

An Epidemiological Study of Hand Eczema

I. Prevalence and Cumulative Prevalence Among Hairdressers Compared with a Control Group of Teachers

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The aim of this cross-sectional study was to estimate the prevalence of dermatitis of the hands and/or forearms among hairdressers compared with a control group of elementary school teachers. Questionnaires were sent to 818 hairdressers and 816 teachers. The response rates were 83% and 65%, respectively. The mean age for those completing the questionnaire, was 28 years (range: 17–71) for the hairdressers and 45 years (range: 20–70) for the teachers. The mean number of months employed in these occupations was 105 (range: 1–672) and 186 (range: 0–516), respectively.

Forty-two per cent of the hairdressers and 23% of the teachers suffered or had been suffering from exanthema of the hands and/or forearms. Sixty-one and 15%, respectively, related the skin disease to work. **Key words:** contact dermatitis; occupation; epidemiology.

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Dermatitis is one of the main occupational diseases in industrialized countries (1,2), and eczema of the hands contributes to a major part of this problem (3,4). (The term eczema is the word of choice in most reports, while the term exanthema would also include other diagnoses, which may be occupational in nature.)

Quite a number of reports have been written on eczema/allergies among hairdressers. However, it is often difficult to make precise statistical conclusions from such reports, due to different methods and selection criteria used and lack of control measures.

Most of our knowledge about contact dermatitis is based on selected out-patient registers. Furthermore, even in the general population, the prevalence of hand eczema is significant, especially among women (5). Therefore, further studies with an epidemiological approach are needed.

This report is the first in a series of communications and consists of a prevalence estimation of hand eczema among hairdressers in Oslo, Norway.

MATERIAL AND METHODS

Study population I, hairdressers

The hairdressers who participated in this study were situated in Oslo. According to official records there were 408 hairdressing salons in the Oslo region and this corresponds to approximately 1,270 man-labour years. This figure may be somewhat conservative, considering the many hairdressers operating at home. These were not included in the study population, which comprised masters, hairdressers and apprentices at registered salons.

Study population II, teachers

A total of 107 primary and secondary schools are situated in Oslo. These schools employ about 4,000 teachers, of whom 80% are women. Because of easy accessibility, this population was used when selecting the control group.

Design and sampling procedures

Since climatic factors can play a role in the development of hand eczema, data concerning temperature, relative humidity and rainfall were obtained from the Institute for Meteorology, Oslo (Table I). The winters during the sampling period were unusually mild without the dry, cold climate typical for Norway.

By simple random sampling, 184 salons with a total of 933 man-labour years were obtained. Twenty-six of these were excluded because of the inaccuracy of the national register. These salons were either closed or they were beauty shops, pedicure salons etc. The remaining 158 hairdressing salons were the basis for the survey population. A questionnaire was sent to the masters in charge of each of the salons in which they were asked to report the number of employees in the salon. The questionnaires were sent at the beginning of January, 1988, and the last written reminder seven weeks later. The response rates were 83% and 87% after the first and second written reminders, respectively.

Twenty-six out of 107 schools were obtained by simple random sampling. According to the register at the Department of Education office, this constituted 816 teaching employees.

New and more comprehensive questionnaires were sent to the salons in exactly the same numbers as the multitude of employees (cluster sampling). Almost the same questionnaires were sent to the sample of teachers. The main question read as follows: "Have you or have you had exanthema on hands and/or forearms?" For the hairdressers, the first sending was at the beginning of January 1988, with the last written reminder twelve weeks later. For the teachers, the first sending was at the beginning of August 1988, and the last written reminder fourteen weeks later.

Table I. Meteorological conditions, with mean values for temperature, relative humidity and rainfall quarterly

| | 1987 | 1988 | | | | 1989 |
|---------------------|------------|------------|------------|------------|------------|------------|
| | 4th quart. | 1st quart. | 2nd quart. | 3rd quart. | 4th quart. | 1st quart. |
| Relative humid. (%) | 82.6 | 78.8 | 51.8 | 69.5 | 74.1 | 75.2 |
| Temp. (Celsius) | 1.8 | -0.7 | 11.4 | 14.4 | 0.3 | 2.8 |
| Rainfall (mm) | 97.9 | 111.4 | 32.6 | 172.7 | 44.2 | 46.5 |

