

A study about the General Awareness of Scabies in a Chinese population

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ABSTRACT

Background: Scabies is a global scourge, but in the developing countries it is such a burden to the health care system that it has been suggested to be a highly neglected tropical disease. Despite the number of treatment options available, scabies continues to occur in epidemics, especially in resource poor communities.

Aim: To assess the amount of knowledge that a Chinese population has about scabies.

Methods: A questionnaire survey was carried out among individuals attending the Dermatology and Venereology Out-Patient Department of the Second Affiliated Hospital of Xi'an Jiaotong University. Descriptive analysis was performed. Total and percentage scores were calculated for each of the participants at the end of assessing each form.

Results: Mean percentage knowledge about scabies in the study population was calculated to be 23.88±28.88%. A total of 50% people scored zero in the questionnaire. Only 21 individuals (4.1% of the sample population) had a satisfactory knowledge of 75% and above. Lowest level of knowledge was seen in 15-30 years age group (mean 19.03±26.58%) and 51-70 years age group (mean 20.00±25.20%). Males were slightly more informed (mean 27.22±30.31% knowledge) than females (mean 20.74±27.25% knowledge). Farmers had the lowest level of intelligence with mean 17.41±27.07 % knowledge. The percentage of scabies knowledge was significantly associated with the education level of the individual (p=0.014).

Conclusion: Eventually, the burden to health care systems may increase significantly. It is suggested that the concerned health authorities should actively implement health education programs about the disease in the society, especially in targeted populations such as primary and secondary schools. Continuous medical education should be a must among doctors dealing with scabies.

Keywords: Scabies, epidemics, percentage knowledge, health education

INTRODUCTION

Scabies, first described in 1687¹, is derived from the Latin word 'scabere', which means 'to scratch'. It is a disease where the acarine itch mite *Sarcoptes scabiei* colonizes the skin of a human or an animal, usually after direct skin-to-skin contact with an already infested host.

Studies done so far on scabies, as well as on the more severe and rarer form of the disease, crusted scabies have shed light on its pathogenesis. An entomologist in the United Kingdom, Kenneth Mellanby worked extensively to shape our modern understanding of scabies². It is a pity, however that the available information is not sufficiently utilized clinically for the control, prevention, diagnosis and treatment of the disease. It is also of critical importance to be fully aware of the mechanisms involved in the complicated immunological responses, innate and adaptive, and in the delay between onset of infection and clinical manifestations. Prevention of scabies infestation can thence step up a long way, decreasing the disease burden, both in terms of health and financial costs. The need for a better disease control cannot be under stressed. A heightened emphasis is required on all three levels of prevention, especially targeted in vulnerable areas like endemic and resource-poor settings³.

A rare form of the disease is "crusted or Norwegian scabies". The population group vulnerable to this keratotic form of scabies is the immunosuppressed. They are infested with hundreds or thousands of mites and are minimally symptomatic if at all. Some scabietic patients have the characteristic itch but carry an appreciable number of mites in their skin. This occurs in patients of the "atypical crusted" scabies. Susceptible individuals are usually from institutions, nursing homes, and can also be HIV/AIDS-affected patients.

Transmission: Scabies mites spread continuously⁴. The mode of transmission is through direct human contact, or sometimes indirectly through contaminated fomites such as clothing or quilts.

Movement of the mite through direct contact necessitates prolonged skin-to-skin contact with an infected individual, via for example, holding hands or sexual contact. Approximately 15-20 minutes of close contact are needed for a successful direct

transmission. Contrary to poor countries where scabies is usually not a sexually transmitted disease, rich countries seem to be transmit the disease commonly through the sexual route⁵.

Results for studies done on genotyping confirm that transmission events for *S. scabiei* tend to be localized in time or space, and that the family/household is the focus of transmission⁶.

Other instances where the disease is spread are where the risk of overcrowding is present, like institutions taking care of elderly and day care for the very young. In a kindergarten, transmission was found to occur both through direct contact and fomites, the risk increasing with the time the children stayed during the day. Around 18% of children who stayed full time as well as slept together with other children at noon became infested, while children who arrived in the afternoon did not develop scabies. It is suggested that the particular pedagogical concept of the kindergarten exposed children and staff in an indiscriminate manner to scabies mites through skin contact or through textiles⁷.

