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Satisfaction with treatment among patients with psoriasis: a web-based survey study

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Summary

Background Various psoriasis treatments are currently available: topical therapy, photo(chemo)therapy, oral agents and biologics. Little is known about patients' satisfaction with these treatment options. Moreover, the few available studies show methodological shortcomings.

Objectives To answer the following questions: firstly, how satisfied are patients with psoriasis with their current treatment and does patients' satisfaction significantly differ between treatment types when controlling for demographic and clinical factors? Secondly, how important are specific domains of satisfaction to patients, and when taking perceived importance into account, which domains merit the most attention in improving quality of care?

Methods Members of the two existing Dutch associations for patients with psoriasis were invited to complete a web-based survey, which included a study-specific satisfaction questionnaire.

Results A total of 1293 patients completed the survey (response rate 32%). Overall, patients were moderately satisfied with their current treatment. Patients receiving topical treatment were significantly least satisfied; patients receiving biologic treatment were significantly most satisfied. Overall, patients rated 'treatment effectiveness' as most important, followed by 'treatment safety' and 'doctor–patient communication'. Domains with the highest 'room for improvement' scores were effectiveness of topical therapy, phototherapy and oral agents (but not biologic treatment), convenience of topical treatment and safety of systemic treatments (both oral agents and biologics).

Conclusions From the perspective of patients, biologic treatment is promising. To improve further the quality of psoriasis care, the effectiveness and convenience of topical therapies, the safety of systemic therapies, and doctors' communication skills need to be addressed.

What's already known about this topic?

- Clinical measures, such as the Psoriasis Area and Severity Index, and patient-reported outcomes are not consistently associated.
- Patients' satisfaction with their treatment is an important indicator of quality of care; additionally, a high level of satisfaction with treatment may lead to an improvement of adherence behaviour and health-related quality of life.
- Little is known about psoriasis patients' satisfaction with treatment.

What does this study add?

- Overall, patients with psoriasis are moderately satisfied with their current treatment.
- Treatment satisfaction varies across treatment groups: patients who received biologic treatment were most satisfied, patients who received topical treatment were least satisfied.

- Patients rated 'treatment effectiveness' as the most important domain of treatment satisfaction, followed by 'treatment safety' and 'doctor–patient communication'.

Psoriasis is a chronic inflammatory skin disease affecting approximately 2% of the population. It adversely affects patients' physical, psychological and social functioning and well-being, i.e. patient's health-related quality of life (HRQoL).[1] In many patients, the impact on their HRQoL is profound and causes as much disability as other major diseases, such as heart failure, type 2 diabetes or depression.[2] Dermatological treatment can offer only a temporary relief of symptoms. As a result, many patients have to cope with the burden of their skin disease for years, or even throughout their entire life.

Several dermatological treatment options are currently available, including topical therapy, phototherapy and systemic therapy. Systemic therapy includes orally administered systemic agents and the relatively new injectable biologics. Evidence on the effectiveness and safety of these treatment options is summarized in clinical practice guidelines. This evidence is mainly based on clinical outcome measures, such as the Psoriasis Area and Severity Index (PASI) and body surface area, as assessed by physicians and/or researchers. Clinical measures, such as the PASI, and patient-reported outcomes (PROs) are only weakly or, at the most, moderately correlated.[3] PROs are reports or assessments of any aspect of a patient's health status and/or treatment impact that are directly expressed by the patient, i.e. without the interpretation of others.[4] Examples of PROs are: HRQoL, patients' experienced disease severity, treatment adherence and satisfaction with treatment. Evidence of the effectiveness of treatments in terms of PROs is relatively sparse and, as yet, hardly or not included at all in clinical practice guidelines.

Patients' treatment satisfaction is a particularly valuable outcome to integrate in clinical practice guidelines, as higher satisfaction leads to improvement in HRQoL.[5] In contrast, dissatisfaction can lead to poor adherence and, as a consequence, suboptimal health outcomes.[6–8] Poor adherence is a widely acknowledged problem in dermatology, with studies suggesting that 39–73% of patients with psoriasis do not use medication as prescribed.[9–11] Moreover, treatment satisfaction is considered an important indicator of quality of care.[12–14] Knowledge about patients' satisfaction with treatment may also provide information for concrete actions to improve the quality of care.

