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A Suspected Scabies Outbreak at a Nursing Home

Abstract

Scabies is a parasitic disease of the skin caused by *Sarcoptes scabiei*. Typical symptoms and signs are intense itching, scratching, vesicles, and pustules. Norwegian scabies is a highly infectious disease caused by mite infection in patients with compromised immunological function. The present study investigated a scabies infection at a nursing home. All patients were treated. Differences in the infection rates of scabies and Norwegian scabies in both the elderly and their caregivers at the Nursing home were compared. Though no differences were noted in the infection rate of scabies, the two groups differed significantly in their Norwegian scabies infection rate. It was concluded that the adequacy of immune function had an impact on the infection and spread of Norwegian scabies.

Key words: scabies, *Sarcoptes* ***scabiei.*** Norwegian scabies, keratotic scabies or crusted scabies

Introduction

Taiwan has become an aging society since 1995. More and more elderly are cared for in nursing homes. Consequently the number of

nursing homes has mushroomed. The advantages and disadvantages of caring for the elderly in nursing homes remain to be debated. However, from the medical and public health point of view, poorly administered nursing homes often become sources of disease and infection. For instance, in this particular nursing home on an offshore island, both the elderly clients and the nursing staff developed intense itching beginning February 2001. A scabies infection was suspected, and an investigation was conducted to confirm the outbreak.

Scabies is a parasitic disease of the skin caused by *Sarcoptes scabiei*. Typical symptoms and signs are severe itching particularly at night, and small but highly pruritic vesicles and pustules of the skin, and general pruritis. The Scabies mites are tiny, about the size of a needle head, visible only as a white dot by the naked eye. The larva has three pairs of legs, and the adult has four. Mites penetrate the upper layers of the epidermis to burrow beneath the skin surface. Lesions are prominent around finger webs, the anterior surface of wrists and elbows, anterior axillary folds, belt line, thighs and external genitalia in men; nipples, abdomen, and the lower portion of the buttocks are frequently affected in women. In infants, the head, neck, palms and soles may be involved; these areas are usually spared in older individuals. Itching is intense, especially at night disrupting sleep. Fertilized female mites burrow beneath the skin and stay there for about two months (mites at other times are not infectious). During this period, the gravid mite produces two eggs a day. The eggs hatch into larvae in 3-4 days and then to adults in 10-14 days. Half of the 2 eggs hatched per day become female mites, after 14 days in the first generation, there will be seven female mites. By multiplying the number of eggs produced in each generation by 7, in the sixth generation after 84 days, there will be 33,614 female mites. The infection will spread if it is not

detected and controlled early. The complications of secondary infection from scratching can be serious. The infection occurs primarily through transfer of parasites by direct skin-to-skin contact. Transfer from undergarments and bedclothes is possible. Scabies occurs more often in nursing homes, the armed forces, prisons and schools. In an ordinary infected person, there may only be a few mites present. In mentally retarded, disabled, or bed-ridden persons, persons with immune deficiency, and persons on steroid medication, mites may breed into millions. Skin may become crusted (the Norwegian scabies, keratotic scabies or crusted scabies). Norwegian scabies is highly infectious. Literature has reported cases of persons living together with or caring for Norwegian scabies patients being infected[(1)].

Materials and Method

Patients and nursing staff of a nursing home in Penghu County during the period of February through May 2001 were investigated. The nursing home is a five-storied building open to the public. At the time of investigation, there were 55 residents (28 seriously and 27 moderately disabled patients), and 19 nursing staff, totaling 74 persons. The seriously disabled were cared for in the rooms on the third floor; and the moderately disabled in the second floor rooms. The nursing and other health care personnel lived on the fourth floor. They assisted patients in their rehabilitation, nursing, feeding, tube feeding, sweeping, bathing, scrubbing and doing laundry.

Definition of Case

1. A scabies case was defined as one with itching and visible vesicles, pustules and scratching.
2. A Norwegian scabies case was defined as one with general vesiculation and crusting of skin.

Statistical Method

Data was analyzed with chi-square test. Scabies infections of the elderly residents and the nursing staff were compared for differences. The confidence intervals were set at $p<0.05$.

Results and Discussion

The moderately disabled patients on the second floor began to complain about itching and disruption of sleep in February 2001. The nursing staff and other patients also began to develop similar symptoms. The bed-ridden patients including some diabetic, cardiovascular and spinal injury patients on the second and the third floors began to develop crusting of the skin. Patients still capable of verbal communication complained about itching; and those unable to talk became irritable and sleepless, and their blood pressures became uncontrollable.

