

CLINICAL REPORT

Treatment of Psoriasis in the Nordic Countries: A Questionnaire Survey from 5739 Members of the Psoriasis Associations Data from the Nordic Quality of Life Study

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The data from a questionnaire-based study of 5,739 members of the psoriasis associations of Denmark, Finland, Iceland, Norway, Sweden and the Faeroe Islands showed that the two most commonly used active agents were topical steroids (89.7% total use and 49.4% present use) and calcipotriol (73.1% total use and 35.8% present use), with only small variations between the countries. Marked differences between the countries were, however, found within all other types of psoriasis therapy, including the so-called alternative treatments. Significant priorities varied between the different countries. The use of dithranol in Finland was almost twice the average. While 14.2% of Danish members had received grenz-rays within the last week only 0.1% of the Finns had been given the same treatment. Psoralen plus ultraviolet A (PUVA) was being used by 13.1% of the Finnish psoriatics compared with 3.8% of Danes, while PUVA was almost non-existent on the Faeroe Islands. The use of non-PUVA phototherapy was highest in Norway and Sweden. Almost 10% of the Danes were presently on methotrexate, which was used far more than etretinate/acitretin or cyclosporine. In contrast, Finnish patients more often received etretinate than other systemic agents, and in Iceland there was a higher present use of cyclosporine than of etretinate. The popularity of alternative therapies was highest in Iceland, where 26.6% had taken such medication during the last week. The results of the study suggest that different treatment patterns should be taken into consideration when discussing the prognosis of psoriasis in different countries. **Key words:** *psoriasis therapy; Nordic countries; quality of life.*

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Large-scale comparisons between treatments of psoriasis in several countries have not previously been reported. The Nordic Quality of Life Study (1) has allowed such comparisons to be made. The study, which was undertaken following an initiative from the Nordic Psoriasis Associations, is a questionnaire-based investigation conducted on their members in order to assess the relationship between psoriasis and quality of life (QoL) in Nordic countries. In the study, the respondents were also asked for information on current and previous medical treatment as well as on their use of alternative treatments. These data are published separately in the present article, as

they have a bearing not only on QoL, but also on other aspects such as complications and long-term side-effects. The aim of this study was to investigate whether there are differences in psoriasis therapy between different countries and, if so, to find the reasons for these differences.

PATIENTS AND METHODS

Patients

The questionnaire was mailed to randomly selected members of the psoriasis associations from Denmark, Finland, Norway and Sweden, and to all members acknowledged the associations from Iceland and the Faeroe Islands. There were 1,356 responders (67.8%) from Denmark, 1,125 (56.3%) from Finland, 451 (40.0%) from Iceland, 903 (45.2%) from Norway, 1,828 (45.7%) from Sweden and 76 (44.0%) from the Faeroe Islands, yielding a total of 5,739 psoriatics. The percentages in parentheses represent response rates, with the average response rate being 50.2%. Patients were excluded if they were under 18 years old, and only patients who had had their diagnosis of psoriasis made or confirmed by a dermatologist were included in the study. The age and sex variation within the groups is shown in Table I, together with the duration of psoriasis. No difference in the proportion of men and women was found between countries ($\chi^2 = 6.7$; ns), with more women than men participating in the survey. There were significant differences between countries with respect to age ($F_{5,723} = 57.1$; $p < 0.001$), disease duration ($F_{5,723} = 53.9$; $p < 0.001$) and disease severity ($\chi^2 = 113.5$; $p < 0.001$). The Finnish and Swedish samples were older, had longer disease duration and reported less severe psoriasis than the other samples. The Norwegian sample had the highest severity scores.

Table II shows the disease severity characteristics of the samples together with the reported frequencies of arthritis. A total of 2,293 patients (40.0%) reported having symptoms that they related to arthritis, while 1,700 (29.6%) had a diagnosis of psoriatic arthritis established by either a rheumatologist or dermatologist. A total of 268 (4.7%) patients had been diagnosed as having arthritis by a physician who was not a rheumatologist or dermatologist.

Questionnaires

The questionnaire (1), besides dealing with matters related to QoL (2, 3), included questions on specific current and previous treatments, current and previous use of alternative treatments, and questions asking for the respondents to rate psoriasis severity on 11-point scales. This assessment included an evaluation of the degree of erythema, scaling, plaque thickness and itch, as well as a general assessment of severity. They were also asked to rate the area of their psoriasis on a scale from 0 to 100%. Respondents with psoriatic arthritis were asked to rate the degree of pain and the degree to which they felt bothered by the pain on an 11-point scale. The remaining questions related to family history, educational status, employment, drinking and smoking habits, hospitalizations and other chronic diseases.