Arlian et al. conducted some research that demonstrated the important role of fomites in scabies transmission⁸. Dust samples were collected in households of scabies patients and mites were found to be present in 44% of them. The viability and infectivity of the scabies mites extracted from bed linen used by scabies patient was demonstrated to remain for 96 hours when stored at room temperature⁹. Textiles can act as fomites as deduced by the study conducted in a teaching hospital in São Paulo, Brazil. Twenty three percent of employees of the laundry section developed scabies after contact with the laundry of a patient with crusted scabies¹⁰. In year 2005 however, another study about fomite transmission concluded that the risk of mite spread through textiles is rather low¹¹. In summary, the role of scabies mite transmission through fomites during epidemics remains inconclusive.

Causative agent: Scabies is a serious disease of both humans and other animals. It is caused by infestation of the skin with the ectoparasitic mite *Sarcoptes scabiei* of the family Sarcoptidae. The scabies mite which affects humans is named *Sarcoptes scabiei* var. *hominis*. *Notoedres cati* is the mange mite of cats¹². What we currently understand about the biology and disease processes

caused by the scabies mite is far less, compared to the significant, worldwide impact of the disease¹³.

Although most cases and outbreaks of scabies in humans are caused by *Sarcoptes scabiei* var. *hominis*, the human scabies mite, sometimes animal scabies mites cause a self-limited infestation in humans¹⁴. The scabies mites that cause infestation in humans and in many other animals are physiological variants of the same species, *Sarcoptes scabiei*¹⁵. Both previous and recent studies on the skin-feeding-mite show similar evidence of a limited gene flow between different host-associated populations of the mite. Thus, being host specific, the microbe usually cannot survive for a long period on another host. This discovery has serious impacts on disease control programmes¹⁶.

Incubation period: There is a gap period between the initial infection and the onset of clinical manifestations. This period of time may be variable, but is on average 14 days or more in a primary infestation¹⁷.

Symptoms: The major symptom is itching, which may be intense and most troublesome at night¹⁸. The uncomfortable symptom starts after 3-4 weeks of infestation and stays for a long time period or until the patient is treated. Itching is co-incident with a papular rash eruption. When a person has been infected previously, the symptoms of the current infection start immediately. In Norwegian scabies on the other hand, itch may be little or non-existent¹⁹.

Figure 1: Papules, excoriations and crusts on hands



Figure 2: Scabetic nodule and burrow on male genitalia



Histopathology: Skin biopsy can prove difficult to demonstrate a mite because there are usually a small number of mites that infest the skin in most cases of human scabies²⁰. Common features are found in papular, vesicular, nodular and Norwegian scabies. Perivascular mixed inflammatory cell infiltrate occurs in superficial and deep dermis, consisting of lymphocytes, histiocytes and numerous eosinophils. Specific feature found in the papulovesicular variant is a spongiotic vesicle in the epidermis. Nodules show a denser cellular infiltrate. Crusted scabies give a hyperkeratotic psoriasisiform dermatitis picture on histopathology. In addition, abundant numbers of eggs, larvae and adult mites are seen in the stratum corneum of these patients. In nodular scabies, those are practically never found, and in papulovesicular form, they can be episodically discovered²¹. Pathognomonic pink 'pigtail-like' structures attached to the epidermis have been described by Kristjansson et al., which are thought to represent abandoned egg cases²².