The condition of the affected persons worsened, and it appeared that a full-scale outbreak would occur. The physician in charge, suspecting scabies infection, collected and studied some skin specimens of the patients under the microscope to find mites. Some ambulatory patients and nursing staff were sent to a dermatology outpatient clinic for further diagnosis. The diagnosis confirmed scabies infection, and control measures were taken immediately.

All 74 inmates and nursing staff of the nursing home were examined. 59 were found to be infected, with a crude infection rate of 80% (59/74). Of the 28 seriously disabled patients, 24 were infected, with an infection rate of 86% (24/28). Of the 27 moderately disabled patients, 22 were infected, with an infection rate of 81% (22/27). Of the 19 nursing and other anxillary staff, 13 were infected, with an infection rate of 68% (13/19) (see Table 1). No significant difference in infection rates was noted

between the nursing staff and the patients ($p>0.1$) (see Table 2). Of the 59 persons infected, 11 were suspected of having Norwegian scabies, with a crude infection rate of 19% (11/59); 7 of the 24 seriously disabled patients, 4 of the 22 moderately disabled patients, and none of the 13 nursing and other care staff. A significant difference in the infection rate of Norwegian scabies was noted between the nursing staff and the elderly residents ($p<0.05$) (see Table 3).

Medical Care

1. Isolation: the infected and the non-infected were isolated .
2. Disinfection: Undergarments, bed sheets and bedclothes of all inmates (infected and non-infected) were sterilized in 60℃+ hot water. Clothes of the infected were treated separately from the non-infected by boiling until the patients terminated medication. Articles of the nursing and other staff were handled in the same way.
3. Medication: Lotion was applied from head to toe including the back, buttocks, genitalia, navel and finger webs on 3 consecutive days to all residents, nursing and other staff. Treatment was continued for five to seven days for the confirmed cases. In a primary infection, allergic reactions to mites and itching may develop a month later. Persons with no symptoms of itching or vesicles might have already been infected; all 74 inmates needed to be treated. Suspected Norwegian scabies cases were treated for 7 to 14 days with fairly satisfactory results. Some Norwegian scabies cases, developed serious complications of secondary bacterial infection, including cellulitis. Antibiotics were also used. Some patients had to continue medication for 30 to 40 days to be effective.
4. Antipruritics: Itching and vesicles disappeared a month later. In the meantime, antipruritics either oral or for external use, were given to

patients to relieve their discomfort. Antipruritics for external use were only applied locally.

5. Some common anti-scabies ointments or lotions available in Taiwan are:

（1） urax H cream or Ulex: use for 2 to 5 days (opinions vary re. length of treatment), less effective;

（2） Sulfur ointment: general application for three nights after bathing with soap and hot water, effective though smelly and oily; use is recommended for young children and pregnant women;

（3） 25% Benzyl benzoate lotion (BB lotion): for three days with satisfactory results; can be irritating;

（4） Mesulphen-contained ointments (Mitigal, Scalphen): several times a day for three days to kill mites and prevent them from surviving under the skin effective but irritating;

（5） Gamma benzene hexachloride cream (Scabi): the so-called r-BHC; applied for one day to be cleansed after 12 to 24 hours; repeated a week later; fairly toxic; use is NOT recommended for young children and pregnant women; it should be used cautiously in breast-feeding mothers .

（6） Oral ivermectin: not available in Taiwan yet; more convenient than medicines for external use.

Scabies is an easily treatable skin disease if correctly and timely diagnosed and medicated. The infection at the nursing home however took three months, from February to May, to control, and some patients were infected for months. This was due on one hand to the delayed diagnosis, and on the other hand, to oversights on the part of the care givers in the areas mentioned below:

1. Anti-scabies medicines, unlike other skin disease lotions that are applied

only locally, should generally be applied to the whole body from head to toe including the backs, buttocks, genitalia, navel, finger webs and nails. In young children, lotions should also be applied to the head and neck if there are vesicles. Care should be taken to avoid the eyes, nose and mouth. In older children and adults, no application of medication to the head and neck is necessary.