Table I. Mean age, sex and mean self-reported disease duration of 5,739 Nordic psoriatics

	Denmark	Finland	Iceland	Norway	Sweden	Faeroe Islands	Total
<i>n</i>	1,356	1,125	451	903	1,828	76	5,739
Women (%)	58.1	54.1	58.2	54.2	54.6	56.7	55.5
Men (%)	41.9	45.9	41.8	45.8	45.4	41.3	44.5
Age (years)	49.3	56.6	47.6	53.1	54.4	45.8	52.5
Duration (years)	25.8	35.0	26.2	28.6	29.4	24.9	29.2

Table II. Average disease severity graded 0–10 by self-assessment in patients with and without arthritis, percentage self-reported arthritis and percentage diagnosed by the patient's rheumatologist or dermatologist

Country	<i>n</i>	Disease severity			Arthritis			
		Total	+ Arthritis ^a	– Arthritis	Self-report		Diagnosed	
					<i>n</i>	%	<i>n</i>	%
Denmark	1,356	5.19	5.60	5.04	466	34.4	345	25.4
Finland	1,125	4.56	5.17	4.26	448	39.8	369	32.8
Iceland	451	4.60	4.82	4.52	162	35.9	121	26.8
Norway	903	5.30	5.91	4.99	416	46.1	302	33.4
Sweden	1,828	4.46	4.84	4.29	791	43.3	558	30.5
Faeroe Islands	76	4.67	5.75	4.60	10	13.2	5	6.6
Total	5,739	4.79	5.26	4.60	2,293	40.0	1,700	29.6

^aRefers to patients diagnosed by a specialist.

Statistical analyses

Proportions and ordinal data were analysed with χ^2 tests and non-parametric tests, including the Mann–Whitney and Friedman tests. Continuous data were analysed with *t*-tests for independent samples, one-way analyses of variance (ANOVAs) and analyses of covariance (ANCOVAs). To analyse the influence of age, sex, disease duration, severity and country on the present and previous use of therapies, a series of logistic regression analyses was conducted with use of therapy or not as the dependent variable, and age, sex, disease duration, severity and country entered as independent variables in the equation. Before being entered into the equation, country was recorded as a dummy variable (country = 1, other countries = 0) for each of the 6 countries. The term “significant differences were found between countries” in the tables is used when one or several countries differ significantly ($p < 0.05$) from one or several other countries. Several of the variations found between countries are small but, owing to the large sample, still statistically significant. The authors have therefore chosen not to burden the reader with statistical results for all pairwise comparisons between individual countries, and detailed statistics for only the more important data are reported in the text.

RESULTS

Topical agents

The reported use of non-specified creams and ointment, including emollients and moisturizers, together with the most common topical agents is shown in Table III. A total of 89.7% had previously used topical steroids and 49.4% were using these agents at present. The corresponding figures for calcipotriol, used nearly as often, were 73.1% and 35.8%. Variations between the countries were small but, owing to the large sample, still significant (Table III). The most significant finding was the common use of dithranol in Finland. The use was almost the double of the average for the Nordic countries. The study did not distinguish between different preparations

or different types of application of any of the topical agents mentioned.

Phototherapy and grenz-rays

The questionnaire referred to psoralen plus ultraviolet A (PUVA) and non-PUVA light therapy (Table IV), but did not distinguish between different types of non-PUVA ultraviolet radiation. Goeckerman treatment is assumed to be included under non-PUVA therapy, although not specifically mentioned, while balneotherapy, which includes “light therapy”, has been classified as “climate treatment”.

Respondents in Norway and Iceland were the highest users of non-PUVA phototherapy; 78% and 74.9%, respectively, had previously been treated with UV radiation. It should be noted that 18.6% of all Nordic psoriatics had received some kind of non-PUVA light therapy within the last week. PUVA was also popular within the Nordic countries. A total of 61% of all patients had tried PUVA and an average of 7% had received PUVA within the last week. Within PUVA, there were, however, very significant differences between countries. In Finland, 69.3% had previously been treated and 13.1% were presently receiving treatment. In Denmark the corresponding figures were 23.4 and 3.8%. The extremely low figures from the Faeroe Islands (1.3 and 0.2%) should be seen in light of the fact that the country has no privately practising dermatologists, and only occasional visits by a consultant at the main hospital. Balneotherapy (climate treatment) had been given on average to a total of 37.7% of all Nordic psoriatics. The questionnaire did not distinguish between places where the therapy was taken (Dead Sea, Lanzarote, Gran Canaria or Blue Lagoon in Iceland).