Diagnosis: Resource poor countries rely on clinical diagnosis as the main method of disease ascertainment. Clinical diagnosis is based mostly on a history of itching that is worse at night, and recognizing scabetic burrows in the skin, which are usually apparent at the sites of predilection (the hands between the fingers, wrists, elbows, shoulders, genital area, including the penis,

lower legs, particularly the ankles, the scrotum in males, and the breasts in women) and are almost diagnostic. Presence of scabetic nodules on scrotum in males aids diagnosis tremendously. In addition, the presence of itching in other members of the family is a strong indicator of the possibility of scabies infestation in the patient and among family members²³. Clinical diagnosis of the disease can nevertheless be difficult in certain situations especially when the signs are ambiguous, for example, burrows may not be apparent when the mite burden is low, examination findings may be atypical, and there may be possible confusion with other skin diseases. In tropical areas, papular rash and itching can mean many other skin diseases besides scabies, hence the latter may be hard to diagnose in every patient. Furthermore, the disease severity within a single family often varies widely. Older children may have only few clusters of lesions at limited sites, while the disease may be widespread in infants, even affecting the scalp²⁴. Simple clinically based diagnostic algorithms have been advocated for community-level diagnosis of scabies. In Mali, a diagnostic algorithm has been developed which is based on a simple combination of symptoms and signs. It can be delivered after a single day of training and has a certain accuracy level²⁵. Another algorithm was designed and used in Fiji²⁶. It has also been shown to be useful in field settings.

Several diagnostic physical examination and laboratory techniques are available to help ascertain with certainty the presence of scabies in a patient. Few tests are said to be sufficiently sensitive, specific, cost effective, or useful in the field²⁷. However, due to lack of a true 'gold standard' technique and the inability to define true negatives (i.e., definite scabies exclusion), the assessment of sensitivity and to a lesser extent specificity of the current available methods are severely confounded²⁸. Enhanced diagnostic sensitivity may be provided by dermoscopy-assisted skin scrapings²⁹. One limitation is the operator training that is required. The best way that a diagnosis of scabies is made in reality is by using clinical algorithms (e.g., presence of itching, characteristic lesions, household contact with itch). This method is reported to be highly sensitive (80–100%), but lacks specificity³⁰.

Differential diagnosis: Unfortunately, the correct diagnosis of the mite infestation is frequently made with a considerable delay³¹. Signs and symptoms of scabies are often non specific, and easily mistaken for other inflammatory skin diseases. Many skin conditions can present with the primary scabetic manifestations of small erythematous papules and burrows. These include insect bites, folliculitis, viral exanthema, papular urticaria³², allergic dermatitis, fungal infections³³ among others. Acute papular onychodermatitis may pose a diagnostic dilemma in differentiating from scabies in areas endemic for onchocerciasis³⁴.

Management: Due to the possible explanation of 'herd immunity', scabies incidence exhibits a cyclical pattern with time in some areas of the world. Hence when there is a fall in incidence of the disease, a subsequent rise is to be expected³⁵. vent or contain spread.

General measures: Close body contact should be avoided between patient and their partner(s) until treatment is successfully completed. When patients are explained carefully about the disease and leaflets containing clear and accurate information about the proper method of topical drug application, are given to them, compliance can be expected to be more. Patient's clothes and beddings should be washed with a water temperature of at least 50°C, because they are most probably contaminated. Other members of the family living in the same house, as well as current sexual partners should be examined and treated as well, even if asymptomatic because they could be in the incubation period phase of the disease. Contact tracing should be done for the previous 2 months³⁶.

Drug treatment: Generally, the first line treatments are topical agents. Oral ivermectin is used only in case of recurrent, difficult-to-treat cases, or patients with crusted scabies; though nowadays, there is increasing interest in the drug for the treatment of simple scabies.

If there is an apparent treatment failure with a particular effective combination of antiscabietic drugs, the cause has to be searched and corrected. The diagnosis may be wrong and has to be reviewed. Patient may additionally have dermatitis secondary to the mite or topical agent. Has the patient not understood the correct way of application of topical drugs, treatment failure can occur. Hyperkeratotic skin and nails result in poor penetration of topical drugs. Reinfestation from close contacts (especially those with crusted lesions) is a probability. Drug resistance cause persistence of mites in the epidermis of the patient³⁷.

Topical treatment: It is of utmost importance that proper and specific instructions about the usage of topical acaricides be given to patients. The entire skin surface has to be smeared with the drug, avoiding the eyes, mouth, and areas of non-intact skin, for a specific period of time dependent on the dose and type of drug, and then completely washed off. Children and the elderly specifically need to apply the drug to the head also, contrary to adults, as they more commonly have scalp lesions. However, special precaution of not applying topical drugs to warm or wet skin after bath in an infant or child needs to be taken because of the higher skin absorption.

