

An Epidemiological Study of Hand Eczema

V. Prevalence Among Hairdresser Trainees, Compared with a General Population of Hairdressers

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The aim of this study was to show degree and pattern of hand eczema in affected hairdresser trainees (n = 52), compared with a general population of affected hairdressers (n = 69).

The mean ages were 18 years (range: 16–25) for the trainees and 27 years (range: 17–63) for the hairdressers. For the latter group, the mean number of months spent in profession was 96 (range: 2–552) and the number of working hours per week was 36 (range: 4–50).

Twenty-seven per cent of all trainees (67/246) were reported to have had initial of eczematous lesions on the hands and/or forearms during their apprenticeship.

The extent of skin affection, as assessed by scores for localization and distribution of eczema, was significantly lower in trainees, compared with the general population of hairdressers. Patch test revealed sensitization to nickel to be prominent in both groups; 34% among affected hairdressers and 26% among affected and non-affected trainees. Of the hairdressers, 3% had allergy to hair dye (2.5-toluenediamine), while 8% were sensitized to glyceryl monothioglycolate. None of the trainees were sensitized to those two chemicals. **Key words:** contact dermatitis; occupation; pattern; hand eczema; patch test.

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Recent reports from central Europe indicate an increase in occupational skin diseases during the last years (1). In particular, this has been seen among the hairdressers and apprentices, and of these, two-third concerned 16–21 years old trainees (2).

The services performed by the the hairdressers require manual use of a number of materials for conditioning, cleansing, styling and colouring of the hair (3). A chief hazard is the extensive use of shampoos, resulting in irritant contact dermatitis of hands.

The present investigation was undertaken in order to evaluate the frequency of skin disease among hairdressers during apprenticeship. This is the first time such a study has been carried out in Norway.

MATERIAL AND METHODS

A cross-sectional design was selected.

Study population – hairdresser trainees

In Oslo there are two schools for training hairdressing apprentices. At both schools, there are two models for this apprenticeship, both with training periods of three years. One model involves being at school the first year, while training as an apprentice in a salon the second and third year. The other alternative is to be an apprentice in a salon from the start, with one day weekly at school during the three years. At time of this investigation, these schools comprised 286 pupils.

Study population – control group

From a questionnaire study of 682 hairdressers in salons in the county of Oslo, a total of 110 hairdressers reported current exanthema on the hands and/or forearms. By visiting the work premises 102 employees were investigated. These employees comprised trainee hairdressers and certified hairdressers.

Study sample – hairdresser trainees

This part of the study comprised 246 trainees. In the first class there were 123 trainees, 98 in the second class, and 25 in the third class. Eczematous lesions were found in 52 trainees. Their mean age was 18.3 years (range: 16–25) and 49 were women.

Study sample – control group

Out of the 102 hairdressers reporting current exanthema during the screening, eczematous lesions were only found in 69. These affected hairdressers had a mean age of 26.8 years (range: 17.2–63.0) and 58 were women. The mean number of months spent in the profession was 95.8 (range: 2–552) and the number of working hours per week was 35.7 (range: 3.5–50).

Personal standard interview and examination

The interview and examination of the trainees were carried out at school. For the control group, these were carried out during working hours at the place of employment.

It was not possible to interview all respondents because of irregular working hours and school hours, change of salon, sickness, etc.

A standard questionnaire was used by the examining doctor during the personal interview. Information was collected concerning earlier or present atopic dermatitis, possible allergic asthma/rhinoconjunctivitis and allergic symptoms among siblings or parents. The examination consisted of simple local inspection of hands/forearms, with no access to inspection of other parts of the body (except the face), because of the lack of facilities for undressing at the working place. Eczema was assessed on the presence of erythematous, maculopapulous and dry/itchy skin.

Patch testing

All trainees at one of the two schools were patch tested, whether affected or not. Only affected hairdressers were tested.

Patch testing was done with the hairdressing series of Chemotechnique Diagnostics AB (Malmö, Sweden), supplemented with four substances from the European standard series and series of various allergens, namely thiuram mix (1% pet.), mercaptomix (2% pet.), carbamix (3% pet.), and fragrance mix (8% pet.).

The tests were applied to the back for two days, using Finn Chambers (Epitest Ltd., Helsinki, Finland) on Scanpor (Norgesplaster a/s, Oslo, Norway). Readings were made at three days, except for 11 trainees, for whom readings were made at two days. The readings were according to recommendations by the International Contact Dermatitis Research Group (ICDRG).

