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Prevalence of skin disease in a population-based sample of adults from five European countries*

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Summary

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Conflicts of interest

None to declare.

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Background There is a lack of prevalence data on skin diseases in the general adult population; most studies have been carried out in small, national or consecutive clinical samples.

Objectives To determine the prevalence of common skin disease in the general European population and to assess differences in the characteristics of treatment between countries.

Methods A random sample consisting of 12 377 participants aged 18–74 years was drawn from the general population of five European countries (Germany, Italy, the Netherlands, Portugal and Sweden). This was a cross-sectional study and all participants were interviewed using a standardized questionnaire that assessed the occurrence of 10 common skin diseases during lifetime, past year and past month. If a skin disease was reported, we additionally assessed who performed the diagnosis and treatment, and whether drugs had been prescribed.

Results The most common skin disease was warts (41.3%), followed by acne (19.2%) and contact dermatitis (15.0%). In general, women were more often affected by skin diseases compared with men; only skin cancer had a slightly higher prevalence in men. The prevalence of skin diseases in northern countries (Germany, the Netherlands and Sweden) was generally higher than in the southern countries (Italy and Portugal). In the Netherlands the treatment of skin diseases was less often performed by a dermatologist compared with the other countries.

Conclusions The prevalence estimates reported in this study are derived from a representative sample of the general population. Data assessment was performed comprehensively across countries, thus country-specific prevalence estimates are comparable.

What's already known about this topic?

- There is a substantive prevalence of skin diseases in the general adult population.
- There is a lack of comparable prevalence estimates across countries.

What does this study add?

- We report prevalence estimates for 10 common skin diseases based on a validated questionnaire.

- Data were assessed in the general adult population of five European countries based on a random sample derived from the regional register of residents.
- Prevalence rates for skin diseases are generally higher in the northern countries.

Skin diseases frequently occur in children and adults,^{1–4} can lead to disability, and account for the fourth leading cause of nonfatal disease burden at the global level.¹ Various studies have shown that skin diseases can have a major impact on the quality of life of those affected.⁵ Some skin diseases, such as skin cancer and infections, are potentially life-threatening.⁶ Skin diseases involve high costs for the individual and society. They are considered a major public health problem.⁶ It is therefore crucial to assess their numbers accurately at a population level. However, prevalence data on skin diseases have been derived mainly from highly selected populations; typically, small studies have been conducted in single countries, and have often failed to explore potential confounding factors and differences by sex and age. The findings of such studies have been combined in reviews to provide a comparison across countries, e.g. for hand eczema⁷ or psoriasis;⁸ however, the studies included used different methodologies making it difficult to compare results. Population-based data on the prevalence of skin diseases are generally rare. At an international population level, prevalence data are available for only a few selected skin conditions, such as atopic dermatitis (AD) (The International Study of Asthma and Allergies in Childhood)^{9–11} and itchy rashes,¹² and a recently published study has reported on the prevalence of rosacea in Germany and Russia.¹³

There is an astonishing lack of findings at a European population-based level on the prevalence, diagnosis and treatment pathways related to the most common skin diseases. Accordingly, the present study undertook a standardized data collection across several European countries at a population level. The main objective of this paper was to assess the prevalence of the most common skin diseases in the general adult population in five European countries. Secondary objectives were to evaluate the main treatment pathways for those skin diseases by country and assess the impact of sex and age.

Material and methods

Study design

The design used for the present study, the composition of the sample and the validation of the questionnaire used have been published previously.^{12,14} The European Dermato-Epidemiology Network (EDEN) conducted a descriptive epidemiological survey called the EDEN fragrance study in Sweden, Germany, the Netherlands, Italy and Portugal. The primary aim of this study was to assess the prevalence of fragrance allergy in the general European population. Here, we report on the questionnaire data for skin diseases.^{15,16} A random sample from the general population aged 18–74 years was drawn using electoral precincts. This study followed a stratified, proportional, sampling-with-replacement design. Using a

standardized questionnaire, 12 370 participants were interviewed face-to-face. The study started in August 2008 and ended in October 2011 and was approved by the ethics committee of each participating centre.

Variables

In the interviews, we collected data on the history of skin problems that had lasted > 3 days during the previous month or previous year (including the previous month), which were summarized into 'active manifestation' and skin diseases that occurred over the lifetime of the patient. Trained interviewers asked specific questions regarding the following diseases: contact dermatitis, atopic eczema, other eczema, psoriasis, warts, acne, urticarial, skin cancer, leg ulcer, vitiligo, allergic rhinitis, allergic asthma and other conditions. The choice of specific skin diseases was based on mutual agreement among the experienced clinicians. Furthermore, this decision was supported by a study by Hay *et al.*⁶ who reported that warts, acne and AD were among the most prevalent skin diseases. The interviewees were asked to describe any previous dermatological diagnoses made by a dermatologist or any other physician, and whether they had received treatment. We also recorded demographic data such as age, sex, occupational status and education.