2. Undergarments, bed sheets and bedclothes of the patients should be either boiled in 60℃+ hot water, dried in high temperature, ironed, or sent to laundry shops. Mites die 3-4 days after lack of skin contact with the human body. Some articles that cannot be boiled or dry-cleaned can be packed in plastic bags and left for two weeks for use again. To air quilts and bedclothes under the sun is ineffective as the temperature of the sunshine is not high enough to kill mites
3. Scabies is highly infectious and infected persons usually develop symptoms a month after the primary infection. All persons, not the patients alone, in a family or group who have shared beds, bedclothes or clothes should be given medication with or without symptoms. Application of medication of the children alone is not enough if the mother is not medicated at the same time. In schools, treatment of the infected schoolchildren alone will not be effective.
4. Vesicles, if infected by bacteria, may develop pustules or furuncles. Antibiotics should be used.
5. Animal mites will not breed on humans. If persons infected with animal mites avoid contact with animals, they should recover without medication in a few weeks. Even so, recovery will be faster if the patients are treated with anti-scabies medicines. Animals infected with scabies should be treated properly to avoid spreading infection to other animals or humans.

Conclusion

Reasons for the scabies outbreak at the nursing home were three: 1) new inmates were not closely examined upon arrival; 2) clothes and garments of the inmates were not treated separately; and 3) personal hygiene of some nursing and other care staff needed improvement; some cared for patients without gloves and isolation robes; some of them even infected their children at home causing itchy rashes on their heads and necks.

Suspected Norwegian scabies patients required a longer period of treatment. They carried many mites on their bodies, and some nursing staff members were re-infected. It took a long while to control the infection. Norwegian scabies is highly infectious. Family members and caretakers of patients will inevitably be infected if the infection is not diagnosed in time and patients treated in isolation. Patients with Norwegian scabies require a longer period of medication than those with ordinary scabies. Patients' rooms, clothes, beds and bedclothes should be disinfected in isolation. Nursing staff should always wear gloves and isolation robes when caring for patients.

No significant differences in the infection rates of scabies were noted between the nursing staff and the inmates. Due to decreased immunity however, more inmates than the nursing staff were infected with the Norwegian scabies. Decreased immune function seemed to be associated with the infection and transmission of Norwegian scabies.

Scabies is widespread. It is a common disease treated by dermatology departments in Taiwan. Scabies can be prevented if the following precautions are taken:

1. When staying in hotels, make sure that the hotel changes bedclothes everyday.

2. A single bed is always preferred. Family members away from home, students and soldiers for instance, should sleep in their own beds when they are home. It is best to avoid co-sleeping in the same bed.
3. Members of groups, students in dormitories or soldiers for instance, should never allow others to share their beds, bedclothes and garments. A bed should not be shared when a person is aware of scabies infection.
4. When one is on night duty and has to share a common bed, make sure that bed sheets and bedclothes are changed everyday.
5. Teachers of kindergartens, primary schools and junior high schools should have knowledge about scabies. Infected children should be separated from other children. When parents realize that their children have been infected with scabies at school, the school should be informed in order to identify infected children and give them proper treatment. Treatment of children alone is not enough. This practice also applies to factories and the army.
6. Scabies is more prevalent in nursing homes, homes for the mentally retarded, psychiatric hospitals and prisons. Family members returning from work or visits to these places should be isolated first and examined carefully. If there are suspicious findings, a physician should be consulted.
7. Physicians of all specialties should be able to diagnose and treat scabies. Training of resident physicians in this regard should be improved.
8. In the case of Norwegian scabies, patients should be isolated. All contacts and persons caring for patients should be followed-up and preferably treated.
9. Nursing homes should be inspected often. Measures for disease control at institutions should be formulated and enforced.

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Table 1 Infection of Nursing Staff and Inmates with Scabies

Category	No.	No. Infected	Infection Rate	Suspected Norwegian Scabies
Nursing	6	4	67%	0
Rehabilitation	2	1	50%	0
Bathing and feeding	8	6	75%	0
Laundry	3	2	67%	0
Moderately disabled	27	22	81%	4
Seriously disabled	28	24	86%	7
Total	74	59		11

Table 2 Infection of Scabies by Nursing Staff and Inmates

	Nursing Staff	Inmates	Total
Infected	13	46	59
Not infected	6	9	15
Total	19	55	74

*p=0.096>0.05, χ^2=2.023, no statistically significant differences

Table 3 Infection of Norwegian Scabies by Nursing Staff and Inmates

	Nursing Staff	Inmates	Total
Infected	0	11	11
Not infected	13	35	48
Total	13	46	59

**p=0.0477<0.05, χ^2=3.82, differences in infection rates of Norwegian scabies between the two groups statistically significant.