A systematic review on the preferences of patients with psoriasis and satisfaction with the available photo-, photochemo- and systemic therapies concluded that little is known owing to methodological shortcomings of the few available studies.[15] For example, studies suffered from small sample sizes, high risk of selection bias and/or did not correct for possible confounders.

In studying patients' satisfaction with their treatment, some issues deserve attention. Firstly, patients' (dis)satisfaction with their treatment is not only determined by treatment characteristics, but may also be influenced by patient characteristics, such as age, or clinical characteristics, such as disease severity and disease duration.[16] Therefore, correction for these possible confounders is needed. Secondly, currently available treatments themselves have different advantages and disadvantages that may contribute to patients' (dis)satisfaction. For instance, topical treatment can be time consuming and may be inconvenient in use,[7,11,17] whereas systemic treatments are less time consuming and more convenient, but can be associated with (severe) side-effects. These differences need to be addressed by asking patients not only about their global satisfaction but also about specific domains of satisfaction. Thirdly, a patient's (dis)satisfaction with a specific treatment characteristic does not necessarily imply that this characteristic is important to him/her. Therefore, not only satisfaction with specific domains, but also the perceived importance of those domains, should be taken into account when using this as input for concrete actions to improve the quality of care.

The present study takes these considerations into account and aims to answer the following questions: (i,a) How satisfied are patients with psoriasis with their current treatment? (i,b) Does patients' satisfaction significantly differ between treatment types (topical therapy, phototherapy, oral agents, biologics) when controlling for demographic and clinical factors? (ii,a) How important are specific domains of satisfaction to patients? (ii,b) When taking perceived importance into account, which domains merit the most attention in improving quality of care?

Materials and methods

Study design and participants

This study comprises a cross-sectional national web-based survey. All members of the two associations for patients with psoriasis in the Netherlands were invited to participate. Patient inclusion criteria were: self-reported diagnosis of psoriasis, age $\geq$ 18 years, currently under treatment for psoriasis, and access to the internet. There were no exclusion criteria.

Procedure

We sent a personal letter to patients' home addresses, providing them with information about the study, instructions about the web-based questionnaire and a personal entry code. Additionally, a call to participate was published in the magazines and on the websites of both patient associations. Patients who had not returned the questionnaire within 4 weeks received a reminder. Data were collected from August until September 2010. In the Netherlands, noninterventional questionnaire

research is exempted from approval by the medical ethics committee, as was the case in this study.

Measures

Treatment satisfaction

Psoriasis-specific satisfaction questionnaires were not available, and existing generic satisfaction instruments were associated with practical constraints (e.g. not available in Dutch, costs). Therefore, we constructed a study-specific questionnaire.

To identify aspects and domains of treatment satisfaction that are important to patients with psoriasis, we updated the systematic review of Lecluse *et al.*[15] on the satisfaction of patients with psoriasis with photo-, photochemo- and systemic therapies for articles published after February 2008 up to October 2009. An additional search for qualitative studies about the perceptions of patients with psoriasis and their experiences with respect to their treatment was performed, using an adapted search strategy of Sandelowski and Barosso.[18] Furthermore, we retrieved results from a Dutch survey, asking patients with psoriasis which factors were important to them when choosing a specific treatment.[19] Based on these sources, we initially identified six domains of treatment satisfaction that were found to be important to patients with psoriasis: 'treatment effectiveness', 'treatment safety', 'treatment convenience', 'doctor–patient communication', 'information about treatment' and 'organization of treatment'.

To check whether the identified domains were indeed relevant to patients with psoriasis, we subsequently organized a focus group meeting with nine patients recruited via the two Dutch patient associations. During a 2-h meeting, patients discussed the characteristics of their treatment that contributed to their (dis)satisfaction. Also, domains in which these characteristics could be categorized, and the relative importance of these domains, were discussed. We found that all treatment characteristics mentioned by patients could easily be categorized into the previously identified six domains.