Sample size and data analyses

Confidence estimates in excess of 0.5% were desired. According to the Clopper–Pearson method, a sample size of 12 000 individuals would produce a 95% confidence interval, with a width equal to 0.003 and relative standard error of 13% when the sample prevalence was 0.5%. As 2000 individuals were interviewed in each centre the required number of 12 000 participants was reached. All statistical analyses were performed using SPSS 23 (IBM, Armonk, NY, U.S.A.).

We present the descriptive data as numbers per skin condition and give the relative frequencies for the demographics and skin complaints of individuals. To compare the lifetime prevalence across countries, we also made a calculation by country using age-standardized estimates. $P < 0.05$ was considered statistically significant. We performed age standardization according to the direct method using the European standard population as reference.¹⁷

Results

Demographic characteristics

The demographic characteristics, in total and by country, have already been reported in detail by Naldi *et al.*¹² Therefore, we have reported the characteristics only in summary. For each

country there was a slightly higher proportion of women represented in the sample (53.9% women in total) and the median age was 43 years with a range from 18 to 74 years. Overall, 56.9% of the sampled population were working, 15.5% were retired and 15.1% were students. The proportion of smokers was 22.8%. These numbers are comparable with those of the general population in Eurostat 2010.¹²

Overall prevalence of skin diseases

Table 1 shows the lifetime prevalence of skin diseases that occurred during the month or year preceding the interview or had occurred during a person's lifetime. The lifetime prevalence is reported for the overall population and according to

sex. With a physician-diagnosed lifetime prevalence of 27.5%, warts was the most common skin condition. After warts, the most common physician-diagnosed manifestations were acne, other eczema, urticaria, contact allergy, AD and psoriasis. For acne and contact dermatitis, the self-reported lifetime prevalence is nearly twice as high as the physician-diagnosed lifetime prevalence, meaning that nearly half of the respondents never visited a physician for any of these diseases.

The physician-diagnosed lifetime prevalence of various skin diseases differed between men and women (Table 1). Table 1 indicates that women were affected by contact dermatitis, AD and urticaria more often than men; a similar sex difference for contact dermatitis, AD and urticaria was also observed for the lifetime prevalence that had not been diagnosed by a physician

