

## An Epidemiological Study of Hand Eczema

### IV. Degree and Pattern of Eczema in Affected Hairdressers, with and without Atopic Symptoms, Compared with a Control Group of Affected Teachers

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The aim of this study was to show degree and pattern of hand eczema in affected hairdressers (n=69), compared with a control group of teachers (n=19). Both groups consisted of employees having eczema, confirmed by the visit of a doctor at the working place.

The mean age for the affected hairdressers was 27 years (range: 17–63) and for the teachers 43 years (range: 27–57). The mean duration of employment was 96 months for the hairdressers (range: 2–552) and 182 months for the teachers (range: 25–336). The localization of eczematous lesions, presence of efflorescences and extent of skin affection were recorded by constructing scores for these variables. The mean number of localizations was significantly higher in hairdressers than in teachers; this was caused by greater affection of fingers in hairdressers compared to teachers. Seventy-five percent of the hairdressers and 79% of the teachers had only modest or very moderate erythema. Fourteen percent and 5%, respectively, had vesicular dermatitis. The right upper limb was most affected in both hairdressers and teachers.

Three subgroups of hairdressers were considered: hairdressers with atopic dermatitis, those with only atopic mucosal symptoms and those without atopic symptoms. No significant differences were found between these groups, except a significant higher finger involvement in atopics compared to non-atopics. **Key words:** contact dermatitis; occupation; epidemiology; atopic dermatitis.

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Irritant or allergic contact dermatitis is one of the main occupational hazards for hairdressers. Such dermatitis, most often presenting as hand eczema, is frequently disabling, forcing many hairdressers to discontinue their career (1).

One can find numerous data on frequency of skin affection, but there are only a few reports on degree and pattern of such dermatitis (2,3).

It is suggested that there are few correlations between clinical patterns of hand eczema and their etiology (4). Unquestionably, there is a significant association between the development of occupationally induced hand dermatitis and a history of atopy, particularly atopic dermatitis (5). In spite of this, Svensson (6) showed, by investigation of 63 consecutive patients in a dermatological out-patient department, that hand eczema of those with and without atopic dermatitis differed very little.

The aim of this study was to show degree and pattern of hand eczema in affected hairdressers, compared with a control group of teachers, and to see whether an atopic constitution is of importance in this occupational setting.

## MATERIAL AND METHODS

In a questionnaire study of 682 hairdressers and 531 teachers in the county of Oslo, a total of 110 hairdressers and 32 teachers reported existing exanthema on hands and/or forearms (7). By visiting their work premises 102 and 24 employees, respectively, were investigated (7).

### Study sample hairdressers

Out of the 102 hairdressers reporting present exanthema at the screening, eczematous lesions were found in 69. Their mean age was 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).

The hairdressers were subdivided into three groups: hairdressers with atopic dermatitis in their medical history (n=11); hairdressers with atopic mucosal symptoms, but not atopic dermatitis (n=19); and hairdressers without atopic dermatitis or atopic mucosal symptoms (n=39).

### Study sample teachers

Out of the 24 teachers reporting existing exanthema at the screening, eczematous lesions were found in 19. Their mean age was 42.7 years (range: 27.7–56.7), and 4 were women. The mean number of months spent in profession was 181.5 (range: 25–336), and the number of working hours per week was 27.4 (range: 10–45).

### Localization

The presence of eczematous lesions was recorded as:

finger tips	right extremity
finger sides	left extremity
finger webs	
dorsal fingers	1. finger
palmar fingers	2. finger
knuckles dip pip mcp	3. finger
dorsa	4. finger
palms	5. finger
hand joints	
lower arms	

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

### Character

Efflorescences were recorded as:

erythema  
vesicles  
scaling  
fissuring  
itch  
pitted nails  
dystrophic nails

