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Contact Dermatitis Due to Student's Clothing

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In recent years, clothes are processed in various ways, such as vapor phase processing, to make them both more comfortable to wear and easier to care for (Hibi 1994). However, it has been pointed out that the chemicals used in this processing can have a negative effect on the skin (Iwama et al. 1997; Fowler et al. 1992), and insufficient care in handling clothes can lead to contact dermatitis (Naruse et al. 1991). One report on the number of patients visiting hospitals for the treatment of contact dermatitis has been made by Ogino et al. (1989), and the Japanese Ministry of Health and Welfare uses a system of monitor hospitals to try to determine the state of contact dermatitis caused by clothing (Kawamura 1999). Since such surveys are conducted at clinical sites, however, they do not include cases of contact dermatitis in which the symptoms are mild, such as itching, and a hospital visit is not required. The purpose of the present study, therefore, was to gain a more accurate understanding of the state of contact dermatitis, including mild cases such as those mentioned above which are not covered in surveys of hospitals and clinics. The relation between allergic constitution and contact dermatitis due to clothing was also investigated. A marked gender difference was seen in the type of clothes that are worn. Thus, the present paper also considers differences in contact dermatitis between the sexes.

MATERIALS AND METHODS

The survey was conducted between January 10 and January 31, 1999. The subjects were 575 university students living in the Tokai region of Japan, with ages ranging from 18 to 22 years. The survey was conducted by written questionnaire. The subjects filled in and returned the questionnaire at the site where it was distributed. Effective responses were obtained from 569 subjects, including 228 males and 341 females. Because the survey was conducted with the subjects in groups, the effective response rate was 99.0% The survey included questions on experience of atopic dermatitis and skin problems due to clothing, cosmetics, house dust, food, soap, medications,

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and ultraviolet rays. For this study, experience of skin problems was defined as having had any of the skin problems described above within the past year up to the time of the survey. Subjects who had experienced contact dermatitis due to clothing were then given additional questions regarding the body location and severity of the contact dermatitis, the type of clothing worn, the season in which the contact dermatitis occurred, and how it had been treated. A statistical analysis by the chi-square test using the SPSS computer program was done in order to compare the rates between males and females.

RESULTS AND DISCUSSION

Subjects were asked whether they had experienced skin problems during the past year up the present. The responses to this question are shown in Table 1. The most frequent cause of contact dermatitis was clothing, experienced by 25.5% of all subjects. Contact dermatitis due to cosmetics was experienced by 16.2% of subjects. Atopic dermatitis was present in 12.5% of subjects. Contact dermatitis caused by house dust was reported by 6.0% of subjects. Hives caused by food were reported by 4.7% of all subjects, contact dermatitis due to soap by 4.6%, and rash due to medications by 3.9%. Those with allergies to ultraviolet rays accounted for 1.1% of subjects.

The state of contact dermatitis caused by clothing was investigated in detail. The percentage of subjects who had experienced contact dermatitis caused by clothing within the past year is shown by gender in Figure 1. This accounted for 11.0% of males and 37.0% of females. The number of females experiencing contact dermatitis was thus significantly higher ($p<0.01$) than that of males. The season in which the contact dermatitis due to clothing occurred is shown in Figure 2. Among males, 52.0% of cases occurred in winter, and 20.0% in summer. Among females, 49.2% occurred in winter and 15.9% in summer. Thus, among both males and females, the greatest number of cases occurred in winter, accounting for about half of the total. Contact dermatitis due to clothing continued throughout the year in 24.0% of males and 23.0% of females.

The type of clothing thought to cause the contact dermatitis is shown in Figure 3. Males claiming that sweaters were the cause of the contact dermatitis accounted for 48.0% of males. Among females, sweaters and pierced earrings were considered to be the cause by 38.1% and 15.9% of subjects, respectively. The reason for the greater incidence of contact dermatitis in the winter thus appears to be the increased opportunities to wear sweaters during that season. Ukei et al. (1992) reported that earrings made of gold are a major allergen in gold allergies.

