

## Appendix S1.

### METHODS

#### *Patients and the heliotherapy course*

The 2-week EHT courses referred to here were arranged by the Finnish Psoriasis Association and the Finnish Central Organization for Skin Patients in Puerto Rico (27°N, 15°W), Canary Islands, Spain, between October 2012 and April 2013. The impact of 8 psoriasis and 4 AD courses were studied. Inclusion criteria were psoriasis or AD without demanding any minimum severity scorings, age 18 years or older and a referral from a doctor. Exclusion criteria were as reported previously (5). The course included an education day before EHT and a reunion weekend 3 months later. Of patients attending the courses, 133/168 of those with psoriasis and 60/72 of those with AD volunteered to participate in the study, but 6 patients with psoriasis and one patient with AD were excluded from the analyses on account of incomplete questionnaires and one because of remaining in Puerto Rico for an extra week. During the EHT the patients were allowed to use their systemic and topical medication, as prescribed and previously used. Of the patients with psoriasis, 15 were using a biological drug with or without methotrexate, 5 were taking methotrexate as a monotherapy, 4 acitretin and 1 cyclosporine. Thirteen of the patients with psoriasis were using potent or very potent topical corticosteroids and 30 of the patients with AD were using mild-to-potent topical corticosteroids. Adjustments in the drugs were allowed during the study period.

The sunbathing time was divided equally between both sides of the body and varied according to the Fitzpatrick's skin phototype (7), season, disease group and severity, being initially 20–90 min for patients with psoriasis and 15–30 min for patients with AD. Daily solar exposure time was increased to 90 min within a week and up to 300 min for psoriasis and 120 min for AD in cases of skin phototype IV. The scheduled exposure time was spent in the mornings or afternoons without sunscreens. Thereafter a sunscreen was applied liberally. Nurses were available at any time.

The EHT staff for the psoriasis groups consisted of 2 nurses and 2 physiotherapists experienced in rehabilitation and group leading. The supporting education for the psoriasis patients included themes, such as psoriasis as a chronic disease (2 h), sunbathing (1 h), the role of sleep and resting (2 h), skin care and pain relief (2 h), nutrition (1 h) and weight control (1 h). Three group discussions were arranged (5–6 h) focusing on sharing experiences of life with psoriasis, treatment experiences, achieving a healthy

lifestyle, coping with stress and cessation of smoking. Physical exercise (24 h) included water sports, trekking and gymnastics.

The staff for the AD groups consisted of a group leader, a nurse and a psychologist. The supporting education included themes such as atopic dermatitis (2 h), sunbathing (1 h), skin care (2 h), nutrition (1 h) and patient organizations (1 h). Four group discussions with a psychologist were arranged (6 h), on topics that included mental well-being, psychosomatics and acceptance of a chronic disease. The objective was to increase empowerment and support self-care of AD and general well-being. Physical exercise (11 h) included water sports, trekking and gymnastics.

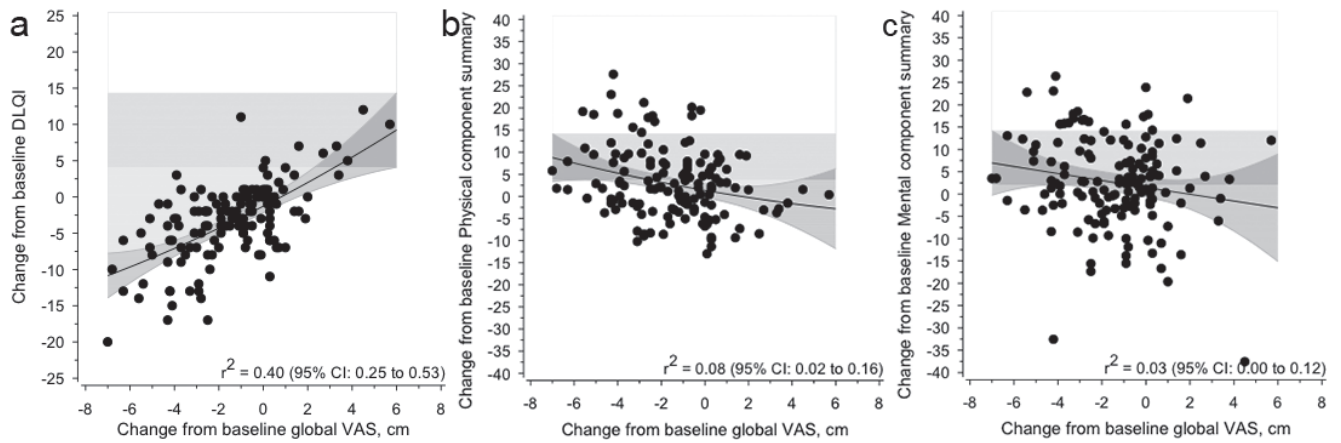
The protocol was approved by the ethics committee of Tampere University Hospital (number o R12219). All the participants gave their informed consent.

#### *Assessment of health-related quality of life and disease severity*

HRQoL was assessed with the Dermatology Life Quality Index (DLQI) (8) and RAND-36 (4-week version), for which physical component summary (PCS) and mental component summary (MCS) scores were calculated (9). Disease severity was assessed with the Self-Administered Psoriasis Area and Severity Index (SAPASI) (10) and Patient-Oriented Scoring of Atopic Dermatitis (PO-SCORAD) (11). Disease severity and pruritus were assessed using a visual analogue scale (VAS) (12). The self-assessments were performed during the education day prior to departure (T1), immediately after returning home from EHT (T2), and 3 months after T2 (T3). Data were available for 127, 125 and 92 patients with psoriasis and 59, 57 and 45 patients with AD, respectively.

