

Treatment of Housewives' Hand Eczema

—Touching on recent topics—

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Abstract: The clinical features of housewives' (hand) eczema are described, distinguishing between dry and moist forms and the pathogenic factors and mechanism of each form, based on the past three years of patient data from practice at Tokyo Kosei Nenkin Hospital. I will also introduce the recent understanding of characteristics of the hands and the barrier function of the stratum corneum, and describe their relevance to the treatment, prevention, and education in skin care of this condition, touching on recent topics.

Key words: Housewives' eczema; Hand eczema; Stratum corneum barrier; Moisture-retentive agent; Topical steroid

What is Housewives' Eczema?

In current usage, the term “housewives' eczema” is synonymous with “hand eczema,” which is popularly called “sore hands” or “chapped hands”. This skin disease is a type of eczema or dermatitis. Among all parts of the human body, the hands are most frequently exposed to challenging chemicals and environmental conditions. Therefore they are the area most susceptible to skin problems. This term has been used at home and abroad because its incidence is so high among housewives, who have to use their hands frequently during domestic tasks, and in this group it is commonly chronic, recurrent and uncontrollable. In addition

to housewives, others who develop occupational hand eczema include barbers, hairdressers, healthcare personnel, cooks and other food /drink-related service providers, cleaners, and office workers who deal with papers or bills. This disease is commonly seen in dermatology clinics.

In this paper, I will focus on non-occupational housewives' hand eczema and refer to some recent topics relevant to this disease.

1. Statistical aspect

Although the overall clinical incidence of hand eczema, including housewives' hand eczema, has been reported in some Japanese and foreign literature, the actual incidence is

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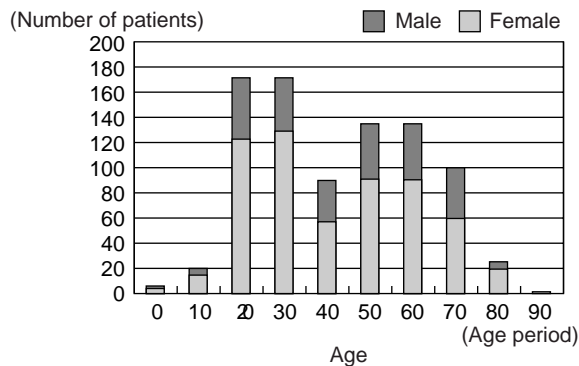


Fig. 1 Number of patients presenting with hand eczema for the past three years by age

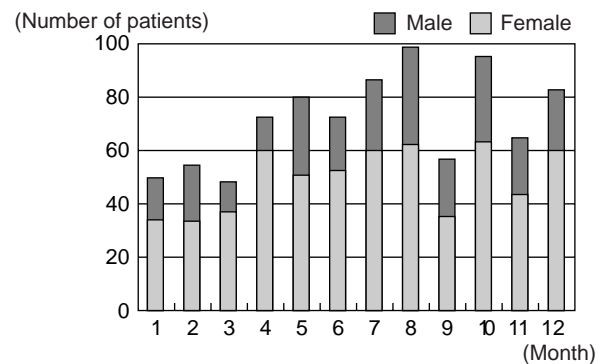


Fig. 2 Number of patients presenting with hand eczema for the past three years by month

unknown. Over 30 years ago (1965), the Lund University (Sweden) department of dermatology conducted a study involving 4,633 patients. The researchers found that the hands were affected in 34% of all patients seen at the department of dermatology, that more than half of these patients had hand eczema, and that women outnumbered men by a ratio of 2 to 1.¹⁾ In Japan, the statistics on patients who visited the Shimane Medical University (Department of Dermatology) for the past 15 years were reported by Jidoi five years ago. According to his report, consistently about 8% of all outpatients had hand eczema, and women outnumbered men by approximately 4 to 1.²⁾ In the department of dermatology of our hospital located in the center of Tokyo, about 5% of all new outpatients seen in the past three years (from 1999 to 2001) had the disease, with a male/female ratio of 1:2.3. The incidence was highest in women in their 20s and 30s, and was also high in patients in their 50s and 60s, followed by patients in their 70s (Fig. 1).

Figure 2 shows the number of patients who visited our department by month. More patients visited in the seasons from spring to autumn (April to October) except September and in December, suggesting a trend similar to the report by Jidoi indicating that the lowest number of patients visited in January and September. Focusing on the number of female

patients, a similar trend was observed: the total number was not higher in winter, except for the dry form of the disease described later. Also, 16% of all patients with eczema and dermatitis (other than atopic dermatitis and seborrheic dermatitis) presented with hand eczema. One-fourth (24%) of these patients were female.