Concerning grenz-rays (Bucky therapy), Denmark differed

Table III. Reported use (%) of non-specified and specified topical agents within the last week (l.w.) or previously (prev.)

Country	n	Non-specified creams		Tar		Topical steroids		Dithranol		Calcipotriol	
		l.w.	prev.	l.w.	prev.	l.w.	prev.	l.w.	prev.	l.w.	prev.
Denmark	1,356	65.6	90.4	7.1	76.2	43.6	89.7	0.6	11.7	34.0	79.2
Finland	1,125	71.5	95.4	9.5	83.5	45.2	81.5	6.2	63.6	28.7	66.3
Iceland	451	63.9	97.7	4.7	62.3	38.1	91.3	1.8	20.6	39.0	79.1
Norway	903	73.8	95.0	5.6	70.4	54.4	95.8	2.3	29.8	41.6	82.1
Sweden	1,828	78.3	96.5	6.7	57.3	57.1	90.7	3.7	35.7	38.3	66.2
Faeroe Islands	76	47.4	87.7	1.7	69.5	36.8	92.4	0.0	7.9	26.3	75.9
Total	5,739	71.7	94.7	7.0	69.6	49.4	89.7	3.0	34.1	35.8	73.1

Significant differences were found between countries for all 5 treatments, both within the last week ($p=0.003-0.0001$) and with respect to previous use ($p<0.001$).

Table IV. Use of phototherapy (%) including climate therapy and grenz-rays within the last week (l.w.) and previously (prev.)

Country	n	PUVA		Non-PUVA		Grenz-rays (Bucky)		Climate therapy
		l.w.	prev.	l.w.	prev.	l.w.	prev.	
Denmark	1,356	3.8	23.4	13.8	57.5	14.2	70.7	33.0
Finland	1,125	13.1	69.3	14.3	59.4	0.1	0.5	51.7
Iceland	451	7.1	47.9	19.3	74.9	0.8	3.1	49.6
Norway	903	4.2	32.7	23.9	78.0	1.0	7.4	49.5
Sweden	1,828	7.2	31.5	22.1	65.5	3.5	13.0	24.5
Faeroe Islands	76	0.2	1.3	15.8	45.5	2.5	7.0	28.9
Total	5,739	7.0	61.0	18.6	65.2	4.9	23.9	37.7

PUVA: psoralen plus ultraviolet A.

Significant differences were found between countries for all treatments, both within the last week ($p<0.001$) and with respect to previous use ($p<0.001$).

highly significantly from all other Nordic countries. A total of 70.7% of all Danish psoriatics responding to the question had previously been treated with grenz-rays and 14.2% of all psoriatics had received this treatment within the last week.

Systemic therapy

The Faeroe Islands had the lowest rate of use of systemic therapy (Table V), reflecting the lack of dermatologists in the islands. Denmark had by far the highest use of methotrexate

(MTX) of all the Nordic countries. Finland predominated in the use of etretinate/acitretin, with approximately twice the use of the total study population, and approximately 3 times higher use than in Denmark and Sweden. Finland also had a relatively high use of cyclosporin A (CsA), sharing the top position with Iceland. A total of 16.7% of patients with arthritis never took analgesics, while 30.7% used these drugs daily. The corresponding figures for "other drugs against arthritis", including non-steroidal anti-inflammatory drugs (NSAIDs) were 39.7% and 22.9% (data not shown).

Table V. Use of systemic therapy (%) (psoralens in PUVA therapy excluded) within the last week (l.w.) or previously (prev.)

Country	n	MTX		Etretinate/Acitretin		CsA	
		l.w.	prev.	l.w.	prev.	l.w.	prev.
Denmark	1,356	9.3	25.5	2.3	9.6	1.5	3.8
Finland	1,125	5.6	15.1	7.0	33.3	2.3	5.3
Iceland	451	5.3	13.7	1.6	9.9	2.5	6.3
Norway	903	6.5	15.1	2.3	13.7	0.8	4.9
Sweden	1,828	6.3	12.6	2.2	10.6	1.4	3.7
Faeroe Islands	76	1.3	4.9	0.0	7.1	0.0	0.0
Total	5,739	6.8	16.6	3.1	15.1	1.5	4.4

PUVA: psoralen plus ultraviolet A; MTX: methotrexate; CsA: cyclosporin A.

Significant differences ($p<0.001$) were found between countries for MTX and etretinate, both within the last week and with respect to previous use. No significant differences were found for CsA.

