

Epidemiology of Different Types of Hand Eczema in an Industrial City

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Different types of hand eczema in an industrial city were studied. Questionnaires were sent to 20 000 individuals aged 20-65 years, randomly selected from the population register of the city. Those subjects (1 385), considering themselves to have had hand eczema within the previous 12 months were invited to a dermatological examination. It was found that hand eczema occurred twice as often among females as among males. The most common diagnosis was irritant dermatitis. Atopic hand eczema and allergic contact dermatitis had a lower but approximately equal prevalence. Onset of hand eczema at young ages was common, in particular among women. Hand eczema was shown often to be a long-lasting disease with a relapsing course. Atopic hand eczema seemed to be most unfavourable, with a long duration, high continuity of symptoms and extensive involvement. **Key words:** *Hand eczema diagnoses; Prevalence; Age of onset; Duration.*

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In a previous paper from our study of hand eczema in Gothenburg, we reported a point prevalence of hand eczema of 5.4% among individuals between the ages of 20 and 65 (1). About 11% of that part of the population considered themselves to have had hand eczema on at least one occasion during a 12-month period. Two per cent had eczema continuously during the year. Hand eczema is thus often a relapsing skin disease that affects a large part of the population. Those persons that considered themselves to have had hand eczema during the last 12-month period were investigated further. In this paper, we report the prevalence of different types of hand eczema, age of onset, duration, continuity of symptoms and extent of involvement.

There are very few epidemiological studies of hand eczema. We are, however, in the fortunate situation that an epidemiological hand eczema study was per-

formed in this country, by Agrup in 1964-65 (2). We thus have an opportunity to study changes that have occurred during a 20-year period in this field.

SUBJECTS AND METHODS

Study population

All the inhabitants of Sweden are registered by the County Administration. From the register for Gothenburg, a random sample was drawn of 20 000 individuals aged 20-65 years. They constituted 7.6% of the total population of Gothenburg in this age-group in 1982.

Questionnaire

To determine the prevalence of hand eczema in the population, a questionnaire with 10 questions and a list of occupations was sent by mail to these individuals. After two reminders, the total response rate was 82.9% (16 584).

Dermatological examination

All individuals considering themselves to have had hand eczema on some occasion during the last 12 months (1958 individuals) were invited to a dermatological examination. It included a standardised interview, registration of objective skin symptoms on the hands, an epicutaneous patch test (3) and fungal culture (3) from the hands and feet. The same person (BM) performed the dermatological examination in all cases. To avoid seasonal variations, the patients were examined during a one-year period. After one reminder, altogether 70.7% (1 385 persons) attended the examination. In 1 238 individuals the diagnosis of hand eczema was confirmed. In 147 cases other diagnoses were made.

Analysis of drop-outs

Among those who did not come for the dermatological examination (573 persons), approximately every second (281) was randomly chosen for interview by telephone or letter. Eight of the standard questions about their eczema were asked in order to make a comparison between attendants and non-attendants possible. Answers were obtained from 208 (74%).

Definition of hand eczema

The following conditions with symptoms on the hands were regarded as hand eczema: allergic contact dermatitis, irritant dermatitis, atopic dermatitis, nummular eczema, hyperkeratotic dermatitis of the palms, pompholyx and unclassified eczema. Psoriasis, pustulosis palmaris et plantaris, tinea and other dermatoses were not included. In some cases, the same

patient had more than one hand eczema diagnosis. No attempt was made to select one of them as the main diagnosis.

Diagnostic criteria

The combined information on morphology, the extent of skin symptoms, exposure, the course, the results of patch testing and data on atopy history were used to establish the diagnoses.

Allergic contact dermatitis. This diagnosis required a positive patch test and a history of exposure to the allergen.

Irritant dermatitis. In cases with a history of exposure to substances irritant to the skin and eczema periods related in time to this exposure, the diagnosis "irritant dermatitis" was recorded when no other diagnosis was obvious.