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

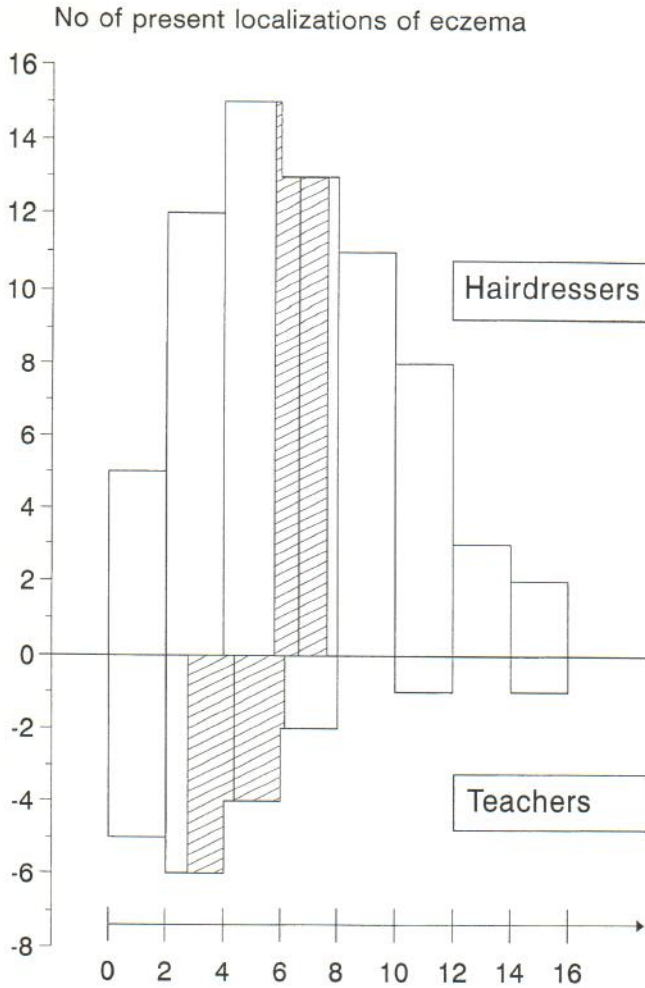


Fig. 1. Distribution of number of present localizations of eczema for hairdressers above the x-axis and teachers below. The mean values, with 95% confidence intervals shaded.

Erythema, vesicles, scaling, fissuring and itch was recorded on a five point scale with 5 possibilities from 0 to 4:

- 0 – none
- 1 – modest
- 2 – very moderate
- 3 – moderate
- 4 – severe

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

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

*Statistical methods*

Scores are expressed as mean values with 95% confidence intervals. The Student procedure (8) was used for calculation of the intervals. Frequencies are expressed as percentages with 95% confidence intervals, constructed by using the theory of single Bernoulli sequences (8).

Two way contingency tables were analyzed by using a chi-square test (8). Analysis of the two-by-two tables were carried out by using the Fisher-Irwin test (8).

Students t-test was used when comparing the hairdressers and teachers scores (8). Kruskal-Wallis test was used when comparing the sub-groups of teachers with regard to their scores, but these results must be interpreted with caution due to the small groups involved (8).