We then formulated five items on satisfaction: one question about patients' global satisfaction ('How satisfied are you with your current treatment?') and four domain-specific questions ('How satisfied are you with the effectiveness/safety/convenience of/information about your current treatment?'). Domains of satisfaction were illustrated with examples mentioned by the focus group participants. We did not devise questions about satisfaction with doctor–patient communication and organization of treatment, as we considered those domains to be generic rather than treatment specific. Items could be answered on a 5-point Likert-type scale with labelled endpoints (1 = not satisfied at all, 5 = very satisfied). Scores 1 and 2 were considered to reflect dissatisfaction. A total satisfaction score was calculated by summing all five items (range 5–25; Cronbach's alpha = 0·84).

Perceived importance of domains

The relative importance of each domain of treatment satisfaction was addressed with one item: 'How important are the following treatment characteristics to you when choosing a treatment?' Patients had to divide 10 points over the six domains. They were instructed to assign more points to a domain that they found more important, and fewer points to a domain that they found less important. See Appendix S1 for the satisfaction and perceived importance items (see Supporting information).

Background characteristics

We assessed patients' sex and date of birth. Self-reported clinical characteristics included comorbidity (multiple choice: six common comorbidities, recoded into a dichotomous variable 'one or more/none of six common comorbidities'), date of diagnosis, disease severity (Likert-type 5-point scale: mild to severe), type of psoriasis (multiple choice with explanation: psoriasis vulgaris, psoriasis inversa, guttate psoriasis, psoriatic arthritis, other type of psoriasis, type not known), location(s) of psoriasis [multiple choice; recoded into two dichotomous variables 'visible/nonvisible location(s)' and 'genitals affected/not affected'], treatment history [recoded into a dichotomous variable 'no other/one or more other treatment(s) in the past'], starting date of current treatment, and specific current treatment. Items about treatment history and current treatment could be answered by ticking one or more choice options consisting of specific medications or treatment modalities (brand name and name of substance).

Statistical analyses

Most patients received more than one therapy. Assuming that satisfaction with current treatment would primarily result from the generally most potent treatment, we labelled the main treatment as 'topical' in patients treated with one or more topical treatment(s) solely; as 'phototherapy' when a patient was treated with photo- or photochemotherapy solely or in combination with one or more topical treatment(s); as 'oral agent' when a patient was treated with an oral agent solely or in combination with one or more topical treatment (s) and/or photo- or photochemotherapy; and as 'biologic' when a patient was treated with a biologic solely or in combination with another treatment (topical, photo/photochemotherapy and/or oral agent).

After calculating mean item and total satisfaction scores, we used a multiple linear regression analysis to examine differences between treatment types (topical, photo, oral agents, biologics) in patients' total satisfaction score, controlling for demographic and clinical characteristics. A check for multicollinearity and outliers revealed that assumptions to perform multiple linear regression were met and no outliers were detected. A block-wise entry was chosen. Block 1 consisted of demographic variables (i.e. age, sex), and block 2 consisted of

clinical variables (i.e. disease severity, disease duration, type of psoriasis, visibility of location, genitals affected, treatment history, comorbidity). Finally, block 3 included treatment type. Firstly, dummy variables were created with topical therapy assigned as the reference category (topical vs. photo, topical vs. oral agents, topical vs. biologic). Then, similar analyses with the same predictors and dummy variables based on the other reference categories (i.e. phototherapy and oral agents) were performed to examine differences between all treatment types.

After calculating mean importance scores per satisfaction domain, we first multiplied these scores with the percentage of patients who were dissatisfied with the domain in question, and then divided this score by 100, resulting in 'room for improvement' scores.[20] A higher score indicates more room for quality improvement from the patient's perspective. SPSS 19·0 was used to perform statistical analyses (IBM SPSS, New York, NY, U.S.A.). We used an alpha level of 0·01.

Results

Patient population

Of the 4875 invitations sent, 880 patients were excluded (invitations returned undeliverable and patients who did not meet the eligibility criteria). Of the 3995 remaining patients, 1293 responded and met inclusion criteria (response rate 32%). Subsequently, 93 patients were excluded because their current treatment was missing, resulting in 1200 patients for further analyses. Demographic and clinical characteristics are shown in Table 1.