Atopic hand eczema. A history of previous atopic dermatitis or present atopic dermatitis at other sites on the body was the main criterion for this diagnosis. Exposure to external agents was considered irrelevant when making this diagnosis.

Nummular eczema on the hands. The diagnosis was based on the presence of nummular lesions on the hands with dorsal, often oozing, eczema patches, occasionally in combination with vesicles on the edges of the fingers.

Hyperkeratotic dermatitis of the palms. This diagnosis was recorded when volar changes with hyperkeratosis and cracks were present. Itching without any vesicles sometimes occurred. External factors were considered of little importance although deterioration from friction might occur.

Pompholyx. This diagnosis was used in cases characterised by sudden eruptions of vesicles, mainly on the palms and fingers, without any known relation to external exposure.

Unclassified hand eczema. This diagnosis was used in cases where a definite diagnosis was difficult to make, for instance when there were no symptoms at the time of examination.

Prevalence estimation

For definition of point and period prevalence see (1). The point prevalence for the different hand eczema diagnoses in subgroups according to age and sex (Table V) has been calculated from the number of individuals attending the dermatological examination and having symptoms at that time, and those answering the questionnaire. As no information on diagnoses is available for the drop-outs, no attempt to compensate for the drop-outs has been made. Thus, the prevalence

Quantification of the extent of involvement

For each patient, the extent of involvement of the hand eczema at the time of medical examination was registered. To obtain a quantitative measure, a scoring system was used (Table I). The total score for each individual was the sum of the scores for the two hands. The range of the scores was 0-47. For the patients with symptoms at the time of examination (score \neq 0), the median score was 5 and the lower and upper quartiles were scores 3 and 12, respectively. Based on the division into quartiles, the patients were divided into four groups, designated very mild, mild, moderate and severe hand eczema (Table VI).

Duration

By duration, we mean the time from the first appearance of hand eczema until the time of examination, irrespective of periods of complete healing in between. This is in fact a

Table I. Scoring system for hand eczema involvement

	Location of hand eczema	Score
Hand	Dorsum, entire	4
	Dorsum, part of	2
	Palm, entire	4
	Palm, part of	2
Finger	Dorsum	1
	Edge	1
	Volar part	1
	Fingertip	1
	Nail	1
	Finger-web	1

Maximum possible score for one patient: 74.

truncated duration as the hand eczema disease for most of the patients probably continued after the examination.

Age of onset

One way of estimating the age of onset of hand eczema for the population studied is to ask the patients when the hand eczema first appeared. However, this method might give systematic errors caused by the way the material was selected. Patients with hand eczema earlier in life but without symptoms during the last 12 months are not included. We have therefore considered it to be more accurate to calculate the age distribution for patients with short duration of their hand eczema. To be correct, we should have used a very short duration, for instance one year, to get as accurate information as possible. However, the number of patients will then be small for some diagnoses. We have therefore chosen to calculate the age distribution for patients with a duration of less than 5 years. In this way, we get an approximate age of onset valid during the last 5 years.

Continuity of symptoms

By continuity of symptoms, we mean that the patient had hand eczema from onset until the time of investigation in the present study without any period of complete healing.

Statistical methods

For correlation analysis, Pitman's nonparametric permutation test (4) was used. For comparison between groups, Fisher's nonparametric permutation test (4) was used, e.g. Tables VII and the drop-out analysis. A special variant of this test, the test for trend in a two-way contingency table (5), was used in Table VI and for the analysis of score of extent of involvement in relation to diagnoses. In the latter case, a multivariate analysis based on Mantel's technique of pooling (6) was used to eliminate the influence of sex. For comparison of proportions between groups, Fisher's exact test was used, e.g. Tables VII and the drop-out analysis.

The Kruskal-Wallis nonparametric one-way analysis of variance (7) was also performed in a first step to test the hypothesis that the distribution of the different groups were equal (Tables VII).