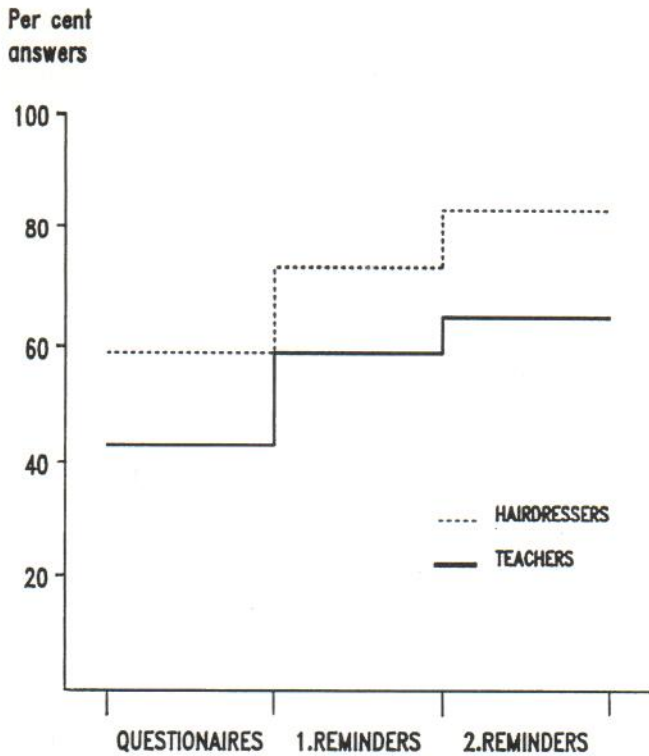


Fig. 1. Response rates following questionnaire and first and second written reminders; questionnaire survey hairdressers and control group.

The following steps were taken to ensure good cooperation by the survey population:

1. A personal letter to all salons drawing attention to the aim and ethical standard of the study.
2. A similar letter from the Head of Oslo schools to the headmasters of the sampled schools.
3. A letter to all salons, signed by the Secretary General of the Norwegian Union of hairdressers and by the masters of the Corporation for Hairdressers in the region of Oslo.
4. Nonrespondents received the mail questionnaire three times.
5. Publicity for this study was gained through presentation of the project in the professional papers for hairdressing masters.

Statistical methods

The results are expressed as mean values and standard deviations. Frequencies are expressed as a percentage with 95% confidence intervals (C.I.) constructed by using the theory of single Bernoulli sequences (7). Continuously distributed variables were analyzed by either the Savage (6) or Wilcoxon rank-sum test (7), depending on the shape of the distribution. Two-way contingency tables were analyzed by using a chi-square test (7). Analysis of the two-by-two tables was carried out by using the Fisher-Irwin test (7).

All tests used in this analysis were carried out two-tailed. Differences were considered significant when the p-values were less than or equal to 5%.

RESULTS

Completed questionnaires were returned from 682 hairdressers and 531 teachers. From the first-sent questionnaire to the second reminder, the response rates increased from 59% to 83% for the hairdressers and from 43% to 65% for the teachers (Fig. 1).

The two groups were significantly different with regard to age and gender ($p \leq 0.01$). The mean age in the group of hairdressers was 28 years (range: 17–71) and in the group of teachers 45 years (range: 20–70), (Fig. 2). The percentage of female employees was 82% and 72%, respectively. Furthermore, the groups were significantly different with regard to the number of months spent in their profession ($p < 0.01$), and the number of working hours per week ($p < 0.01$) (Table II).

The frequency of persons who were suffering or had been suffering from exanthema of the hands and/or forearms was significantly larger ($p \leq 0.01$) among hairdressers than among teachers. Forty-two per cent (C.I.: 38.4–45.9) of the hairdressers and 23% (C.I.: 19.0–26.1) of the teachers reported exanthema.

Sixteen per cent (C.I.: 13.3–18.5) of the hairdressers were suffering from exanthema when they answered the questions, 15% (C.I.: 12.3–17.7) had suffered from this during the preceding year but not when they answered the questions, and 11% (C.I.: 8.5–13.2) suffered prior to the preceding year. The corresponding figures for the teachers were 6% (C.I.: 4.0–8.2), 9%

Table II. Comparison of hairdressers and teachers regarding total working time in the profession and no. of hours per week at work. The results are expressed as mean values with standard deviations in brackets

| | Hairdressers | Teachers |
|-----------------------------------|---------------|---------------|
| No. of months spent in profession | 105.4 (116.9) | 185.9 (119.3) |
| No. of hours per week at work | 36.6 (6.5) | 31.3 (9.7) |