Table 1 Prevalence of skin diseases by sex

	Lifetime prevalence						
	N	Total n (%)	95% CI	Men n (%)	95% CI	Women n (%)	95% CI
Contact dermatitis	12370	1854 (15.0)	14.4–15.6	564 (9.9)	9.1–10.7	1290 (19.3)	18.4–20.3
Atopic dermatitis	11361	898 (7.9)	7.4–8.4	307 (5.8)	5.2–6.5	591 (9.7)	9.0–10.5
Other eczema	11460	1624 (14.2)	13.5–14.8	633 (11.9)	11.0–12.8	991 (16.2)	15.3–17.1
Psoriasis	11283	590 (5.2)	4.8–5.7	281 (5.3)	4.7–6.0	309 (5.1)	4.6–5.7
Warts	11869	4897 (41.3)	40.4–42.2	2214 (40.2)	38.9–41.5	2683 (42.2)	41.0–43.4
Acne	11447	2202 (19.2)	18.5–20.0	998 (18.7)	17.7–19.8	1204 (19.7)	18.7–20.7
Urticaria	11323	1040 (9.2)	8.7–9.7	306 (5.8)	5.2–6.5	734 (12.2)	11.3–13.0
Skin cancer	11265	292 (2.6)	2.3–2.9	144 (2.7)	2.3–3.2	148 (2.5)	2.1–2.9
Leg ulcer	11252	78 (0.7)	0.5–0.9	38 (0.7)	0.5–1.0	40 (0.7)	0.5–0.9
Vitiligo	11272	213 (1.9)	1.6–2.2	97 (1.8)	1.5–2.2	116 (1.9)	1.6–2.3
Other diseases	11333	1281 (11.3)	10.7–11.9	570 (10.8)	9.9–11.6	711 (11.8)	11.0–12.6
Diagnosed by a physician							
Contact dermatitis	12370	1027 (8.3)	7.8–8.8	289 (5.1)	4.5–5.7	738 (11.1)	10.3–11.8
Atopic dermatitis	11361	810 (7.1)	6.7–7.6	280 (5.3)	4.7–5.9	530 (8.7)	8.0–9.5
Other eczema	11460	1347 (11.8)	11.2–12.4	511 (9.6)	8.8–10.4	836 (13.6)	12.8–14.5
Psoriasis	11283	515 (4.6)	4.2–5.0	241 (4.6)	4.0–5.2	274 (4.6)	4.0–5.1
Warts	11869	3260 (27.5)	26.7–28.3	1412 (25.6)	24.5–26.8	1848 (29.1)	28.0–30.2
Acne	11447	1348 (11.8)	11.2–12.4	570 (10.7)	9.9–11.5	778 (12.7)	11.9–13.6
Urticaria	11323	743 (6.6)	6.1–7.0	206 (3.9)	3.4–4.5	537 (8.9)	8.2–9.6
Skin cancer	11265	290 (2.6)	2.3–2.9	143 (2.7)	2.3–3.2	147 (2.5)	2.1–2.9
Leg ulcer	11252	58 (0.5)	0.4–0.7	27 (0.5)	0.3–0.7	31 (0.5)	0.4–0.7
Vitiligo	11272	125 (1.1)	0.9–1.3	65 (1.2)	1.0–1.6	60 (1.0)	0.8–1.3
Other diseases	11333	1020 (9)	8.5–9.5	445 (8.4)	7.7–9.2	575 (9.5)	8.8–10.3
Active manifestations							
Contact dermatitis	12370	781 (6.3)	5.9–6.8	171 (3.0)	2.6–3.5	610 (9.1)	8.5–9.9
Atopic dermatitis	11361	477 (3.9)	3.5–4.2	144 (2.5)	2.1–3.0	333 (5.0)	4.5–5.5
Other eczema	11460	724 (5.9)	5.4–6.3	278 (4.9)	4.3–5.5	446 (6.7)	6.1–7.3
Psoriasis	11283	381 (3.1)	2.8–3.4	191 (3.4)	2.9–3.9	190 (2.8)	2.5–3.3
Warts	11869	909 (7.3)	6.9–7.8	408 (7.2)	6.5–7.9	501 (7.5)	6.9–8.2
Acne	11447	621 (5.0)	4.6–5.4	260 (4.6)	4.0–5.1	361 (5.4)	4.9–6.0
Urticaria	11323	205 (1.7)	1.4–1.9	51 (0.9)	0.7–1.2	154 (2.3)	2.0–2.7
Skin cancer	11265	59 (0.5)	0.4–0.6	35 (0.6)	0.4–0.9	24 (0.4)	0.2–0.5
Leg ulcer	11252	20 (0.2)	0.1–0.2	12 (0.2)	0.1–0.4	8 (0.1)	0.1–0.2
Vitiligo	11272	175 (1.4)	1.2–1.6	80 (1.4)	1.1–1.7	95 (1.4)	1.2–1.7
Other diseases	11333	534 (4.3)	4.0–4.7	224 (3.9)	3.4–4.5	310 (4.6)	4.2–5.2

CI, confidence interval.