Dietary measures

The questionnaire did not distinguish between diets instituted by physicians or dieticians and those instituted by the patients. More than 40% of psoriatics from Iceland had attempted a special diet, compared with only 7.2% Swedish psoriatics and 7.5% from the Faeroe Islands. The figures from the other countries ranged from 10.3 to 23.6%.

Alternative therapies

The questions related to the present and previous use of "alternative medicine" and to the present and previous use of "alternative treatment" (Table VI). The popularity of this type of "therapy" was highest in Iceland, where 26.6% had taken alternative medications within the last week and 17.2% other alternative therapies.

Relation to sex, age and duration of disease

Sex-specific differences in treatment were found in relation to total use of tar, and topical steroids. Women had a slight, but significantly higher use of these remedies ($p < 0.001$). The same was found for "other alternative therapies", and there was a pronounced higher use of both present ($p < 0.05$ and $p < 0.02$) and total use ($p < 0.001$) of grenz-rays and alternative medicine in women, together with a slightly higher present use of non-specific creams ($p < 0.02$). In contrast, men had a significantly higher present and total use of etretinate ($p < 0.001$) and present use of calcipotriol ($p < 0.05$), PUVA and non-PUVA phototherapy ($p < 0.001$). Men also had a higher total use of balneotherapy ($p < 0.001$).

There were also significant age-related differences, when corrected for duration ($p < 0.001$). Within present therapy, grenz-rays, PUVA and etretinate were given more often to older patients. The same was the case for previous use of etretinate, while younger patients were more often given non-PUVA phototherapy and had more frequently been users of topical steroids, calcipotriol, alternative medicine and other alternative therapies. With a longer duration of disease more were in present treatment with grenz-rays and more had previously been treated with non-PUVA phototherapy.

Relation to disease severity and arthritis

The data from the study on QoL (1) showed an increase in the patients' evaluation of the severity of their disease when

going from topical agents to phototherapy and further to systemic therapy, with MTX and dithranol being the exceptions. The severity index in patients presently on MTX was lower than in patients receiving phototherapy and grenz-rays. The percentage of patients with arthritis was especially high in patients on MTX and CsA. The frequency of arthritis was also increased in patients on PUVA, etretinate and the different alternative therapies.

Results of logistic regression analyses

Self-reported disease severity was a significant predictor of use for all treatments except for dietary measures, while age only played a small, albeit significant, role in the use of some present treatments, but a significant role for all but one of the previous treatments. Having controlled for the other independent variables, being female increased the likelihood of presently using non-specific creams, grenz-rays and alternative medications. Being female also increased the likelihood of previous use of tar, topical steroids, grenz-rays, dietary measures, alternative medications and other alternative therapies. Being male increased the likelihood of present use of retinoids, calcipotriol, PUVA and non-PUVA phototherapy, and of previous use of retinoids, dithranol and balneotherapy. Country remained a significant predictor for a number of present and previously used therapies.

DISCUSSION

It is well known that there are great differences in therapy between developed and underdeveloped countries, and that such differences largely depend on economy, availability and tradition. The present data show variations in therapy between developed countries. Although disease severity was found to be a significant predictor of use for almost all therapies, and age and sex also played a role, psoriasis treatment can vary significantly independently of these factors.

The authors have no explanation for the variations in age and sex found among members of the different psoriasis associations in this material, nor could they identify possible differences between types of patients who were members of the different psoriasis associations. Variations within the use of the most popular topical agents were small. Corticosteroids were still the most widely used agents, but they were closely followed by calcipotriol (4) in both current and previous use. It is, however, noteworthy that approximately 10% of all

Table VI. Use of alternative medicine and other alternative treatments (%) within the last week (l.w.) or previously (prev.)

Country	n	Alternative medicine		Other alternative therapy	
		l.w.	prev.	l.w.	prev.
Denmark	1,356	22.5	34.1	14.0	25.8
Finland	1,125	19.5	23.9	12.4	14.7
Iceland	451	26.5	42.1	17.2	26.0
Norway	903	17.7	26.8	10.7	14.1
Sweden	1,828	13.0	19.7	8.5	10.0
Faeroe Islands	76	8.7	25.6	8.7	23.5
Total	5,739	17.9	26.6	11.4	17.1

Significant differences ($p < 0.001$) were found between countries for alternative medicine and other alternative therapies, both within the last week and with respect to previous use.

Nordic psoriatics have never tried topical steroids. A significant finding in topical therapy was the high usage of dithranol in Finland. This is probably due to habit: the use of this drug has a long tradition at the University Hospital in Helsinki (5).