Although simple comparisons cannot be drawn among these results, I have formed the following broad impressions: that the large proportion of outpatients presenting with hand eczema in the past has recently decreased by half although the absolute number of patients with hand eczema has not decreased, that the incidence is more than 2 times higher in females than males in all ages, that women who live in rural areas are likely to develop the condition at nearly twice the rate of those who live in urban areas, and that a higher number of patients visit hospitals in the months or seasons with high levels of activity compared to winter. In conclusion, the onset of hand eczema may be related to two factors, gender and life habits.

2. Clinical features

In practice, both dry and moist forms of the disease are mixed in a given patient. The disease alternately exacerbates and remits and, in quite a few cases, may become chronic. Rough categorization into dry and moist forms facilitates understanding the clinical features of



Fig. 3 Dry-form (KTPP) housewives' eczema
Keratotic inflammation presents as disappearance of fingerprints and gloss. Such inflammation frequently involves the entire area around the distal phalanx, often associated with abnormal nail growth (79-year-old patient).

housewives' eczema.

a. Dry form (Fig. 3)

In Japan, this form of housewives' eczema has been referred to as keratoderma tylodes palmaris progressiva (KTPP),¹⁾ and originates from the tips of the first, second and third fingers (thumb, index and middle fingers) of the dominant hand and progresses centripetally. Left untreated, the disease involves other fingers, and finally all fingers of both hands. Hyperkeratosis or exfoliation with gloss and redness in the fingertips appear, frequently accompanied by the disappearance of fingerprint pattern. In this case, fissures and pain are apt to occur. Coverage with an adhesive bandage such as a Band Aid as first aid causes inflammation leading to further exacerbation. This is the stage when many patients visit hospitals for the first time. Deformations of the nails, such as vertical and horizontal lines and roughness are commonly observed because the entire fingertip is affected, suggesting that the condition has become chronic.

Itching is mild and rarely involves the back of the finger other than the end phalanx. Once



Fig. 4 Moist-form housewives' eczema
The eczema occurs acutely and is associated with severe itching and inflammation. The forearms and dorsal hands are also affected. In many cases, an allergic mechanism is suggested (43-year-old patient exacerbated by rubber gloves).

developed, the disease frequently relapses and becomes chronic. It tends to occur and exacerbate particularly in winter. According to the statistics presented by Jidoi, 98% of the patients with KTPP were female and the disease occurs in winter at higher incidence.²⁾

b. Moist form (Fig. 4)

In the moist form of housewives' eczema, severe itching and redness/inflammation as well as the appearance of small vesicles and effusion are observed. The backs of hands and fingers are frequently affected, in addition to the palms. Since this disease develops acutely, many patients presenting with this disease visit hospitals at an earlier stage. Some patients visit hospitals because the skin under a ring is affected and the resultant inflammation does not allow the ring to be removed. Some combination of irritative dermatitis due to detergents and other agents and delayed allergy to nickel or rubber gloves is indicated. Unlike the dry-form eczema KTPP described in the previous section, the moist form is observed throughout the year.

3. Pathogenic factors and mechanism

Pathogenic factors of housewives' eczema appear to include both endogenous and exog-

enous factors. Endogenous factors include atopic predisposition, and local hyperidrosis. Patients who have these predispositions are thought to have a higher incidence of hand eczema.³⁾ According to a questionnaire investigation of 6,666 twins two years ago by Bryld *et al.* (Denmark), hand eczema occurs in identical twins with nearly double the incidence seen in pairs of fraternal twins; however, any predisposition is related to the onset, though whether it is atopy or contact allergy is unknown.⁴⁾ However, this hypothesis is debatable and we cannot know whether either of these factors is essential.

a. Dry form

The dry form of hand eczema (KTPP) is an irritative and nonallergic contact dermatitis. The disease is initiated in two steps. The first step is the removal of skin surface lipid (delipidation) in the course of domestic chores that may involve frequent hand washing with soap, detergent and hot water, repeated use of alcohol cottons or organic solvents such as acetone and benzene, and frequent contact with newspapers or other papers. The second step is exposure of the skin to different chemicals involved in these domestic tasks. Therefore this type of eczema can occur in anyone who encounters these conditions. Chemicals such as surfactants can denature protein.¹⁾

b. Moist form

The moist form of eczema may occur primarily due to allergic contact dermatitis. The disease develops only in individuals who are sensitive to certain substances, and each patient seems to respond to a specific sensitizing substance. The variety of sensitizing substances is wide. Commonly encountered sensitizing substances for housewives' eczema include metals such as nickel, chromium, and cobalt, perfume, hair-dye, permanent wave liquid (especially type 1), and rubber or synthetic gloves. The range of known causative agents is now expanding to foods, including spices, and gardening-related substances. Also, contact urticaria (immediate allergy) has been caused

by fresh seafood and the latex protein in natural rubber gloves, which can exacerbate housewives' eczema. When there is a suggestion that these allergic mechanisms may be involved, an aggressive search for the causative agents is necessary, using patch or prick tests.