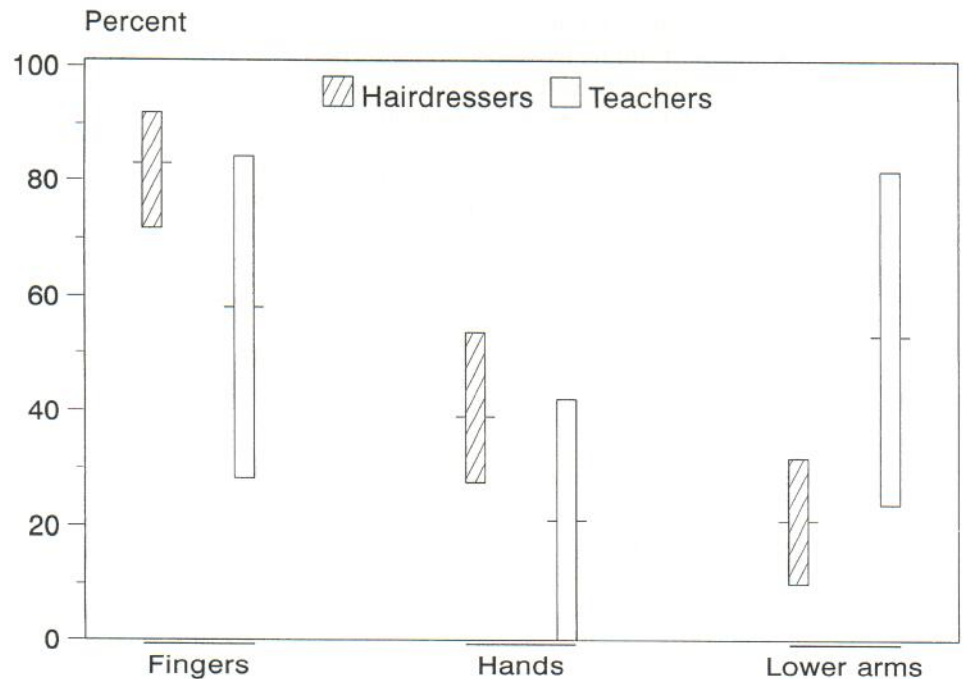


Fig. 2. Comparison of hairdressers and teachers with regard to eczema on the fingers, hands and lower arms. The results are expressed as mean values with 95% confidence intervals.

Table I. Comparison of hairdressers (n = 69) and teachers (n = 19) regarding degree and types of efflorescences. The results are expressed as percentages with 95% confidence intervals

	Degree of efflorescences				
	None	Modest	Very moderate	Moderate	Severe
<b>ERYTHEMA</b>					
Hairdressers	11.6 (2.4–20.3)	42.0 (29.0–55.1)	33.3 (20.3–45.6)	11.6 (2.4–20.3)	1.4 (0–9.4)
Teachers	15.8 (0–36.8)	15.8 (0–36.8)	63.2 (36.8–89.5)	5.3 (0–22.1)	0 –
<b>VESICLES</b>					
Hairdressers	85.5 (75.4–94.2)	8.7 (0.7–15.9)	4.3 (0–11.6)	1.4 (0–9.4)	0 –
Teachers	94.7 (73.7–100)	0 –	0 –	5.3 (0–22.1)	0 –
<b>SCALING</b>					
Hairdressers	15.9 (6.1–25.4)	34.8 (23.2–47.8)	40.6 (27.5–53.6)	8.7 (0.7–15.9)	0 –
Teachers	21.1 (0–44.7)	21.1 (0–44.7)	42.1 (15.8–71.1)	15.8 (0–36.8)	0 –
<b>FISSURING</b>					
Hairdressers	81.2 (71.7–91.3)	17.4 (8.0–27.5)	0 –	1.4 (0–9.4)	0 –
Teachers	78.9 (56.8–1.0)	21.1 (0–44.7)	0 –	0 –	0 –
<b>ITCHING</b>					
Hairdressers	78.3 (65.2–88.4)	20.6 (10.1–31.9)	1.4 (0–9.4)	0 –	0 –
Teachers	63.2 (36.8–89.5)	36.8 (11.6–64.2)	0 –	0 –	0 –

All tests were carried out two-tailed with a significance level of 5%.

## RESULTS

### Localization hairdressers vs. teachers

The mean number of localizations was 6.7 (range: 1–15) for the hairdressers and 4.4 (range: 1–16) for the teachers (Fig. 1). The groups were significantly different with regard to the number of localizations ( $p=0.02$ ), and the main reason was more affection of fingers among the hairdressers ( $p=0.03$ , Fig. 2). Eighty-three per cent of the hairdressers had finger involvement. Sixty-three per cent had affection of dorsal fingers, 19% had palmar changes, while only 4 hairdressers (6%) had dermatitis on finger tips.

Table II. Comparison of hairdressers and teachers with regard to skin involvement of overextremities. The results expressed in percentage with 95% confidence interval

	Overextremities			
	Left hand	Left lower arm	Right hand	Right lower arm
Hairdressers (n = 69)	66.7 (55.1–79.7)	17.4 (8.0–28.3)	78.3 (66.7–87.7)	18.8 (8.7–30.4)
Teachers (n = 19)	31.6 (7.4–58.9)	47.4 (18.4–76.3)	58.0 (28.9–84.2)	26.3 (2.1–53.7)

Thirty-nine per cent had affection of the hands (excluding fingers). This affection of hands was palmar in 26% and dorsal in 10%. Lower arms were involved in 20% of the hairdressers.