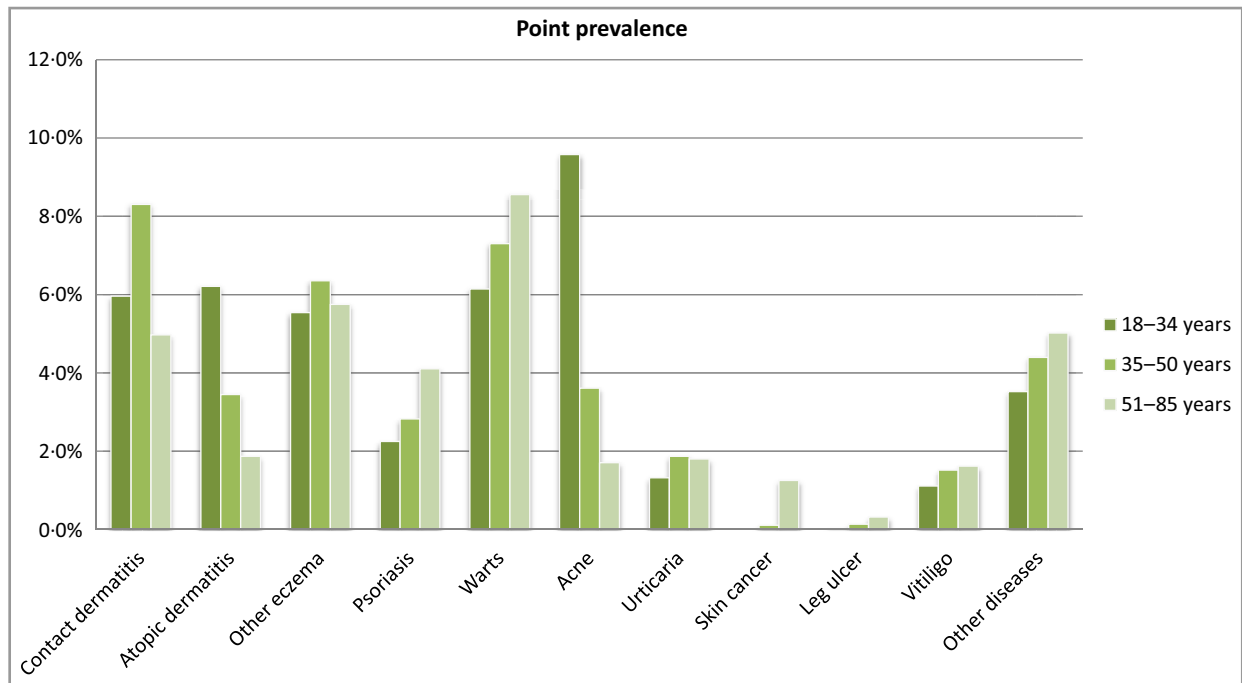


Fig 1. Point prevalence (active manifestations) of skin diseases by age groups.

and for the individuals with active manifestations of the disease at the time of the interview. The only condition in which men slightly outnumbered women was the active manifestation of skin cancer at the time of the interview (men 0.6% vs. women 0.4%).

Prevalence of skin diseases for different age groups

In Figure 1, the point prevalence for the investigated skin diseases is given for three age groups. Although the point prevalence for AD and acne decreases with age, an increase can be seen in psoriasis, warts and skin cancer. Also, leg ulcers were seen only in the older age groups. Vitiligo, urticaria and other eczema showed no association with age, while the prevalence of contact dermatitis had a peak in the group of subjects aged 35–50 years.

Medical treatment

Table 2 provides details for the individuals with a skin condition who consulted a dermatologist or a physician. It indicates the respective proportions of individuals who were treated by a dermatologist or another physician and those who received no treatment at all for their condition. The skin diseases were treated by dermatologists in 39.7–82.8% of cases. Most cases of skin cancer, psoriasis and acne were treated by a dermatologist. The conditions with the lowest number of cases treated by dermatologists involved leg ulcer, urticaria and vitiligo. Slightly more women (a relative excess of 6.1%) than men consulted a physician for acne; they mainly consulted a dermatologist. By contrast, fewer women were treated for vitiligo. Physicians treated a high proportion of leg ulcer, warts and urticaria.

Prevalence of skin diseases across countries

Table 3 presents lifetime prevalence by country. Germany and the Netherlands evidenced a higher proportion of skin diseases diagnosed by a physician than Portugal and Italy. Sweden was about average compared with the other countries in this study. Among the northern countries (Sweden, the Netherlands and Germany) the relative lifetime prevalence of AD cases diagnosed by a physician was two times higher than in the southern countries (Portugal and Italy).

Tables 4 and 5 give the proportions of individuals with a skin condition who consulted a physician and were treated with prescription or nonprescription drugs by a physician or dermatologist for each country. Table 4 shows that among all of the countries, Germany had the highest proportion of patients who were treated by a dermatologist. There were differences among the countries regarding the specific diseases that were treated by a dermatologist. In Italy and Portugal, a high proportion of patients with vitiligo were treated by a dermatologist; however, fewer cases of leg ulcer were treated by a dermatologist in those two countries. In the Netherlands, a lower proportion of skin diseases were treated by a specialist; acne was treated by a dermatologist in 80.0% of cases in Germany, but only in 24.3% of cases in the Netherlands. In the Dutch population, treatment was conducted by a dermatologist in most cases only for skin cancer, psoriasis and leg ulcer. Acne was treated by a dermatologist more frequently in Sweden than on average in the other countries; however, the frequency of dermatological treatment of other skin diseases in Sweden was in accordance with the European average.

Table 5 shows the proportions of conditions per country treated by physicians. Among the countries, leg ulcers – and a