Understanding the Characteristics of the Hands and the Barrier Function of the Stratum Corneum

1. Characteristics of the hands

The palms have a peculiar skin structure, which is related to the fact that the hands are the body part most frequently exposed to external stimuli. The stratum corneum of the palms consists of approximately 50 layers, and is much thicker than the skin on other parts of the hands (about 15–20 layers). Also unlike the facial skin, the stratum corneum has no hair follicles and sebaceous glands. In areas where hair follicles are present, the super surface lipid membrane overlying the stratum corneum is predominantly produced by the sebaceous glands associated with hair follicles, while in the palms and soles the membrane is composed exclusively of lipid produced by metabolism of epidermal cells. The super surface lipid membrane is well developed in the face, whereas the membrane in the palm is thinner, which is compensated for by a thick stratum corneum. Additionally we should understand that the back of the fingers distal phalanx has no hair follicles and that the nail margins and fingertip have the same properties as the palms and finge-pulps.

2. Barrier function of the stratum corneum

It has been shown that homeostasis of barrier function of the stratum corneum is maintained primarily by three factors; 1) surface lipid, 2) intrinsic hydrophobic lipid of the stratum corneum such as ceramide, and 3) natural moisture-retentive factors. Among these factors, ceramide has recently emerged as an important contributor to the moisture-retentive barrier.

Table 1 Housewives' Hand Eczema: Main Points of Treatment and Prevention

	Treatment	Prevention (daily life education)
Dry (KTTP)	moisture-retentive agents (urea and heparin preparation)	<ul style="list-style-type: none"> • Protection of hands <ul style="list-style-type: none"> Limit the frequency of hand washing: 2 to 3 times per day Wear two different gloves (or skin protective cream) Adjust domestic tasks (sharing among family members and automatic dishwasher) Wear gloves to protect against low temperatures • Avoid factors* leading to exacerbation <ul style="list-style-type: none"> * Detergent and soap, organic solvents, paper, hair-dyeing at home, metal rings, covering fissures with BandAids
Moist	topical steroids (medium or high potency) and oral antipruritic drugs moisture-retentive agents after improvement	

Ceramide is the hydrophobic lipid that bridges the gap between the horny cells and forms the barrier that keeps water from passing through. The substance is supplied by a structure of the epidermal cell called a lamellar granule (or Odland body), and the process of its metabolism and production is under investigation. The so-called natural moisturizing factors are thought to bind with water within the horny cells and play a role in enhancing the flexibility of the keratin. The factor originates from the keratohyaline granules of the epidermal cells, which are the soluble amino acids produced by degeneration of fillagrin. In the cosmetic industry, great importance is placed on this factor.

When the super surface lipid membrane and lipids such as ceramide between the horny cells are removed by artificial cause, internal water is lost from the stratum corneum (trans-epidermal water loss [TEWL]) and the way is left open for chemical stimuli or external substances including allergens and microorganisms to invade the body, leading to susceptibility to inflammation and allergic sensitization. I scratching also occurs (itch-scratch cycle), such entry and inflammation are promoted, causing the chronic disease picture involving the two clinical forms of eczema described previously. The body part most vulnerable to the influences that permit this sequential process is the hands.

Treatment and Prevention of Housewives' Eczema (Table 1)

1. Treatment

Dry-form (KTTP) eczema is treated primarily with topical moisture-retentive agents and education in skin care. Although topical steroids (ointment or tapes) may be concomitantly used for a short time (about a week) during the inflammation phase, moisture-retention and education are very important. Emollients and moisturizers are known as moisture-retentive agents; the emollient softens the stratum corneum and the moisturizer, in addition to its softening effect, aggressively binds to water and thereby inhibits evaporation of water over a long period. Typical emollients and moisturizers are petrolatum and topical agents containing urea or heparin, respectively. Physicians should advise patients not to apply Band-Aids or other adhesive bandages to painful fissure. Instead, medical dressings can be used to cover the fissures for a short period.

Severe inflammation and itching is associated with moist-form hand eczema. Therefore medium or high potency topical steroids should be used aggressively. Additionally, a short-term coating with zinc ointment should be used for protection. Oral antihistamine should be used concomitantly to suppress itching and scratching. After the lesions have improved, these agents are replaced with moisture-retentive

agent and skin care education is started.