#### *Statistical analysis*

Repeated data were analysed using generalizing estimating equation (GEE) models with an unstructured correlation structure and bootstrap-type standard error. The GEE models, which were developed as extensions of the general linear model for analysing longitudinal and other correlated data, take into account the correlation between repeated measurements in the same subject, do not require complete data, and allow a fit to be achieved even when observations for some individuals are lacking at certain time-points. Bonferroni adjustments were performed to correct the significance levels for the multiple tests. The normality of the variables was evaluated using the Shapiro-Wilk statistics. The Stata 14.0 statistical package of StataCorp LP (College Station, TX, USA) was used for the analyses.



**Fig. S1.** Relationship of change from the baseline global visual analogue scale (VAS) score to improvements in (a) the DLQI and RAND-36 findings and (b) the physical and (c) the mental component summary scores in patients with psoriasis or atopic dermatitis (n = 186).

**Table SI. Improvement in the Dermatology Life Quality Index (DLQI) and alleviation of disease severity during the empowering heliotherapy course**

	Baseline Mean (SD)	Change from baseline	
		Δ Week 2 Mean (95% CI)	Δ Week 14 Mean (95% CI)
<b>Psoriasis</b>			
DLQI	8.2 (5.9)	-5.4 (-6.4 to -4.4)***	-2.6 (-3.7 to -1.4)***
RAND-36 physical component	41.1 (10.7)	2.7 (1.4 to 4.0)***	3.9 (2.4 to 5.3)***
RAND-36 mental component	45.7 (11.0)	6.1 (4.3 to 7.9)***	3.0 (1.0 to 4.9)**
Self-Administered Psoriasis Area and Severity Index	7.4 (5.8)	-5.0 (-5.9 to -4.1)***	-2.7 (-3.8 to -1.6)***
Visual analogue scale pruritus	3.4 (2.4)	-2.0 (-2.4 to -1.7)***	-0.7 (-1.2 to -0.1)*
Visual analogue scale global	4.1 (2.0)	-2.0 (-2.3 to -1.7)***	-1.2 (-1.7 to -0.8)***
<b>Atopic dermatitis</b>			
DLQI	10.4 (5.5)	-7.7 (-9.1 to -6.4)***	-4.8 (-6.2 to -3.5)***
RAND-36 physical component	46.6 (8.8)	3.3 (1.5 to 5.2)**	2.8 (0.9 to 4.7)*
RAND-36 mental component	44.5 (10.5)	6.5 (3.9 to 9.2)***	4.7 (2.4 to 7.1)**
Patient-Oriented Scoring of Atopic Dermatitis	36.8 (15.5)	-24.0 (-27.3 to -20.1)***	-14.6 (-18.7 to -10.6)***
Visual analogue scale pruritus	4.5 (2.3)	-3.4 (-4.0 to -2.8)***	-2.4 (-3.1 to -1.6)***
Visual analogue scale global	3.9 (2.1)	-2.8 (-3.3 to -2.3)***	-1.9 (-2.5 to -1.4)***

Bonferroni-adjusted *p*-values: \*\*\**p*<0.001, \*\**p*<0.01, \**p*<0.05 compared with day 1 of heliotherapy.

**Table SII. Improvement in quality of life as measured by the RAND-36 questionnaire during the empowering heliotherapy course**

	Baseline Mean (SD)	Change from baseline	
		Δ Week 2 Mean (95% CI) <sup>a</sup>	Δ Week 14 Mean (95% CI) <sup>a</sup>
<b>Psoriasis</b>			
Physical function	73.6 (21.7)	5.3 (1.9 to 8.7)***	5.0 (1.6 to 8.5)**
Physical role	46.2 (42.3)	14.4 (6.7 to 22.1)***	15.3 (5.5 to 25.2)**
Bodily pain	58.3 (26.1)	7.5 (3.8 to 11.1)***	6.7 (1.3 to 12.0)**
General health perceptions	48.5 (18.9)	6.1 (3.2 to 9.0)***	5.0 (2.1 to 8.0)***
Social function	68.9 (22.7)	10.8 (6.9 to 14.6)***	6.6 (1.1 to 12.2)*
Emotional role	61.8 (42.3)	12.5 (3.8 to 21.3)**	7.5 (-2.5 to 17.5)
Vitality	50.6 (19.9)	15.9 (12.0 to 19.7)***	9.3 (4.9 to 13.8)***
Mental health	67.1 (18.1)	10.5 (7.1 to 13.8)***	4.6 (0.6 to 8.5)*
<b>Atopic dermatitis</b>			
Physical function	84.7 (16.6)	8.1 (3.5 to 12.8)**	6.3 (1.7 to 10.9)**
Physical role	56.6 (42.1)	15.5 (3.2 to 27.7)*	20.7 (5.4 to 36.0)*
Bodily pain	70.0 (24.4)	10.1 (2.7 to 17.4)**	2.7 (-4.8 to 10.3)
General health perceptions	56.0 (21.2)	8.1 (3.5 to 12.8)***	6.3 (1.7 to 10.9)**
Social function	69.1 (24.7)	12.6 (6.2 to 19.0)***	13.2 (5.4 to 21.1)***
Emotional role	63.1 (41.7)	14.8 (1.0 to 28.7)*	16.1 (1.7 to 30.4)*
Vitality	55.5 (20.6)	15.5 (9.8 to 21.1)***	5.8 (-0.3 to 11.8)
Mental health	67.6 (18.1)	11.9 (7.8 to 16.0)***	5.4 (1.1 to 9.7)*

<sup>a</sup>Bonferroni confidence intervals. Bonferroni-adjusted *p*-values \*\*\**p*<0.001, \*\**p*<0.01, \**p*<0.05 compared with values on day 1 of heliotherapy.  
95% CI: 95% confidence interval.