Table 1 Demographic and clinical characteristics of sample (n = 1200)

Characteristic	
Sex, n (%)	
Male	644 (53·7)
Female	556 (46·3)
Age (years), mean (SD)	55·9 (12·3)
Comorbidity, n (%)	
One or more of 6 common comorbidities	448 (37·3)
None of 6 common comorbidities	752 (62·7)
Disease severity (1–5), mean (SD)	2·5 (1·1)
Time since diagnosis (years), mean (SD)	28·8 (15·4)
Type of psoriasis,[a] n (%)	
Psoriasis vulgaris	814 (67·8)
Psoriasis arthritis	372 (31·0)
Psoriasis guttate	33 (2·8)
Psoriasis inversa	95 (7·9)
Psoriasis type not known	179 (14·9)
Other	36 (3·0)
Location of psoriasis, n (%)	
Visible	667 (55·6)
Not visible	533 (44·4)
Genitals, n (%)	
Affected	397 (33·1)
Not affected	803 (66·9)
Treatment history, n (%)	
One or more treatment(s) in the past	522 (43·5)
No treatment(s) in the past	678 (56·5)
Current treatment, n (%)	
Topical	557 (46·4)
Phototherapy	71 (5·9)
Oral agents	376 (31·3)
Biologic	196 (16·3)
Time since start of current treatment (years), mean (SD)	6·3 (9·0)

[a]Percentages may not add up to 100% because of the option to choose multiple answers.

Treatment satisfaction

The mean item and total satisfaction scores of patients with psoriasis were calculated for the total sample and the treatment groups separately (Table 2). The results of the multiple linear regression analysis (Table 3) show that demographic variables explained 0·4% of total satisfaction scores (block 1). Adding clinical variables (block 2) significantly increased the explained variance in total satisfaction scores by 28·1% ($P < 0·001$). In the final model (block 3), the addition of treatment type significantly increased the explained variance in total satisfaction scores by 10·5% ($P < 0·001$), resulting in 38·6% explained variance. Age [$t(1182) = 2·9$, $P = 0·004$] and disease severity [$t(1182) = -18·6$, $P < 0·001$] significantly predicted total satisfaction scores. Moreover, compared with patients receiving topical treatment, patients receiving phototherapy [$t(1182) = 6·48$, $P < 0·001$], oral agents [$t(1182) = 10·43$, $P < 0·001$) and biologic therapy [$t(1182) = 12·47$, $P < 0·001$] were significantly more satisfied. Similar analyses with the other treatment types as the reference category revealed that patients receiving biologic treatment were significantly more satisfied, compared with patients receiving oral agents [$B = 1·49$, SE $B = 0·30$; $t(1182) = 4·876$, $P < 0·001$]. The other treatment types did not differ significantly [photo vs. oral agents: $B = -0·27$, SE $B = 0·44$; $t(1182) = -0·619$, $P = 0·536$; photo vs. biologic: $B = 1·21$, SE $B = 0·48$; $t(1182) = 2·504$, $P = 0·012$].

Perceived importance of domains

Overall, patients rated 'treatment effectiveness' as most important (Table 4). 'Treatment safety' and 'doctor–patient communication' were rated as equal second most important in the total sample. The same pattern was found in patients receiving topical therapy and oral agents, whereas patients receiving phototherapy rated 'treatment safety' as more important than 'doctor–patient communication'. In contrast, patients receiving biologic therapy rated 'doctor–patient communication' as more important than 'treatment safety'.