Localization

The presence of eczematous lesions was recorded as:

finger tips	
finger sides	right extremity
finger webs	left extremity
dorsal fingers	

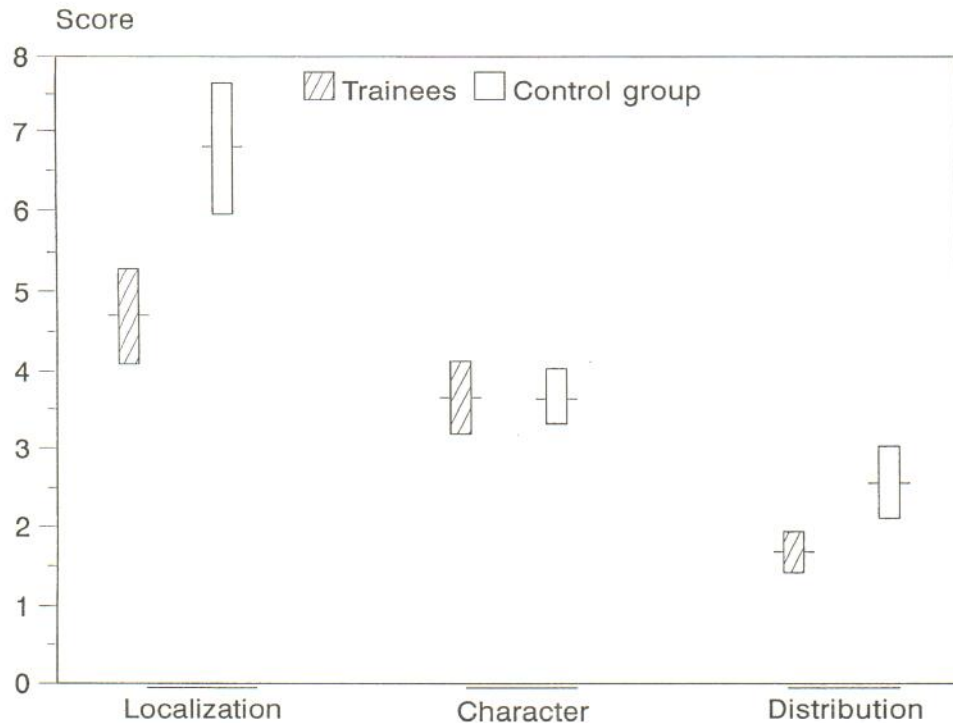


Fig. 1. Scores of localization, character and distribution in hairdressing trainees and a control group. The results are expressed as mean values with 95% confidence intervals.

- palmar fingers
- knuckles dip pip mcp
- dorsa
- palms
- hand joints
- lower arms

- 1. finger
- 2. finger
- 3. finger
- 4. finger
- 5. finger

- 4 = 50-70%
- 5 = 70-90%
- 6 = 90-100%

The scores of the four variables were summarized and the total score ranges from 0 to 24.

A total score for localization was constructed by giving each localization score 0 (none) or 1 (present) and when summarized, the total score ranges from 0 to 17.

Character

Efflorescences were recorded as:

- erythema
- vesicles
- scaling
- fissuring
- itch
- pitted nails
- dystrophia nails

These variables were given scores 0/1 and a total score for character was constructed by summarizing these scores. This total score ranges from 0 to 7.

Distribution

The presence of skin affection was recorded as:

- left hand
- left lower arm
- right hand
- right lower arm

These localizations, if present, were scored, according to skin area affected, as follows:

- 1 = <10%
- 2 = 10-30%
- 3 = 30-50%

Statistical methods

The total scores are expressed as mean values with 95% confidence intervals. The Student procedure was used for calculation of the intervals (4).

Students t-test was used when comparing the groups with regard to the sumscores. All tests were carried out two-tailed with a significance level of 5%.

RESULTS

Personal interview-trainees

Sixty-seven (27.2%) of the 246 trainees reported having had the initial onset of eczematous lesions on the hands and/or forearms during apprenticeship. Forty of the 67 trainees reported initial symptoms during the first year of training, 24 the second year, while none reported disease onset in the last year. Three trainees were uncertain of the date of onset.

Localization trainees vs. hairdressers

The mean score for localizations in trainees was 4.7 (C.I.: 4.09-5.31), with a maximum score of 10 localizations (Fig. 1). This was significantly different ($p < 0.01$) from the control group, which had a mean score of 6.8 (C.I.: 5.95-7.65), and a maximum score of 15 localizations.