The type of clothing causing contact dermatitis in those who experienced

Table 1. Types of skin problem experienced by subjects during the year up to the time of the survey.

Kind of skin problem	Rate (%)
Contact dermatitis due to clothing	25.5
Cosmetic allergy	16.2
Atopic dermatitis	12.5
House dust allergy	6.0
Hives due to food	4.7
Soap allergy	4.6
Eruptions from medications	3.9
Ultraviolet ray allergy	1.1

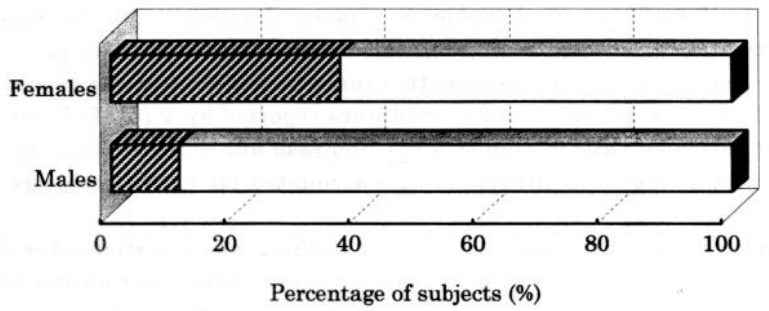

Figure 1. Percentage of subjects experiencing contact dermatitis due to clothing during the year up until the time of the survey. ▨ :experienced, □ :did not experience

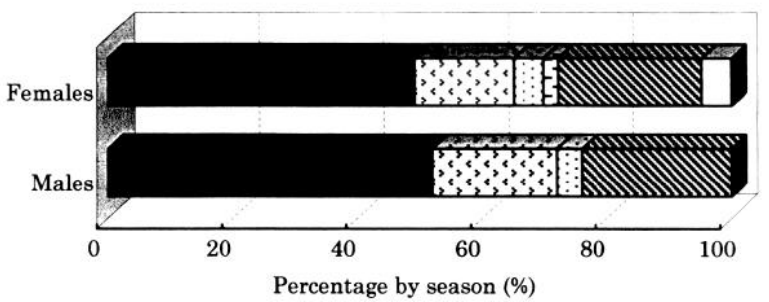

Figure 2. Season in which contact dermatitis due to clothing appeared. ■ :winter, ⊠ :summer, ⊡ :autumn, ⊟ :spring, ▧ :all seasons, □ :unknown

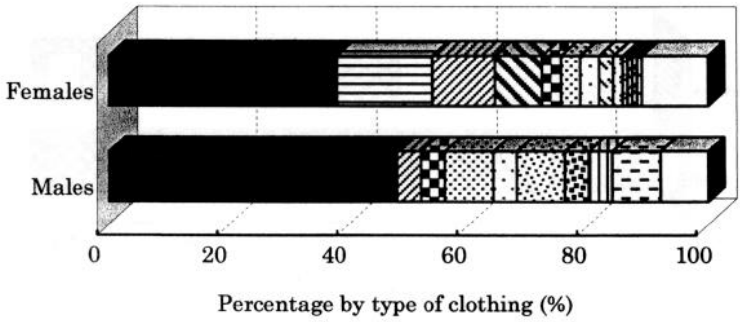

Figure 3. Type of clothing thought to be the cause of contact dermatitis.
■:sweater, ▤:pierced earring, ▨:underwear or brassiere, ▧:stocking, ▩:trousers or skirt, ▦:shirt or blouse, ▢:necklace, ▥:earring, ▣:underpants, ▦:watch, ▩:socks, ▩:glasses, ▥:ring, ▤:others, □:unknown

the condition year-round was investigated. Among items of clothing, pierced earrings were the leading cause. Because they are worn throughout the year, they would be apt to cause contact dermatitis regardless of the season.