According to 'room for improvement' scores (Table 4), 'treatment effectiveness' appears to be the most relevant

Table 2 Mean (SD) treatment satisfaction scores per treatment type

Treatment	n	Global satisfaction[a]	Effectiveness[a]	Safety[a]	Convenience[a]	Information[a]	Total score[b]
All treatment types	1200	3·6 (1·1)	3·5 (1·1)	3·5 (1·0)	3·8 (1·1)	3·9 (1·0)	18·3 (4·2)
Topical	557	3·1 (1·0)	3·1 (1·0)	3·5 (0·9)	3·3 (1·1)	3·5 (1·0)	16·5 (3·8)
Phototherapy	71	3·6 (1·0)	3·5 (1·0)	3·6 (1·1)	3·6 (1·1)	4·0 (0·8)	18·3 (3·5)
Oral agents	376	4·0 (1·0)	3·9 (1·1)	3·4 (1·1)	4·1 (1·0)	4·1 (1·0)	19·5 (4·1)
Biologics	196	4·2 (0·9)	4·1 (1·0)	3·6 (1·0)	4·4 (0·8)	4·4 (0·8)	20·9 (3·5)

[a]Range from 1 = 'not satisfied at all' to 5 = 'very satisfied'. [b]Total score = sum of 5 items (range 5–25; Cronbach's alpha 0·84).

Table 3 Multiple regression analyses with total satisfaction score as dependent variable (n = 1199)

	Block 1		Block 2		Block 3	
	Coefficient, B1	Standard error, SE (B1)	Coefficient, B2	Standard error, SE (B2)	Coefficient, B3	Standard error, SE (B3)
Constant	17·40	0·84	22·75	0·88	20·06	0·83
Sex	−0·14	0·24	−0·13	0·21	0·14	0·20
Age	0·02	0·01	0·02	0·01	0·03*	0·01
Disease severity			−1·95**	0·10	−1·73**	0·09
Comorbidity			−0·48	0·24	−0·43	0·22
Time since diagnosis			0·00	0·01	0·01	0·01
Psoriasis vulgaris			−0·11	0·31	−0·30	0·29
Psoriatic arthritis			0·13	0·29	−0·26	0·27
Guttate psoriasis			0·11	0·66	0·21	0·61
Psoriasis inversa			−0·39	0·40	−0·27	0·37
Psoriasis type not known			−0·68	0·39	−0·54	0·36
Visibility of location of psoriasis			0·06	0·22	−0·12	0·20
Genitals affected			−0·51	0·23	−0·35	0·21
Treatment history			0·72*	0·21	−0·51	0·22
Topical vs. phototherapy					2·74**	0·42
Topical vs. oral agents					2·47**	0·24
Topical vs. biological					3·95**	0·32

R^2 = 0·004 for block 1; R^2 = 0·281 for block 2 (ΔR^2 = 0·277; P < 0·001); R^2 = 0·386 for block 3 (ΔR^2 = 0·105; P < 0·001). *P < 0·01, **P < 0·001.

domain for further improvement, in particular in topical therapy and to a lesser extent in phototherapy and oral agents (but not biologics). 'Treatment convenience' of topical treatment and 'treatment safety' of systemic therapy (both oral agents and biologics) may also be considered for further improvements.

Discussion

The results of our study indicate that, overall, patients with psoriasis are moderately satisfied with their current treatment. Yet, treatment satisfaction varied across treatment groups. Patients receiving topical treatment were least satisfied, whereas patients receiving biologic treatment were most satisfied.

We found lower overall percentages of patients being dissatisfied (10–17%) than reported in previous studies (25–42%).[21–23] This might be explained by differences in study populations or methodology. For instance, studies were performed in other countries, within the general population or at outpatient clinics. Also, other instruments for measuring satisfaction were used. In addition, differences in dissatisfaction percentages could be explained by the availability of better treatments. However, our results are in line with previous findings that topical therapy, phototherapy and oral agents do not fully meet the needs of patients, indicating the need for biologic treatment.[17,22,24] Moreover, patients receiving biologic treatment are highly satisfied.[25–28] Thus from a patient's perspective, biologic treatment is promising.