When diagnoses were compared, only patients with a single

Table II. The number and percentage of hand eczema patients attending the dermatological examination in relation to age and sex

Age	Male		Female		Total		Female/ male ratio
	n	%	n	%	n	%	
20-24	43	3.5	117	9.5	160	12.9	2.7
25-29	64	5.2	140	11.3	204	16.5	2.2
30-34	58	4.7	108	8.7	166	13.4	1.9
35-39	56	4.5	90	7.3	146	11.8	1.6
40-44	44	3.6	72	5.8	116	9.4	1.6
45-49	34	2.8	58	4.7	92	7.4	1.7
50-54	39	3.2	75	6.1	114	9.2	1.9
55-59	41	3.3	73	5.9	114	9.2	1.8
60-64	37	3.0	78	6.3	115	9.3	2.1
65	5	0.4	6	0.5	11	0.9	1.2
Total	421	34	817	66	1 238	100	1.9

diagnosis were included, to obtain well-defined groups. Each diagnosis was compared with each of the other diagnoses, with respect to those variables with a significant result by the Kruskal-Wallis method. Two-sided tests were used.

RESULTS

Age and sex

The age and sex distribution of the 1 238 hand eczema patients is given in Table II.

Diagnosis

The distribution of the different hand eczema diagnoses is shown in Table III. Altogether 1 457 diag-

Table IV. Hand eczema patients with more than one diagnosis

	n
Allergic contact dermatitis + irritant dermatitis	47
Allergic contact dermatitis + atopic hand eczema	45
Allergic contact dermatitis + nummular hand eczema	1
Allergic contact dermatitis + hyperkeratotic dermatitis of the palms	2
Allergic contact dermatitis + pompholyx	7
Allergic contact dermatitis + unclassified hand eczema	1
Irritant dermatitis + atopic hand eczema	83
Irritant dermatitis + unclassified hand eczema	1
Pompholyx + atopic hand eczema	5
Unclassified hand eczema + atopic hand eczema	1
Total	193
Allergic contact dermatitis + irritant dermatitis + atopic hand eczema	13
Total	206

noses were made, which means that some patients had more than one diagnosis (Table IV). In Tables III and VII the values for patients with one diagnosis only (1 032) are given within brackets. Irritant dermatitis was the most common diagnosis (35%), followed by atopic hand eczema (22%) and allergic contact dermatitis (19%). For patients without symptoms at the time of examination, the proportions of the diagnoses "irritant dermatitis", "atopic hand eczema" and "allergic contact dermatitis" were 42, 14 and

Table III. Distribution of hand eczema diagnoses in relation to sex

Patients with only one diagnosis within brackets

	Male				Female				Total				Female/ male ratio
	n	%	(n)	(%)	n	%	(n)	(%)	n	%	(n)	(%)	
Allergic contact dermatitis	44	3	(26)	(3)	239	16	(141)	(14)	283	19	(167)	(16)	5.4 (5.4)
Irritant dermatitis	143	10	(110)	(11)	371	25	(260)	(25)	514	35	(370)	(36)	2.6 (2.4)
Atopic hand eczema	110	8	(69)	(7)	206	14	(100)	(10)	316	22	(169)	(16)	1.9 (1.4)
Nummular hand eczema	16	1	(16)	(2)	5	<1	(4)	(<1)	21	1	(20)	(2)	0.3 (0.3)
Hyperkeratotic dermatitis of the palms	16	1	(16)	(2)	13	1	(11)	(1)	29	2	(27)	(3)	0.8 (0.7)
Pompholyx	34	2	(31)	(3)	40	3	(31)	(3)	74	5	(62)	(6)	1.2 (1.0)
Unclassified hand eczema	107	7	(106)	(10)	113	8	(111)	(11)	220	15	(217)	(21)	1.1 (1.0)
Total	470	32	(374)	(36)	987	68	(658)	(64)	1 457	100	(1 032)	(100)	

Table V. Point prevalence of different hand eczema diagnoses in relation to age and sex (minimum figures)