Table 2 Treatment by sex

	Dermatologist						
	N	Total		Men		Women	
		n (%)	95% CI	n (%)	95% CI	n (%)	95% CI
Contact dermatitis	1027	473 (46.1)	43.0–49.2	125 (43.3)	37.5–49.2	348 (47.2)	43.5–50.8
Atopic dermatitis	810	514 (63.5)	60.0–66.8	171 (61.1)	55.1–66.8	343 (64.7)	60.5–68.8
Other eczema	1347	676 (50.2)	47.5–52.9	249 (48.7)	44.3–53.2	427 (51.1)	47.6–54.5
Psoriasis	515	398 (77.3)	73.4–80.8	177 (73.4)	67.4–78.9	221 (80.7)	75.5–85.2
Warts	3260	1518 (46.6)	44.8–48.3	630 (44.6)	42.0–47.3	888 (48.1)	45.8–50.4
Acne	1348	896 (66.5)	63.9–69.0	363 (63.7)	59.6–67.6	533 (68.5)	65.1–71.8
Urticaria	743	306 (41.2)	37.6–44.8	75 (36.4)	29.8–43.4	231 (43.0)	38.8–47.3
Skin cancer	290	240 (82.8)	77.9–86.9	119 (83.2)	76.1–88.9	121 (82.3)	75.2–88.1
Leg ulcer	58	23 (40)	27.0–53.4	10 (37)	19.4–57.6	13 (42)	24.5–60.9
Vitiligo	125	54 (43.2)	34.4–52.4	29 (44.6)	32.3–57.5	25 (41.7)	29.1–55.1
Other diseases	1020	434 (42.5)	39.5–45.7	189 (42.5)	37.8–47.2	245 (42.6)	38.5–46.8
Other physician							
Contact dermatitis	1027	229 (22.3)	19.8–25.0	68 (23.5)	18.8–28.9	161 (21.8)	18.9–25.0
Atopic dermatitis	810	225 (27.8)	24.7–31.0	79 (28.2)	23.0–33.9	146 (27.8)	23.8–31.6
Other eczema	1347	467 (34.7)	32.1–37.3	188 (36.8)	32.6–41.1	279 (33.4)	30.2–36.7
Psoriasis	515	72 (14.0)	11.1–17.3	40 (16.6)	12.1–21.9	32 (11.7)	8.1–16.1
Warts	3260	1500 (46.0)	44.3–47.7	669 (47.4)	44.7–50.0	831 (45.0)	42.7–47.3
Acne	1348	339 (25.1)	22.9–27.6	139 (24.4)	20.9–28.1	200 (25.7)	22.7–28.9
Urticaria	743	333 (44.8)	41.2–48.5	97 (47.1)	40.1–54.1	236 (43.9)	39.7–48.3
Skin cancer	290	45 (15.5)	11.5–20.2	23 (16.1)	10.5–23.1	22 (15.0)	9.6–21.8
Leg ulcer	58	34 (59)	44.9–71.4	17 (63)	42.4–80.6	17 (55)	36.0–72.7
Vitiligo	125	13 (10.4)	5.7–17.1	9 (13.8)	6.5–24.7	4 (6.7)	1.8–16.2
Other diseases	1020	450 (44.1)	41.0–47.2	199 (44.7)	40.0–49.5	251 (43.7)	39.6–47.8
No treatment							
Contact dermatitis	1027	145 (14.1)	12.0–16.4	32 (11.1)	7.7–15.3	113 (15.3)	12.8–18.1
Atopic dermatitis	810	39 (4.8)	3.4–6.5	16 (5.7)	3.3–9.1	23 (4.3)	2.8–6.4
Other eczema	1347	74 (5.5)	4.3–6.8	27 (5.3)	3.5–7.6	47 (5.6)	4.2–7.4
Psoriasis	515	28 (5.4)	3.6–7.8	15 (6.2)	3.5–10.1	13 (4.7)	2.6–8.0
Warts	3260	108 (3.3)	2.7–4.0	47 (3.3)	2.5–4.4	61 (3.3)	2.5–4.2
Acne	1348	66 (4.9)	3.8–6.2	31 (5.4)	3.7–7.6	35 (4.5)	3.2–6.2
Urticaria	743	60 (8.1)	6.2–10.3	22 (10.7)	6.8–15.7	38 (7.1)	5.1–9.6
Skin cancer	290	0 (0.0)	NA	0 (0.0)	NA	0 (0.0)	NA
Leg ulcer	58	2 (3)	0.4–11.9	0 (0)	NA	2 (6)	0.8–21.4
Vitiligo	125	57 (45.6)	36.7–54.7	26 (40)	28.0–52.9	31 (52)	38.4–64.8
Other diseases	1020	86 (8.4)	6.8–10.3	36 (8.1)	5.7–11.0	50 (8.7)	6.5–11.3

CI, confidence interval; NA, not available.

relatively high proportion of warts and urticaria – were often treated by nondermatologists. In Italy, even skin cancer was treated by other physicians in 31.7% of cases.

Discussion

This is the largest study to assess the prevalence of several common skin diseases at a population level among a number of European countries. The study population comprised 12 370 patients from five countries from Northern to Southern Europe. Using primary data, the present study systematically analysed the prevalence of a number of skin diseases and treatment pathways. This study thus rectifies the lack of public health information about skin diseases.