Many topical agents are gifted with high efficacy. Common drugs used are permethrin (5%), benzyl benzoate (25%), crotamiton (10%), malathion (0.5%) and g-benzene hexachloride (1%, lindane). Cheaper medications like sulphur preparations and benzyl benzoate are usually prescribed in developing countries. Sulphur-containing preparations have the advantage that it can also be used in infants and young children. The main problem with all topical antiscabietics is the associated poor compliance. Side effects can be serious with lindane, permethrin, and crotamiton. However, they appear to be confined to cases where there is improper use of the products.

Permethrin

Permethrin was agreed to be the topical treatment of choice in a recent review. When treatment failure was used as the outcome measure, permethrin was the most effective agent. Compared with one dose of oral ivermectin, permethrin was superior, but when two doses of the oral drug were given 2 weeks apart, the efficacy of both treatment options were almost equal (38). The UK National Guidelines recommend permethrin cream at a dose of 5% to be applied to the whole body except the head, usually at night, and left for 12 hours before washing off. While a single dose may be enough treatment for close contacts of patient, a second application 1-2 weeks later increases the efficacy in patient treatment significantly. In crusted scabies, topical 5% permethrin can be given every 2-3 days for 1-2 weeks along with oral ivermectin. It is a safe drug to be used during pregnancy and lactation.

Malathion: Malathion aqueous lotion has been recommended at a dose of 0.5%, applied to the whole body except the head, usually at night, and left for 12 hours before washing off.

Benzyl Benzoate: The irritant potential of benzyl benzoate is considered too high by the UK National Guidelines on scabies management. Patients of crusted scabies can benefit from topical benzyl benzoate 25% (with or without tea-tree oil 5%) as an alternative drug.

Crotamiton: Crotamiton, as adjunct, may give symptomatic relief in itching. Compared to permethrin cream and malathion lotion, it is ineffective when used alone.

Lindane: Toxic side effects of lindane has caused its withdrawal from the market in many countries.

Alternatives: Some research works have demonstrated alternative acaricides that show promising activity. Essential oils of tea tree (*Melaleuca alternifolia*), lippie (*Lippia multiflora*), neem (*Azadirachta indica*) (39), *Eupatorium adenophorum*, eugenol compounds, and toto soap have been shown to have antiscabietics effect in in-vitro studies. Clinical trials and analysis have been conducted on only few of these compounds, and no conclusion can be reached as to their safety and efficacy. There is a lack of comparisons with currently accepted treatments.

Systemic treatment: The main antiscabietic drug used per oral is ivermectin. Other drugs, like moxidectin, have shown success in the treatment of other parasitic infections, and are emerging as potential therapeutic options against scabies. Oral ivermectin has been demonstrated to be highly efficient in scabies treatment, particularly for Norwegian scabies, epidemics in institutions, and mass administration in highly endemic communities. Several mass drug administration programs have been used to test oral ivermectin at a dose of 200 µg/kg, but it is only formally licensed for scabies treatment in a few countries. It is not approved for the treatment of scabies by the Food and Drug Administration. Single dose oral ivermectin at 200 µg/kg body weight was found to be more effective than two applications of 1% lindane one week apart. Double dose oral ivermectin two weeks apart also had higher efficacy than two treatments two weeks apart of a double- 1% lindane application one week apart. Single dose oral ivermectin can be given in close contacts of patients as a second line drug. In patients of ordinary scabies, it is prescribed at 200µg/kg on day 1 and second dose is given 1-2 weeks apart. In crusted scabies, ivermectin 200µg/kg is given in three (days 1, 2, 8), five (days 1, 2, 8, 9, 15), or seven (days 1, 2, 8, 9, 15, 22, 29) doses, depending on how severe the infection is. Ivermectin is not recommended both for pregnant or lactating women and for children under 15 kg.

Conflict of interest: Authors have no conflict of interest

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