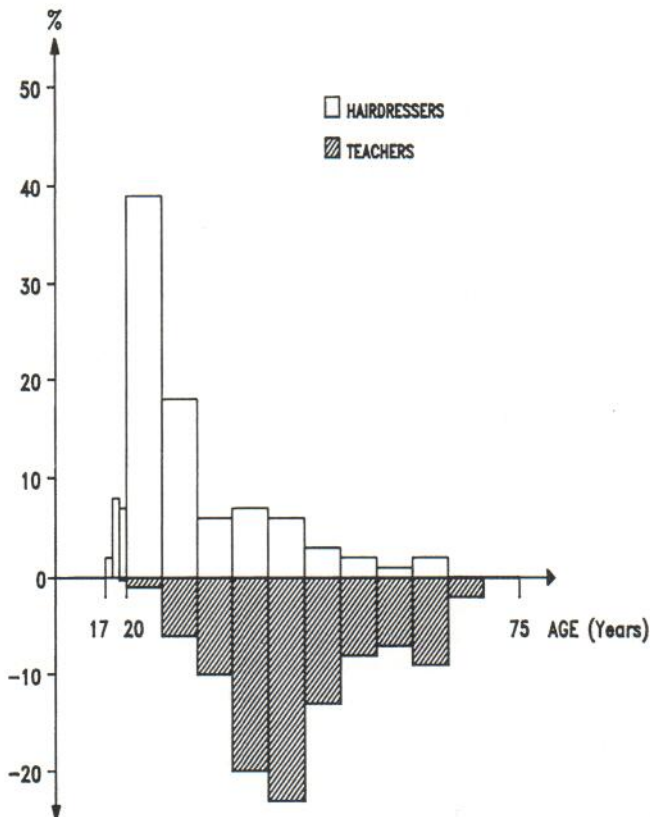


Fig. 2. Age distribution of hairdressers and teachers.

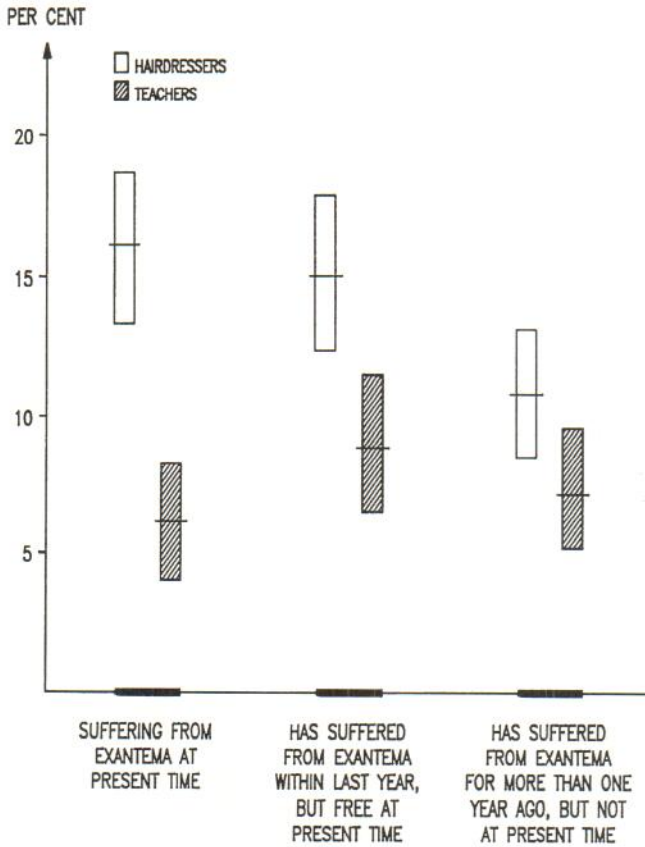


Fig. 3. Exanthema of the hands and/or forearms among hairdressers and teachers at different time intervals. The results are expressed as prevalence rates with 95 per cent confidence intervals.

(C.I.: 6.5–11.5) and 7% (C.I.: 5.1–9.5). Consequently, the hairdressers suffered significantly more than the teachers in the trial period, and both during and prior to the preceding year (Fig. 3).

Thirty-nine per cent of the hairdressers and 27% of the teachers who reported exanthema, were affected when answering the questions. Thirty-six per cent and 40% suffered symptoms during the preceding year, while the remaining groups had a rash prior to one year ago. Hence, the difference in time intervals between groups was not significant ($p=0.10$).