The present study found that nearly one-third of the general population from different European regions were affected by warts that had been diagnosed by a physician. The next most common skin conditions included acne, other types of eczema, urticaria, contact allergy, AD and psoriasis. There was some variation in the proportions of the population affected by these conditions across different geographic regions, with northern regions (Germany, the Netherlands and Sweden) showing a significantly higher prevalence for all diseases assessed in this study compared with the southern regions (Italy and Portugal).

Dermatologists played the leading role in diagnosing and treating the most important skin diseases; however, other physicians also played a role. Approximately 63.5% of patients with lifetime AD consulted a dermatologist and 27.8% of

Table 3 Prevalence of skin diseases diagnosed by a physician by country (age-standardized)

	Germany		Italy		The Netherlands		Portugal		Sweden	
	n (%)	95% CI	n (%)	95% CI	n (%)	95% CI	n (%)	95% CI	n (%)	95% CI
Contact dermatitis	519 (12.7)	11.7–13.7	116 (5.7)	4.7–6.8	179 (8.2)	7.1–9.5	101 (5.0)	4.1–6.1	146 (7.1)	6.0–8.3
Atopic dermatitis	383 (9.4)	8.5–10.3	76 (4.2)	3.3–5.3	125 (8.5)	7.2–10.1	67 (3.3)	2.6–4.2	142 (7.2)	6.1–8.4
Other eczema	538 (13.2)	12.2–14.3	53 (3.0)	2.2–3.8	386 (24.5)	22.4–26.7	156 (7.8)	6.7–9.1	237 (12.0)	10.6–13.5
Psoriasis	281 (6.9)	6.1–7.7	47 (2.6)	1.9–3.5	43 (3.1)	2.2–4.1	29 (1.5)	1.0–2.1	106 (5.4)	4.5–6.5
Warts	1653 (40.5)	39.0–42.0	114 (6.3)	5.2–7.5	1046 (53.1)	50.8–55.3	145 (7.3)	6.2–8.5	239 (12.0)	10.6–13.5
Acne	720 (17.7)	16.5–18.9	98 (5.5)	4.5–6.6	213 (13.6)	12.0–15.4	130 (6.5)	5.5–7.7	184 (9.3)	8.0–10.7
Urticaria	344 (8.4)	7.6–9.3	52 (2.9)	2.2–3.8	132 (9.0)	7.6–10.6	55 (2.8)	2.1–3.6	168 (8.5)	7.3–9.8
Skin cancer	112 (2.7)	2.3–3.3	15 (0.8)	0.5–1.4	57 (4.0)	3.0–5.1	7 (0.4)	0.1–0.7	75 (3.8)	3.0–4.8
Leg ulcer	14 (0.3)	0.2–0.6	4 (0.2)	0.1–0.5	21 (1.5)	0.9–2.3	2 (0.1)	0.0–0.3	11 (0.6)	0.3–1.0
Vitiligo	61 (1.5)	1.2–1.9	7 (0.4)	0.2–0.8	31 (2.2)	1.5–3.1	6 (0.3)	0.1–0.7	22 (1.1)	0.7–1.7
Other	415 (10.2)	9.3–11.2	32 (1.8)	1.2–2.5	276 (17.8)	15.9–19.7	203 (10.2)	8.9–11.6	117 (6.1)	5.1–7.3

CI, confidence interval.

Table 4 Treatment by dermatologist by country (age-standardized)