Diagnosis	Age									
	20-29		30-39		40-49		50-59		20-65	
	M	F	M	F	M	F	M	F	M	F
Allergic contact dermatitis	0.25	2.3	0.35	1.6	0.49	1.7	0.38	1.5	0.40	1.8
Irritant dermatitis	1.1	3.3	1.5	2.1	0.91	2.2	0.64	1.9	1.1	2.3
Atopic hand eczema	2.1	3.8	1.1	1.9	0.70	0.60	0.38	0.65	1.1	1.8
Other hand eczema diagnoses	0.80	0.84	1.2	0.98	2.5	0.81	1.4	1.2	1.3	1.0
All hand eczema diagnoses	3.3	7.6	3.6	5.4	4.2	4.3	2.6	4.7	3.3	5.5

18%, respectively. The point prevalence of each hand eczema diagnosis for males and females in different age-groups has been calculated (Table V). The disparity in prevalence between the different age-groups was small except for the diagnosis atopic hand eczema, where a much higher prevalence was found in young age-groups.

Scores of extent of involvement

The distribution of hand eczema patients in relation to the score of extent of involvement is shown in Table VI. Of the different diagnostic groups, the highest scores were found for atopic hand eczema, followed by allergic contact dermatitis. The proportion of patients in the group "severe", score ≥ 13 , was 26% for atopic hand eczema, 16% for allergic contact dermatitis, 7% for irritant dermatitis and 10% for

other hand eczema diagnoses. The score differences were statistically significant for atopic hand eczema compared to allergic contact dermatitis ($p < 0.05$) and to irritant dermatitis ($p < 0.01$), and for allergic contact dermatitis compared to irritant dermatitis ($p < 0.01$).

Duration

The average duration of the hand eczema from onset to examination was 11.6 years, with a range of 0-63 years. The duration did not differ significantly between males and females. The durations for the different diagnoses are shown in Table VII. There was a statistically significant correlation between the duration of hand eczema and extent of involvement ($p < 0.05$).

Age of onset

The age of onset as defined above is given in Fig. 1 for all hand eczema cases and for the different diagnoses for both sexes separately.

Continuity of symptoms

Twenty-three per cent of the hand eczema patients had continuous symptoms from the onset of the hand eczema disease to the time of examination. Continuous symptoms were most frequent among males, 28%. The corresponding figure for females was 20% ($p < 0.01$). The percentages of continuous symptoms for the different diagnostic groups are given in Table VII. Continuous symptoms were found to be more frequent in patients with high scores of involvement ($p < 0.001$). For the score groups very mild, mild,

Table VI. Scores of extent of involvement for males and females at the time of examination

Score group	Score	Male		Female		Total	
		n	%	n	%	n	%
Symptomless	0	154	37	346	42	500	40
Very mild	1-3	69	16	152	19	221	18
Mild	4-5	57	14	95	12	152	12
Moderate	6-12	62	15	123	15	185	15
Severe	≥ 13	79	19	101	12	180	15
Total		421		817		1 238	

Men had a greater extent of involvement than women ($p < 0.01$).