The symptoms of those who experienced contact dermatitis due to clothing are shown in Figure 4. The percentage of males complaining of itch due to clothing was 76.0%, against 50.0% of females. Stronger symptoms such as pain, bleeding, suppuration, desquamation, blisters, rash, and erythema occurred in 24.0% of males and 44.4% of females. Ogino et al. (1991) reported that clothes can be a material causing irritant dermatitis, and that accessories can be a material causing allergic dermatitis. Allergic contact dermatitis is generally more severe than irritant contact dermatitis, and females wear accessories more often than males. The present findings that the symptoms of contact dermatitis are more severe in females than in males agree with these facts.

The method of treatment of contact dermatitis is shown in Figure 5. Those who did nothing to treat their contact dermatitis due to clothing accounted for 56.3% of females and 68.0% of males. Four percent of males were treated at outpatient clinics, against 15.1% of females. The reason for the higher level of treatment among females than males may be the greater severity of the condition among females, as shown in Figure 4.

The body location where the contact dermatitis occurred is shown in Figure 6. For both males and females, the most common location for contact dermatitis was the neck. It occurred on the neck of 48.0% of males, and 33.3% of females. The next most common location among females was the ears, occurring in 18.3%.

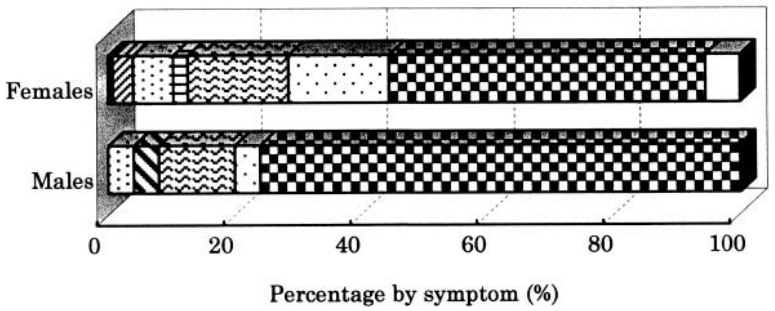

Figure 4. Symptoms of contact dermatitis due to clothing. ■:pain, ▨:bleeding, ⊡:suppuration, ▤:desquamation, ▧:blisters, ▩:rash, ⊡:erythema, ▣:itch, □:unknown

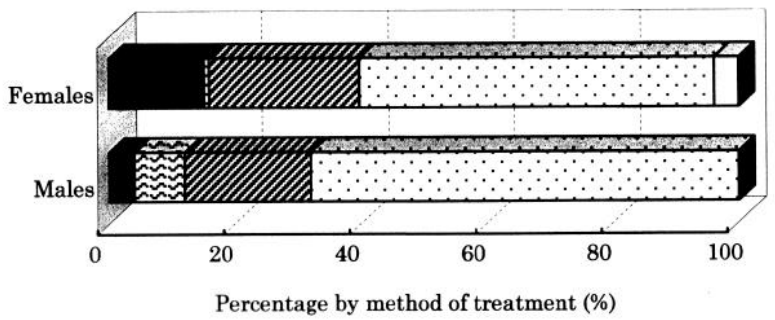

Figure 5. Method of treatment for contact dermatitis due to clothing. ■:hospital visit, ▩:non-prescription internal medicine, ▨:non-prescription external medicine, ⊡:not treated, □:unknown