	Germany		Italy		The Netherlands		Portugal		Sweden	
	n (%)	95% CI	n (%)	95% CI	n (%)	95% CI	n (%)	95% CI	n (%)	95% CI
Contact dermatitis	272 (52.4)	48.0–56.8	55 (47.6)	38.1–56.9	42 (23.3)	17.4–30.2	53 (52.1)	41.8–62.0	64 (43.8)	35.6–52.3
Atopic dermatitis	301 (78.6)	74.1–82.6	48 (62.7)	50.6–73.1	34 (26.9)	19.5–35.6	40 (59.7)	47.0–71.5	72 (50.8)	42.2–59.2
Other eczema	379 (70.4)	66.3–74.1	31 (58.0)	44.1–71.9	67 (17.5)	13.8–21.7	96 (61.4)	53.4–69.2	119 (49.9)	43.5–56.5
Psoriasis	232 (82.7)	77.9–87.1	32 (68.7)	52.9–80.9	20 (46.9)	31.2–62.3	26 (89.4)	72.6–97.8	79 (74.4)	65.1–82.5
Warts	1159 (70.1)	67.8–72.3	74 (64.5)	54.9–73.1	112 (10.7)	8.9–12.8	59 (40.8)	32.6–49.2	103 (43.3)	36.9–49.8
Acne	576 (80.0)	76.9–82.9	57 (58.3)	47.8–68.1	52 (24.3)	18.7–30.6	86 (66.2)	57.3–74.2	127 (69.1)	61.8–75.6
Urticaria	195 (56.7)	51.3–62.0	18 (34.9)	22.0–49.1	16 (12.5)	7.3–19.5	27 (47.9)	34.7–62.0	55 (32.5)	25.5–40.2
Skin cancer	105 (94.1)	87.5–97.5	9 (58.5)	32.3–83.7	46 (80.7)	68.1–90.0	6 (83.2)	42.1–99.6	54 (72.2)	60.4–81.8
Leg ulcer	8 (58)	28.9–82.3	1 (23)	0.6–80.6	10 (46)	24.4–67.8%	0 (0)	NA	2 (21)	2.8–60.0
Vitiligo	25 (42)	29.1–55.1	6 (77)	34.9–96.8	12 (39)	21.8–57.8%	5 (85)	35.9–99.6	4 (16)	4.5–36.1
Other	263 (63.5)	58.7–68.2	11 (34.8)	18.6–53.2	48 (17.3)	13.0–22.2%	75 (37.0)	30.3–44.0	45 (38.1)	29.4–47.5

CI, confidence interval; NA, not available.

patients consulted another physician. The proportion of patients who consulted a dermatologist was not higher among women than among men. The highest dermatologist consultation rates were for skin cancer. Population-based epidemiological data are needed to obtain an accurate estimate of the prevalence of common skin diseases in addition to the number of patients who consult physicians. These numbers are likely to differ between countries because of different regulations in each country. For example, we found comparable prevalence rates for AD across countries; however, in the Dutch population, only 26.9% of patients with AD were treated by a dermatologist, whereas this rate was 50.8–78.6% in other countries. Similar effects were also seen for contact dermatitis, other types of eczema, urticaria and warts; this may be due to the fact that a dermatologist is accessible in the Netherlands only through referral.

A major advantage of the present study was the comprehensive approach across several European countries using a standardized method for data collection. One strength of this study was that data was collected using standardized interviews applicable in all countries rather than using secondary data. This study used validated measures to assess skin diseases, and the sampling strategy accounted for sex and age. The population-based design meant that the results were less prone to selection and ascertainment bias. We presented the sociodemographic characteristics of the participants, and the age and sex distribution was comparable to that of the general European population.¹² We chose to study the most common chronic skin diseases, which are treated in both primary and tertiary care; however, future studies should also examine other skin diseases.

The age and sex distribution of the participants in this study is consistent with general population data obtained from

Table 5 Treatment by other physician by country (age-standardized)

	Germany		Italy		The Netherlands		Portugal		Sweden	
	n (%)	95% CI	n (%)	95% CI	n (%)	95% CI	n (%)	95% CI	n (%)	95% CI
Contact dermatitis	61 (11.7)	9.1–14.8	31 (27.1)	19.3–36.3	72 (40.3)	33.0–47.8	35 (34.3)	25.2–44.4	38 (25.8)	19.0–33.7
Atopic dermatitis	50 (12.9)	9.8–16.7	12 (15.3)	8.2–25.3	81 (65.0)	55.8–73.1	26 (38.8)	27.1–51.5	54 (38.2)	30.2–46.9
Other eczema	85 (15.8)	12.8–19.2	6 (10.8)	4.0–21.9	257 (66.6)	61.6–71.3	49 (31.2)	24.1–39.1	77 (32.4)	26.5–38.7
Psoriasis	26 (9.2)	6.1–13.2	10 (22.0)	11.2–37.1	20 (45.5)	30.4–61.2	3 (10.6)	2.3–28.2	14 (12.9)	7.3–20.8
Warts	377 (22.8)	20.8–24.9	20 (17.8)	11.3–26.2	880 (84.1)	81.8–86.3	66 (45.3)	37.0–53.6	100 (41.7)	35.4–48.2
Acne	85 (11.7)	9.5–14.3	22 (22.0)	14.3–31.4	154 (72.5)	66.1–78.5	41 (31.5)	23.7–40.3	30 (16.3)	11.3–22.5
Urticaria	97 (28.3)	23.6–33.4	28 (54.9)	40.3–68.9	95 (72.5)	64.0–80.0	30 (54)	39.7–67.0	84 (49.9)	42.2–57.8
Skin cancer	9 (7.7)	3.6–14.1	5 (32)	11.0–58.7	11 (19.6)	10.2–32.4	1 (17)	0.4–64.1	15 (20)	11.8–31.2
Leg ulcer	6 (42)	17.7–71.1	2 (50)	6.8–93.2	13 (59)	36.4–79.3	2 (100)	15.8–100.0	7 (63)	30.8–89.1
Vitiligo	3 (4)	0.9–12.4	0 (0)	NA	4 (14)	4.0–32.7	0 (0)	NA	7 (33)	14.6–57.0
Other	90 (21.6)	17.8–25.9	10	16.1–50.0	192 (69.7)	64.0–75.2	112 (55.2)	48.1–62.1	55 (46.7)	37.4–56.0

CI, confidence interval; NA, not available.

