personal hygiene habits.

2.1.7. Prognosis

Scabies itself is not typically life-threatening, but the intense itching and potential for secondary skin infections can significantly impact daily life. In some instances, a more serious condition known as crusted scabies emerges. This variant is notoriously difficult to treat using standard methods and poses significant challenges because it often leads to continuous reinfection both within the same person and among other individuals they come into contact with (4). So the prognosis of scabies is quite positive but it must be accompanied with prompt diagnosis and treatment. However, in cases involving immunocompromised patients, like people with HIV, or those living in settings like orphanages or dormitories, there is a higher risk of reinfestation. Reinfestation especially common happens in individuals who return to homes that are still infested with scabies, making ongoing management crucial (27).

3. Conclusion

In conclusion, the characteristics of scabies reveal a complex interplay between the mite *Sarcoptes scabiei* and the immune system, resulting some atypical manifestation finding on some individual. But in most people, classic scabies is marked by intense itching, particularly at night, and is often accompanied by distinctive burrows and papular rashes. Vulnerable populations, such as immunocompromised individuals, may experience atypical presentations, including bullous and nodular forms. Despite its non-life-threatening nature, scabies can lead to significant discomfort and complications, including secondary bacterial infections. Understanding the various forms and symptoms of scabies is crucial for effective diagnosis and treatment. Continued are very important to improve the management strategies of scabies and to reduce the spreadness of scabies.

Compliance with ethical standards

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No conflict of interest to be disclsoed.

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