Use of phototherapy and grenz-rays can be of interest for the long-term evaluation of skin cancer among psoriatics. Other therapies such as systemic immunosuppressive agents may also be significant in this respect (6), although any evaluation is extremely difficult because true long-term monotherapy is rare. This was also the case in the present study, where a high degree of overlap of potential carcinogenic substances was found. Different Nordic countries each had their significant priorities within these areas. The high use of grenz-rays in Denmark is an example. Grenz-rays are not used in Iceland or the Faeroe Islands, and positive responses from these countries to the question about treatment with grenz-rays either represent treatment abroad or misunderstanding of the question.

Although Danish dermatologists were among the first to introduce liver biopsies for monitoring patients on MTX (7), almost 10% of their patients are presently on the drug with a fairly low self-reported severity of disease. When studying previous therapy with MTX, Denmark differs highly significantly from the other countries in its high use and Finland in its low use, in both cases independently of other factors. The older age of the Finnish sample seemed to have been partly responsible for or contributed to the selection of etretinate. Iceland had a higher present use of CsA than of etretinate, but only Finland's relatively high use of CsA was independent of other factors. None of the patients from the Faeroe Islands had ever tried CsA, and their use of systemic therapy was almost negligent, probably because of the already mentioned lack of dermatologists on the islands. The same applies to their extremely low use of PUVA. The differences in systemic therapy between the other countries were probably also due to tradition and interest within special centres.

Use of climate therapy or balneotherapy probably depended more on availability and economy than on patient preference. The policy of the health authorities for referring patients to a therapy that in most cases takes place abroad varies from country to country. Only Iceland offers balneotherapy within its own borders (8). Variations in the use of alternative therapies are more difficult to explain. The two North Atlantic countries represent the highest (Iceland) and lowest (Faeroe Islands) users of these types of therapy. It should be noted that alternative therapies were used by women more often than by men.

Other sex-specific differences in the treatment of psoriasis have recently been studied in the USA (9). In mild disease treated with topical treatment alone the US study found notable differences between the sexes. The present study found that women had a slight, but significantly higher, use of a number of remedies applied to the skin, including non-specific creams and ointments. This could be related to the generally more common use of skin-care products by women. Because retinoids are potent teratogens (10), it is only natural that both the US and the present study disclosed a significantly higher use of etretinate in men than in women. The US study also showed a large sex-related difference in the use of MTX, probably due to restrictions on its use in women of childbearing potential (11). In the US study 23% MTX users were women and 77% male, whereas the present study found no significant

sex-specific pattern related to MTX. In the USA, women also seem to compensate for the restrictions on the use of etretinate and MTX by a higher frequency of use of PUVA (9), while this seems not to be the case in the Nordic countries. An unexplained difference by sex is the higher present use of phototherapy by men.

As mentioned, age had a significant and independent influence on the use of several treatment modalities in this sample. The restrictions for women of childbearing age could account for the higher use of retinoids in age groups over 45 years, and a more relaxed attitude to cancer risks in the older age groups for the increased use of grenz-rays and PUVA with age. Elderly patients were less eager than younger ones to use alternative therapies. To a smaller degree they also used less topical treatment with steroids and calcipotriol.

Besides tradition, differences in the organization of health care, geography and differences in price policies for drugs could be important, but the results of these factors seem more obscure. Some of the variations in the popularity of alternative therapies have been discussed, but without a satisfactory explanation. Such popularity is a general trend. In the main study (1) patients were asked for information on their level of satisfaction with their contact with the physician. The degree of satisfaction was in general high, and this factor does not seem to be decisive in this respect.

The study had an average response rate of 50.2%, which is comparable to the response rates of 40–50% generally found in mailed epidemiological questionnaires (12). The higher response rate of Danish members was probably due to the fact that the Danish association was the only one that followed the authors' advice to mail a reminder of the study shortly before mailing the questionnaires. This has also been shown to be an important factor for the response rate to mailed epidemiological questionnaires (12). A relatively large number of comparisons was conducted, which could potentially induce a risk of mass significance. However, the large sample and the highly significant differences indicate that the observed differences are likely to continue to be statistically significant, even when controlling for multiple comparisons. Thus, when using the Bonferroni adjustment method, a result of $p < 0.001$ would still be significant ($p < 0.05$) when controlling for 50 simultaneous comparisons.

This study has proven that in spite of international guidelines for the treatment of psoriasis (13), there are significant differences between countries in the treatment of psoriatics. The variation is found in all types of therapy, topical as well as systemic, and now even for similar countries such as the Nordic countries. The results suggest that different patterns of treatment should be taken into consideration when discussing the outcome of psoriasis in different countries.

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