Eurostat 2010, as presented by Naldi *et al.*¹² The details of skin problems among the general population presented here improves our understanding of factors that influence consultations for skin problems. Our findings are in line with those of other studies.^{1,2,4,18,19} However, in a recently published study, a full-body skin examination was performed in a Dutch sample and the prevalence for any kind of skin cancer was higher in this study¹⁹ compared with our findings (4.9% vs. 4.0%). This might indicate an underdiagnosis of skin cancer in the general population. However, only slightly higher but comparable standardized rates of psoriasis were found (3.4% vs. 3.1%) in the Dutch study.¹⁹ These results strengthen our findings, which were based on self-reports. A point prevalence of 2–4% of psoriasis in the adult population seems reasonable according to other epidemiology studies.²⁰ This study, by Michalek *et al.*, also made it clear that there is a need for better quality data on epidemiology in psoriasis. As we used a standardized methodology in our study, it was possible to compare results between different European countries.

Our results regarding acne are in accordance with those of Hay *et al.*, who reported that in 2010 acne was one of the 10 most prevalent diseases worldwide⁶ and eczema was among the top 50. We found acne to be common, which was also previously shown by Vos *et al.*;⁴ however, we did not interview adolescents younger than 18 years, in whom acne is more prevalent, and older individuals may have forgotten that they had acne when they were younger. However, our results additionally show that about half of the respondents do not visit any physician because of their acne; this may be an indicator that the acne is not very severe in those people. Two German studies have described the prevalence and treatment pathways of AD using secondary data;^{21,22} their findings are in line with our results regarding the German study population, which might confirm the validity of the current study. In one of those German studies, the diagnosis and treatment pathways of AD were affected by sex.²¹

Generally we found higher prevalence rates for skin diseases in women, which confirms the findings of a population-based study conducted in Oslo, Norway, in which self-reported skin symptoms were found to be more common in women.² Warts and vitiligo were more prevalent in Northern Europe compared with Italy and Portugal. The study by Hay *et al.* found warts to be the most common skin disease,⁶ which is in accordance with the results of the current study. As viral warts can be of short or intermediate duration and have a relatively high incidence rate, it would be reasonable to expect the results to show a higher lifetime prevalence.²³ The current study found a self-assessed lifetime prevalence of about 41%. The lifetime prevalence of warts confirmed by a physician was about half the lifetime prevalence assessed by the participants, which seems reasonable, as many individuals treat warts themselves.

The lifetime prevalence of contact dermatitis (irritant or allergic) in our study was 15.0% according to self-reporting and 8.3% for cases diagnosed by a physician. However, in our study, the lifetime prevalence of having at least one contact allergy was 27.0%¹⁶ which compares to a review of

population-based studies in 2008 where it was reported to have a range from 12.5% to 40.6% with a median estimate of 21.2%.²⁴ This indicates that a contact allergy does not necessarily lead to contact dermatitis over the course of a patient's lifetime.

Several of the dermatological conditions examined in the present study were reported in more than one-quarter of the general European population. Accurate early diagnosis and treatment could affect the severity and outcome of skin diseases.²⁵ In this regard, dermatologists play a crucial role. Sex-specific differences must be considered when planning and implementing future preventive measures. Climate and other environmental or cultural factors, apart from genetic aspects of the population, may contribute to the variations in the prevalence of skin diseases among the different countries.

Population-based epidemiological studies on skin diseases are needed to provide important risk data to government agencies, industries and patients. When comparing diagnosis and treatment with different healthcare levels, it is essential to obtain epidemiological data based on carefully conducted representative studies. These data are essential for assessing the burden of skin diseases and are also necessary for the international surveillance of skin diseases in order to observe trends and potential risk factors. For example, the skin cancer incidence rate has risen in Sweden, possibly resulting from an increased intermittent pattern of sun exposure, as reflected by the relatively high reported prevalence of skin cancer in the current study. Modifiable risk factors might be addressed to reverse this trend. It is necessary to conduct similar studies in other parts of the world.

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