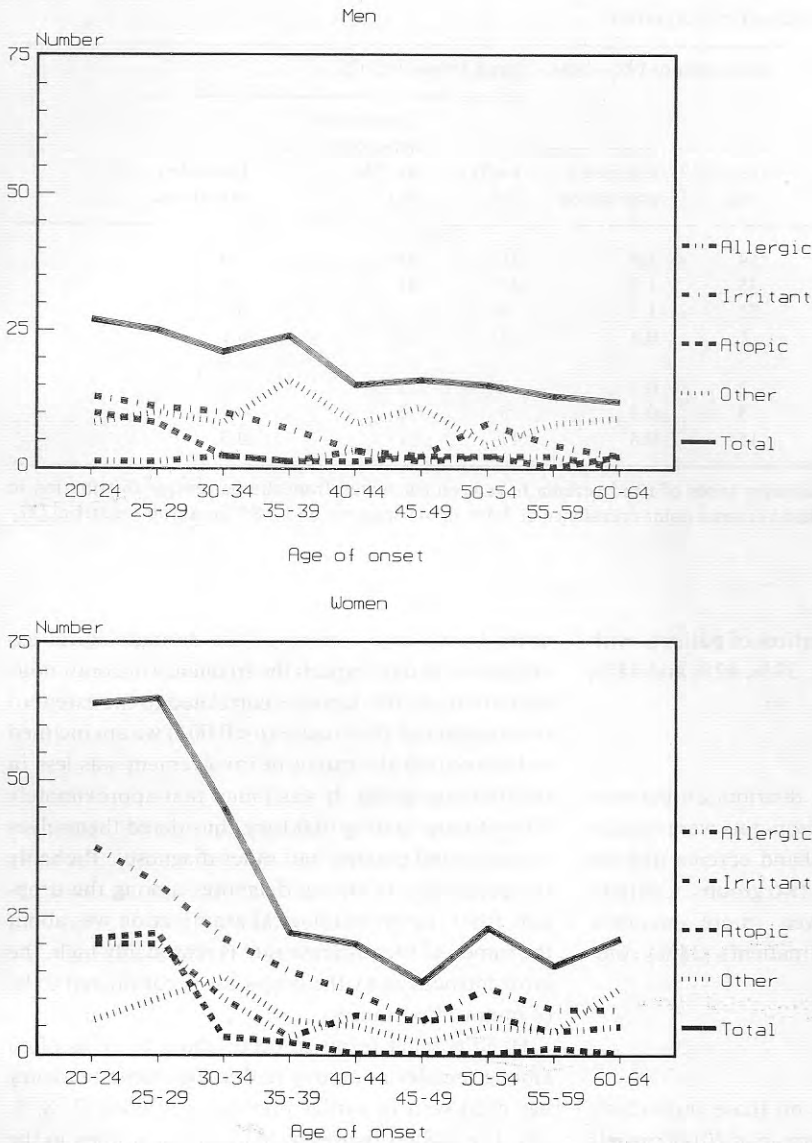


Fig. 1. Distribution of the age of onset in relation to diagnosis and sex. For definition of age of onset see "Material and methods".

Table VII. Duration and continuity of symptoms of hand eczema in relation to diagnosis

Patients with only one diagnosis within brackets

Diagnosis	n	(n)	Duration (years)		Continuity (%)
			Mean \pm SEM	Median	
I. Allergic contact dermatitis	283	(167)	12.8 \pm 0.7 (12.0 \pm 0.9)	9 (8)	27 (24)
II. Irritant dermatitis	514	(370)	10.3 \pm 0.4 (9.9 \pm 0.5)	7 (7)	19 (15)
III. Atopic hand eczema	316	(169)	15.5 \pm 0.7 (16.3 \pm 0.9)	12 (13)	32 (32)
IV. Other hand eczema	344	(326)	9.8 \pm 0.5 (9.6 \pm 0.5)	7 (7)	22 (21)

Duration: I-II $p < 0.05$, I-III $p < 0.001$, II-III $p < 0.001$. Continuity: I-II $p < 0.05$, I-III NS, II-III $p < 0.001$.

Table VIII. Comparison of distribution of diagnoses

	Gothenburg 1983-1984		Lund 1964-1965 (2)		
	n=1 457 (%)	Estimated prevalence	n=911 (%)	Comparable age-groups n=704 (%)	Estimated prevalence
Allergic contact dermatitis	19	1.0	31	34	1.0
Irritant dermatitis	35	1.9	37	41	1.1
Atopic hand eczema	22	1.2	9	3	0.1
Nummular hand eczema	1	0.1	2	2	0.1
Hyperkeratotic dermatitis of the palms	2	0.1	4	3	0.1
Pompholyx	5	0.3	6	6	0.2
Unclassified hand eczema	15	0.8	11	11	0.3

The estimated prevalences of the different types of hand eczema have been calculated from the percentage distribution in columns 1 and 4 and an estimated hand eczema point prevalence of 5.4% in our material and 2.8% in Agrup's material (2).

moderate and severe the proportion of patients with continuous symptoms was 24%, 39%, 42% and 48%, respectively.