Character trainees vs. hairdressers

The mean score for character in trainees was 3.65 (C.I.: 3.18-4.12) with maximum all efflorescences recorded at the same individual (Fig. 1). This was not significantly different from the

Table I. Frequency of positive patch test reactions in affected and non-affected trainees, compared with affected hairdressers

	Trainees (n = 74)	Hairdressers (n = 75)
2,5-Diaminotoluene sulfate 1.0% pet	0	2 (2.7%)
Ammonium persulfate 2.5% pet	1 (1.4%)	3 (4.0%)
Formaldehyde 1.0% aq	1 (1.4%)	
Nickel sulfate 5.0% pet	19 (25.7%)	26 (34.7%)
Cobalt chloride 1.0% pet	4 (5.4%)	6 (8.0%)
Perubalsam 25.0% pet	0	2 (2.7%)
Glyceryl monothioglycolate 1.0% aqb	6 (8.0%)	
Cocamidopropylbetaine 1.0% aq	0	1 (1.4%)
Kathon CG 0.02% aq	0	1 (1.4%)
Thiuram mix 1.0% pet	0	1 (1.4%)
Carba mix 3.0% pet	0	
Fragrance mix 8.0% pet	2 (2.7%)	6 (8.0%)

control group ($p=0.95$), which had a mean score of 3.63 (C.I.: 3.23–4.03).

Distribution

The mean score for distribution of exanthema in trainees was 1.67 (C.I.: 1.41–1.93) with a maximum score of 6. This was significantly different ($p<0.01$) from the general population of hairdressers which had a mean score of 2.56 (C.I.: 2.10–3.02) with a maximum score of 9 (Fig. 1).

Patch testing

In Table I are listed the substances giving positive patch test results either in trainees or control group. Nickel sulfate and cobalt chloride were the main allergens common for both groups, and the most important allergens for trainees. For the general hairdressing population, additional common allergens were glyceryl monothioglycolate and fragrances.

The positive patch test reactions were found in 22 of the 74 trainees, and in 39 of 75 hairdressers. Skin changes were present in 6 of 22 trainees at the time of patch testing.

DISCUSSION

The hairdressing apprentices have to learn the manual use of a number of materials for conditioning, cleansing, styling and colouring of the hair. The first year trainees placed in salons may have to do more than 20 shampoos every day, while second year trainees often have long-time monotonous manual work, e.g. styling hair with a permanent (5). Hairdressers with a craft certificate will likely have more variable and dryer manual work.

Therefore this study emphasises the skin problems among trainees, compared to a general population of hairdressers, acting as a control group. But, what kind of population is "indifferent enough" to justify the label "control group", and thus make adequate comparisons possible? This aspect of the study has a weakness making the comparison between our two groups less than perfect. Our control group will likely include an unknown number of trainees stationed in salons. Nevertheless, our choice of a control group is not unsuitable since there is, at least, a great

difference in mean age and number of months spent in profession between our groups.

This study shows that 60% of those trainees who developed skin complaints, did so in the first year of training. This is consistent with earlier findings by Cronin (6). In her study, 62% of 84 hairdressers with hand eczema developed their skin manifestations during the first year of training.

In contrast, our study reveals a lower morbidity among affected trainees, compared to affected hairdressers with a longer career. The skin affection is nevertheless moderate in both groups, quantitatively assessed with our scoring system.

Not only are hairdressers regularly and frequently exposed to water and detergents and to irritant hairdressing chemicals, but they are also exposed to several potent allergens. Most of our knowledge on allergic contact dermatitis among hairdressers concerns hairdressers who seek medical advice. On the other hand, our study refers to affected hairdressers, not selected in any way.

In recent years, the incidence of dermatitis due to hair dyes containing p-phenylenediamine (or derivatives) appears to have decreased (6). None of our trainees and 3% of our hairdressers had allergic contact dermatitis from 2,5-toluenediamine. A recent study (7) confirms that this chemical is still a problem for some hairdressers.

Allergy to glyceryl monothioglycolate is reported with increasing frequency over the past decade (8). In our study also, this chemical seems to be the main sensitizing allergen for hairdressers after fragrances and metals, but not for our trainees.

Among trainees, metal allergy seems to be pronounced, as noted also in our study. However, sensitization to nickel may be independent of occupational exposure (9). It is difficult to estimate the relevance of such metal allergy in trainees and hairdressers, and whether or not such sensitization is occupational or domestic in nature. Therefore, the crucial questions formulated by Wahlberg in 1981 (10) remain unanswered.

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