The figures for teachers as regards fingers, hands and lower arms were 58%, 21% and 53%, respectively.

There was no significant difference between hairdressers and teachers with regard to affection of the hands or lower arms.

### Character hairdressers vs. teachers

Sixty-seven per cent of the hairdressers and 53% of the teachers had two or three efflorescences present, and no significant difference was found between the groups ( $p=0.62$ ).

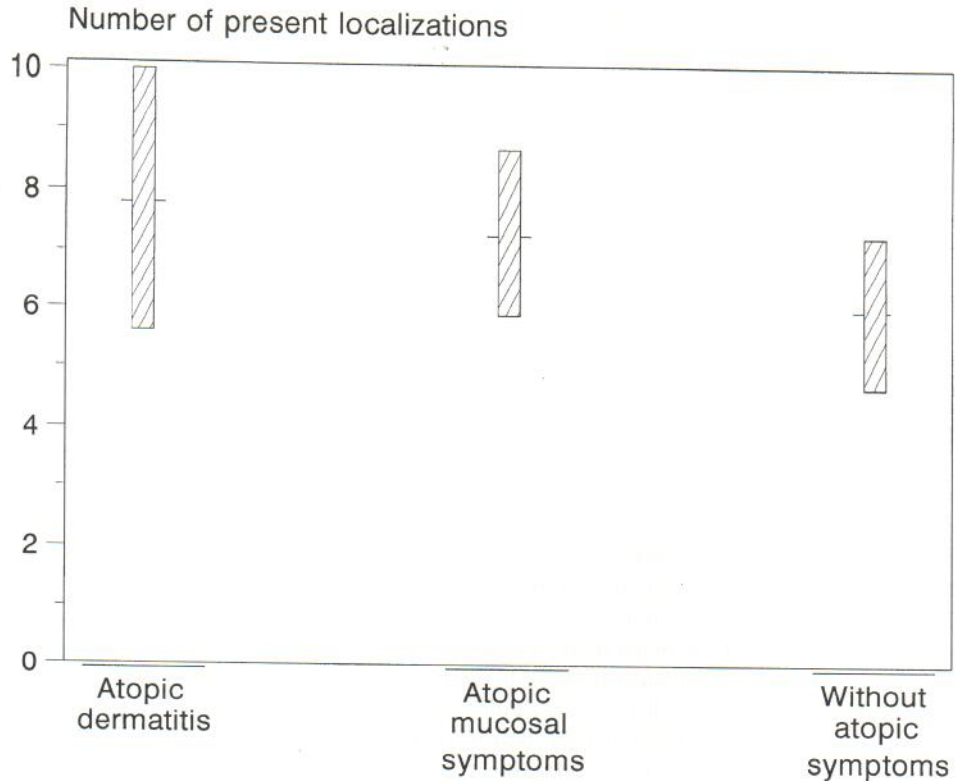
Seventy-five percent of the hairdressers and 79% of the teachers had only modest or very moderate erythema, while 14% and 5% respectively had a vesicular dermatitis (Table I). Thirty-four per cent of the hairdressers and 16% of the teachers showed dystrophias of the nails. Pitted nails were found in 9% and 16%, respectively.

### Distribution hairdressers vs. teachers

The mean sum score for hairdressers was 2.5 (range: 0–9), compared to 2.1 for teachers (range: 0–11). This difference was not significant ( $p=0.36$ ).

The right hand (including fingers) was the most affected part of the overextremities in both groups (Table II). For this hand, 46% of the hairdressers had less than 10% involvement of skin, 28% had 10–30% affection and only three hairdressers (4%) had

Fig. 3. Number of present localizations in hairdressers, expressed as mean values with 95% confidence intervals.



more than 30% involvement of skin. Six hairdressers (8%) had more than 10% affection of lower arms.

#### Localizations in hairdresser subgroups

The mean number of present localizations was 7.8 for hairdressers with atopic dermatitis, 7.3 for those with only atopic mucosal symptoms and 6.0 for those without atopic symptoms (Fig. 3). No significant difference was found between the groups ( $p=0.11$ ).