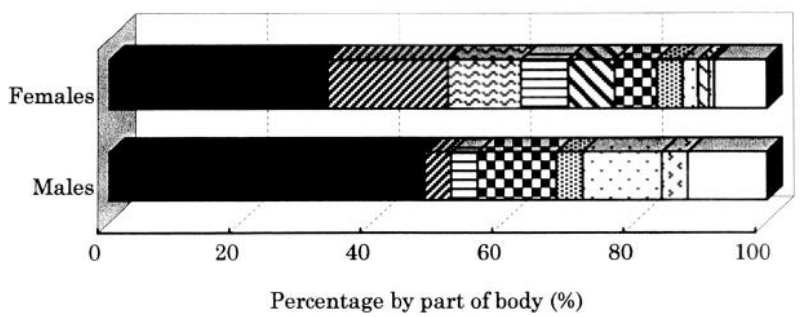

Figure 6. Body location of contact dermatitis due to clothing. ■:neck, ▨:ear, ▩:upper limb, ▤:waist, ▧:leg, ▣:back, ▩:chest, ⊡:wrist, ▧:foot, ⊡:hand, □:unknown

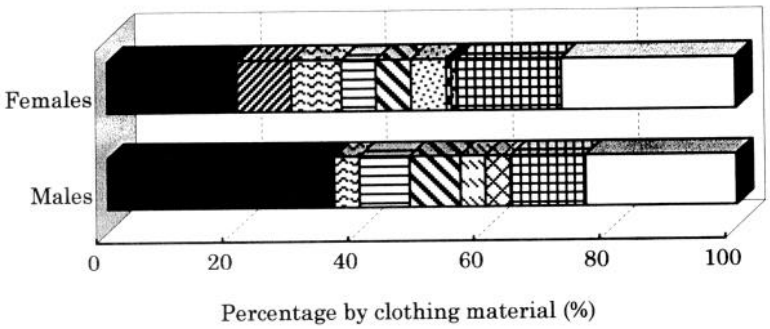

Figure 7. Clothing material which caused contact dermatitis. ■:wool, ▨:acrylic, ▩:cotton, ▤:polyester, ▧:nylon, ▩:gold, ▩:nickel, ▩:chrome, ▨:leather, ▩:cobalt, ▦:others, □:unknown

The clothing material which brought about the contact dermatitis is shown in Figure 7. Among both males and females, wool was the material most often causing contact dermatitis. Of those experiencing contact dermatitis, wool was the cause in 36.0% of males and 20.6% of females. Other materials causing contact dermatitis included acrylic, cotton, polyester, nylon, and gold also. However, 24.0% of males and 27.8% of females could not identity the material causing the condition. That a considerable number of subjects could not reply with the type of material causing contact dermatitis indicates that many subjects did not have sufficient knowledge to distinguish between clothing materials. This means that even if these people knew the type of clothing material that causes contact dermatitis, they would not be able to take appropriate preventive measures. Kawamura (1999) pointed out the importance of supplying appropriate information on items of clothing to consumers. The present investigation also suggests that proper clothing labels are necessary for the prevention of contact dermatitis caused by clothing.

Hayakawa (1990) reported that people with atopic dermatitis have a low resistance to external irritants such as wool and metal. It is thought that allergic constitution affects contact dermatitis due to clothing. In the present study, subjects with atopic dermatitis or a sensitivity to cosmetics, house dust, food, soap, medications, and ultraviolet rays were taken as an allergy group. Those without such sensitivity were the non-allergy group. Among the male subjects, 44.0% of the allergy group and 13.3% of the non-allergy group had experienced contact dermatitis due to clothing. Among female subjects, the percentages were 57.9% and 31.2%, respectively. There was thus a significantly higher rate of contact dermatitis among the allergy group than the non-allergy group ($p<0.05$).

No significant relationship was found, however, between the severity of the

contact dermatitis shown in Figure 4 and the method of treatment shown in Figure 5 among the allergy group, whereas among the non-allergy group this relationship was significant ($p<0.05$). This suggests that in the non-allergy group the cause of the contact dermatitis was the direct stimulation of the clothing itself. In the allergy group, the severity of the symptoms of contact dermatitis due to clothing may be affected by the person's physical constitution. Thus, measures to prevent contact dermatitis may be more complex for people such as those in the allergy group than for those in the non-allergy group.

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