Drop-outs

The differences in age and sex distribution between the examined patients and the drop-outs were negligible (NS). The duration of the hand eczema did not differ significantly between the two groups. Continuous symptoms were, however, more common ($p < 0.01$) among the examined patients (23%) compared to the drop-outs (12%).

DISCUSSION

This analysis is based on data on those individuals among the randomly selected sample of 20000 people between 20 and 65 years of age in Gothenburg who considered themselves to have hand eczema, who responded to the questionnaire and subsequently came for a dermatological examination. There are two possibilities of selection errors. Firstly, those who responded to the questionnaires might not be representative of the whole sample; secondly, those who came for the dermatological examination might not be representative of the hand eczema group. In our first paper from this study of the prevalence of hand eczema, a drop-out analysis for the first possible source of error was performed (1).

The drop-out analysis of the second possible source of error indicates that the drop-outs mainly seem to

differ from those coming to the dermatological examination in one respect; the frequency of continuous symptoms. As this factor is correlated to the extent of involvement of the disease ($p < 0.001$) we are inclined to believe that the extent of involvement was less in the drop-out group. It was found that approximately 10% of those stating that they considered themselves to have hand eczema had other diagnoses. Probably the percentage of wrong diagnoses among the drop-outs from the dermatological examination was about the same. As the response rate is reasonably high, the error introduced by the drop-outs is considered to be of minor importance.

Hand eczema seems to occur about twice as often among females as among males. The same tendency has been seen in earlier prevalence studies (2, 8, 9, 10). The highest figures were found for women in the younger age-groups, 20-35 years old (Table II).

The method we have used to estimate the age of onset of hand eczema is a reasonable approximation for hand eczema patients in Gothenburg in the last five years. We are aware of the fact that the age distribution of the population in Gothenburg influences the distribution of age of onset as calculated with our method. The possible error thereby introduced is not of great importance for the conclusions drawn. Fig. 1 clearly indicates that onset of hand eczema among men was more common at younger ages but the difference is small. In women, however, onset of hand eczema between 20 and 35 years of age was much more common than later on in life. Fig.

I also shows that the age of onset of allergic contact dermatitis was evenly distributed in men but at considerably lower age in women. The same tendency was seen for irritant dermatitis. Atopic hand eczema appeared early in life, as might be expected. Other types of hand eczema had a more evenly distributed age of onset.

Atopic hand eczema was characterised not only by onset early in life, but also by a long duration, a high frequency of continuous symptoms and a high score of extent of involvement (Fig. 1, Table VII). When comparing allergic contact dermatitis and irritant dermatitis, we found statistically significant differences in continuity of symptoms and score of extent of involvement, indicating that the former diagnosis gives more permanent symptoms.

The fact that we have an epidemiological study on hand eczema in Sweden, performed 20 years earlier by Agrup (2), makes it possible to study changes of the disease panorama in this field. However, Agrup's study, performed in 1964–1965, concerns a more rural population than ours, so there is not only a difference in time but also a difference in occupational exposure. In Table VIII, we have tried to estimate the prevalence of the different hand eczema diagnoses in Agrup's study and in ours, compensating for a slightly different age-range. It is clear that the prevalence of hand eczema has increased. The prevalence of allergic contact dermatitis seems to be unchanged. The prevalence of irritant dermatitis appears to be higher and atopic dermatitis much more common in Gothenburg in 1983–84 compared to the south of Sweden in 1964–65 (2).

There are two Dutch studies on hand eczema prevalence (8, 9). The results are difficult to compare with ours, however, as those studies are based on a 3-year period prevalence and a somewhat different age-range.

Hand eczema is evidently a long-lasting disease. We believe that the etiology of allergic contact dermatitis and irritant dermatitis is well known and the diseases are often possible to treat and prevent. The long duration suggests that dermatological care of hand eczema is not as good as we imagine.

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