The groups were significantly different with regard to a possible association between their disease and their profession ($p \leq 0.01$), as judged by the employees themselves. Among the the group of hairdressers, 61% (C.I.: 55.5–66.8) believed that their exanthema was due to their profession, in comparison with 15% (C.I.: 8.8–21.7) of the teachers. Twenty-two per cent (C.I.: 17.4–27.1) of the hairdressers and 25% (C.I.: 17.6–33.3) of the teachers thought their skin disease was due partly to their profession. Eleven per cent of the hairdressers did not know if their exanthema was caused by their profession, while the corresponding figure for teachers was 22%.

DISCUSSION

One must include practical and economical considerations when choosing a control group, and then consider methodical problems. In occupational dermatology, what kind of occupation is "indifferent enough" to make adequate comparisons possible?

In epidemiological surveys of occupational medicine, the general population is often used as a control group (5). However, by selecting healthy workers, the distribution of risk factors will be distorted (8). Additionally, all manual professions will imply a certain risk regarding hand eczema. Our choice of control group is not unsuitable since there is, at least, a great difference in exposure between hairdressers and teachers. The climatic influences on the occurrence of hand eczema in Scandinavian countries can be quite impressive. For instance, would not cold and dry weather during winter time frequently provoke symptoms in atopic persons who have a predisposition to develop eczematous lesions? There were unusually mild winters during the sampling period, and the climatic factors were probably of less importance.

Many of the earlier reports on hand eczema prevalence concern unskilled occupational groups (i.e. hospital cleaning personnel) (9). However, both hairdressers and teachers are trained in their respective trades, and thus are less likely to change professions, despite the disease. Another reason for the choice of teachers as a control group was to compare working hygienic circumstances. The teaching profession implies more gentle manual working conditions, limiting both the exposure for potential allergens and the degree of "wet" work. For the teaching staff, the potential work-etiologial factors regarding hand eczema are chalk and wet sponge when blackboard writing, and special types of handwork.

In this study, it was not practicable to get precise demographic data for the hairdressers before starting the study. Hence, the difference in age distribution became more pronounced than desired.

Response rates in surveys are mainly dependent on the effort of the research team and the survey population's acceptance of the applied procedure and the aim of the study (10). A response rate of 83% among the hairdressers shows the acceptability of the method used. Sixty-six per cent among teachers does not necessarily reflect bad representation. An adequate comparison between the two occupational groups is dependent on applying the same methods; hence, possible selections appear in the same direction. As in other postal questionnaire surveys of this sort, the non-respondents may be a problem. Demographic variables for this group were not achieved because of the lack of an official register of practising hairdressers in Oslo, as mentioned earlier.

"Exanthema" can imply many diseases: dermatitis, urticaria, psoriasis, verruca, vitiligo etc. But, in providing patient information to the respondents on the aim of the study, eczema naturally will be the most common disease.

Forty-two per cent of the hairdressers suffered or had been suffering from exanthema, compared with 23% of the teachers. However, we must note the difference in time spent in their chosen occupation and the finding that only 15% of the teachers connect their skin disease solely to their work, compared with 61% of the hairdressers. Then, the job-determined difference in eczema prevalence will likely be even higher. A quite interesting finding is the insignificant difference between groups regarding the periods with exanthema, indicating the same chronicity of suffering (Fig. 3).

The high prevalence rate of hand eczema in the hairdressing

trade is not surprising. A subjective analysis carried out via questionnaires obtained from the National Hairdressers and Cosmetologists Association in the U.S.A. revealed that 50% of 405 respondents in the study had experienced dermatitis as a result of exposure to shampoos, permanent-wave solutions or hair bleach (11). Statistics from the Federal Republic of Germany indicate an incidence of two point three cases of skin disease per 1000 hairdressers (12). Of the 107 employees at the hairdressing department of a large London store studied by Cronin & Kullavanijaya (13), 30 out of 33 junior hairdressers had hand dermatitis, mostly consisting of a dry irritant dermatitis, connected with shampooing. This was revealed by personal interviews.

The prevalence estimate is a rather poor parameter on which to calculate the risk of developing illness. The estimate represents a "photograph" of multitude of illnesses both at present and in the past. The present group of affected persons will consist of acute cases, cases with a short history of illness and more longstanding cases. Hence, in a group of sick people the chronic cases will be overrepresented in proportion to the share of incidence.

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