The three groups were significant different with regard to affection of fingers ( $p=0.03$ ). All hairdressers in the atopic dermatitis group had their fingers affected. In the atopic mucosal group, 95% had finger involvement, while 72% of hairdressers without atopic symptoms had affection of fingers. No differences were observed with regard to the hands (excluding fingers) or lower arms ( $p>0.27$ ).

Table III. Comparison between hairdressers with atopic dermatitis, atopic mucosal symptoms and patients without atopic symptoms with regard to efflorescence and distribution score. The results are expressed as mean values with standard deviations in brackets

	Atopic dermatitis	Atopic mucosal symptoms	Without atopic symptoms
Efflorescence score	3.3 (0.9)	2.7 (1.0)	2.5 (1.1)
Distribution score	2.9 (2.2)	2.6 (1.3)	2.4 (2.1)

#### Character hairdresser subgroups

No differences were found between the hairdresser groups with regard to the number of efflorescences (Table III,  $p=0.13$ ).

#### Distribution hairdressers subgroups

No differences were found between the hairdresser groups with regard to the distribution score of eczema (Table III,  $p=0.28$ ).

#### A statistical appendix

Using the logistic regression analysis, both with the localization and character as dependent variables, age, duration in work and weekly working time did not give significant effects to this model. This concerned both comparison of hairdressers and teachers, and the study of subgroups of hairdressers.

## DISCUSSION

The major finding of this part of study was a higher number of localizations of eczema (Fig. 1) among hairdressers compared to our control group of teachers. But, this difference between groups is quite minor, taken into consideration the difference in harmful exposition of the skin between the groups. The difference in finger affection seems to be the decisive characteristic (Fig. 2).

The literature on pattern of hand eczema is not abundant. In an earlier study of hand eczema in women (4) the palmar pattern was the commonest, with finger affection only in 19%. Our study population shows a rather different pattern with finger affection in 83% of the hairdressers, mostly dorsal in nature. But, conversely, the affection of hands (excluding fingers) was

mostly palmar. The teachers also, as a control group, were mostly affected on the fingers.

It is generally thought that in the early stages of hand dermatitis, there are recognizable patterns that may help to delineate the cause, whether endogenous, irritant or allergic. Irritant dermatitis often starts on dorsa, as in junior hairdressers (2), while in palmar affection endogenous eczema or psoriasis is more likely the cause (9). Characteristic patterns for allergens occur rather infrequently, but finger tip dermatitis is the most common pattern of contact dermatitis produced from permanent waves. In our study few hairdressers had such dermatitis on finger tips.

The age difference between hairdressers and teachers can be important for a number of reasons. Usually, a higher age correlates with higher cumulative exposure for occupational hazards. On the other hand, the low mean age figure for the hairdressers may indicate that they frequently change or leave their job. The cross-sectional design of this study gives no information of how hairdressers with hand eczema cope later. Of hairdressers affected, as many as 62% are reported to abandon their career (1). Despite such selection, our study shows, in two quite different occupations, a high rate of finger dermatitis, which is generally less amenable to treatment and has generally a poor prognosis (2). Potential work-etiological factors regarding teachers' hand eczema may be chalk and wet sponge used when blackboard writing, and special types of handwork (10).

Taken into consideration the heavy load of wet work, irritantia and allergens in hairdressing services, it is quite surprising that this does not affect the character and extent of hand eczema, compared with the control group. This may be a result of selection. Similarly, both hairdressers and teachers had quite moderate clinical scores on their dermatitis (Table I).

Hand eczema is significantly more common in people with a history of atopic dermatitis (10,11). Comparisons between patients with and without atopic dermatitis have not revealed a specific pattern of atopic hand eczema (4,6). In our study, the

insignificant trend toward higher number of localizations in hairdressers with atopic dermatitis may be accidental because few persons with atopic dermatitis participated (Fig. 3). This reduces the strength of the tests used. Despite this, there was a significant higher prevalence of finger involvement of those with atopic dermatitis, compared to non-atopics. Hence again, finger dermatitis seems to be of vital importance in determining the bad prognosis connected with atopic hand dermatitis, although our study did not find more affection as regards character and extent of eczema (Table III).

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