Some reports have shown that oral disodium cromoglycate (Intal[®]) is effective in patients whose nickel allergy is confirmed and worsened by dietary intake of nickel. Therefore this therapy may merit a trial.⁷⁾

A recent study on long-term intermittent therapy with topical steroids in patients with refractory eczema in Denmark has been reported.⁸⁾ In this study, 120 such patients were assigned to one of three treatments: 1) topical steroid on alternate days for 3 weeks, 2) topical steroid on Saturday and Sunday, or 3) moisture-retentive agent and a non-steroid. Treatment with topical steroid on alternate days for 3 weeks showed the highest effectiveness (83%). In this study, mometasone furoate cream (released as Flumeta cream[®] in Japan) was used as the topical steroid.

A study conducted in Germany achieved a reported efficacy rate of approximately 90% in 28 patients using local warm bath therapy and PUVA (psoralen ultraviolet A) administered 4 times per week up to a maximum of 25 times. This therapy was recommended for refractory eczema due to a lower incidence of side effects, including phototoxic reactions, compared with conventional topical PUVA therapy.⁹⁾

2. Prevention and daily life education

In treating and avoiding both dry and moist eczema, patients must receive education on the need to modifying their daily lives so as to reduce the frequency of hand washing and to avoid lipid-removing irritants and allergens.

We often find a considerable reduction of the frequency of hand washing results when the patient can achieve some distance from domestic tasks, for example with travel. It is a well known fact that turnover of the stratum corneum takes two weeks. The authoritative "*Fisher's Contact Dermatitis*" states that the preferred frequency of hand washing is 2 to 3 times per day,¹⁰⁾ which is, however, impractical. It has also been reported that switching from synthetic detergent to liquid soap does not

modify the degree and incidence of sore hands.¹¹⁾ Therefore the use of double gloves, where cotton gloves are worn under rubber, vinyl or plastic gloves has conventionally been recommended.

Rubber gloves are known to cause delayed allergy due to the different vulcanization accelerators used in the manufacturing processes. Natural rubber gloves are reported to cause this type of allergy as well as contact urticaria due to latex protein, which can initiate an anaphylactic reaction potentially leading to death.¹²⁾ The powder used to lubricate the interior of gloves has been suggested as a cause of rash, and there is a potential additional risk of contact allergy from powders that have absorbed latex protein, and risk of anaphylactic shock resulting from inhaling the powder.¹²⁾ Recently a variety of gloves for medical use, including gloves with antigen removed, hypoallergenic gloves, powder-free gloves, and urethane gloves, have become commercially available.¹³⁾ Patients with housewives' eczema who are sensitive to rubber gloves need to select gloves based on their skin test results. For the patients who develop immediate allergy in response to latex, caution should be exercised due to possible cross-reaction in response to banana, avocado, kiwi fruit, and melon.¹⁴⁾

On the other hand, skin-protective creams designed in consideration of the inconvenience of wearing two different gloves are available, and should be tried. Patients should be instructed to devise daily life plans that are easy on the hands and use the conveniences of modern society. These would include, for example, the use of a dishwasher, sharing of domestic tasks among family members, eating out and utilization of fast food. When going out in winter, gloves should be worn for protection against low temperatures.

The market is flooded with many non prescription moisture-retentive agents. These agents use mixtures of different ingredients to achieve moisture-retention. Commercial products containing urea have recently appeared,

and these provide a long-lasting moisture-retentive effect and appear to be superior to similar products prescribed in hospitals.¹⁵⁾ These products' moisture-retentive effect can persist for as long as 2 weeks, even after discontinuation of use, and by themselves they can restore the barrier function of the stratum corneum.

With respect to allergens, there is concern that the new European coins in use beginning this year may cause nickel allergy, depending on the alloy used. Recent experiments suggest the possibility that nickel leaches from these coins and invades the skin of the palms when the coins are grasped strongly for as little as 2 minutes.¹⁶⁾ Patients with housewives' eczema should be alert to such possibilities.

The recent boom in nail art has made nail shops common in Japan. Attention should be given to the delipidization of the fingertip caused by polish removers containing toluene and other organic solvents.

Wearing cotton gloves is recommended when touching newspapers and magazines. Although environmentally friendly pulps have recently been manufactured, some literature suggests that there is a risk that these pulps contain sensitizers such as oxides of the resin called rhodine, unlike conventional chemical pulps.¹⁷⁾ This example indicates that environmentally friendly goods are not necessarily human-friendly.

Conclusion

I conclude that housewives' hand eczema is typically a lifestyle-related skin disease. Irrespective of any predisposition, its development and exacerbation depend on a patient's awareness of causative and preventative factors. As women are increasingly assimilated into society beyond the household, the proportion of women with housewives' eczema may become lower than that of men presenting with this eczema. Clinicians should continue to pay attention to changes in society and the environ-

ment and should include daily life education in patient interviews.

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