Not surprisingly, patients considered effectiveness of treatment as most important. This is consistent with previous research reporting that satisfaction ratings predominantly reflect the opinions of patients with psoriasis on efficacy and, to a lesser extent, their opinion on side-effects and convenience.[29] Likewise, ineffectiveness of treatment was the most troublesome aspect of treatment in one-third of patients with psoriasis[22] and, together with side-effects, was generally given as a reason for dissatisfaction.[7]

Treatment safety and doctor–patient communication were rated as second most important. These high importance scores

Table 4 Importance, percentage of dissatisfied patients and room for improvement scores

		Importance,[a] mean (SD)	Dissatisfied,[b]%	Room for improvement score[c]
All treatment types (n = 1198)	Effectiveness	2·8 (1·5)	16·9	0·47
	Safety	1·8 (1·0)	13·1	0·24
	Convenience	1·4 (0·9)	13·8	0·19
	Information	1·1 (0·7)	10·3	0·11
	Doctor–patient communication	1·8 (1·1)	NA	NA
	Organization	1·1 (0·9)	NA	NA
Topical (n = 555)	Effectiveness	2·7 (1·5)	26·2	0·71
	Safety	1·8 (1·0)	12·2	0·22
	Convenience	1·5 (0·9)	22·1	0·33
	Information	1·1 (0·7)	16·5	0·18
	Doctor–patient communication	1·8 (1·1)	NA	NA
	Organization	1·1 (1·0)	NA	NA
Photo (n = 71)	Effectiveness	2·6 (1·5)	12·7	0·33
	Safety	1·8 (1·1)	7·0	0·13
	Convenience	1·4 (0·9)	18·3	0·26
	Information	1·1 (0·8)	5·6	0·06
	Doctor–patient communication	1·6 (1·2)	NA	NA
	Organization	1·4 (0·9)	NA	NA
Oral agents (n = 376)	Effectiveness	2·8 (1·4)	10·1	0·28
	Safety	1·8 (1·1)	15·7	0·28
	Convenience	1·4 (0·9)	6·4	0·09
	Information	1·1 (0·7)	6·9	0·08
	Doctor–patient communication	1·8 (0·9)	NA	NA
	Organization	1·0 (0·9)	NA	NA
Biologic (n = 196)	Effectiveness	3·1 (1·6)	5·1	0·16
	Safety	1·6 (0·9)	12·8	0·20
	Convenience	1·4 (0·8)	3·1	0·04
	Information	1·1 (0·7)	1·0	0·01
	Doctor–patient communication	1·8 (0·9)	NA	NA
	Organization	1·0 (0·7)	NA	NA

[a]Mean assigned points to each domain (0–10); [b]score 1 or 2, ranging from 1 = 'not satisfied at all' to 5 = 'very satisfied'; [c](importance × percentage dissatisfied)/100; NA, not applicable (not measured).

for doctor–patient communication are in line with the results of Renzi and colleagues, showing that physicians' interpersonal skills are the most relevant factor in determining patient satisfaction with care.[8] Specific communication skills suggested to contribute to the satisfaction of patients with psoriasis are: (i) the doctor asking the patient if he/she has preferences or concerns; (ii) the doctor considering the patient's preferences; and (iii) the doctor informing the patient about treatment options and potential side-effects.[30] Also, patients stressed their need to be listened to and their wish that the physician use simple language.[31] Improvement of doctors' communication skills could further improve psoriasis care.[5,8,32,33] Our findings suggest that, from a patient perspective, treatment-specific domains that merit the most attention to improve quality of psoriasis care are: the effectiveness of topical therapy, phototherapy and oral agents (but not biologic treatment), the convenience of topical treatment, and the safety of systemic treatments (both oral agents and biologics).

Our study has its limitations. Firstly, we used a study-specific satisfaction questionnaire consisting of one item per domain, setting limits to the reliability. Secondly, we assumed that satisfaction with current treatment would be determined by the main treatment, whereas an additional treatment may also affect patients' satisfaction. Thirdly, selection bias of respondents may have occurred, because patients without access to the internet were excluded. Previously, patients with psoriasis in an online sample were less satisfied than patients in an outpatient clinic sample.[34] Also, we included only members of patient associations, possibly resulting in a selection of patients with a strong opinion about the quality of healthcare and of more chronically ill patients.

As we found variations in satisfaction with domains and perceived importance between treatment types, we recommend for clinical practice that the physician explicitly asks the patient about his/her preferences before deciding upon a particular treatment. Incorporating patients' preferences in decision-making may improve treatment adherence and increase the likelihood that positive outcomes are achieved.[35] During a control consultation, we recommend the physician to ask a patient about several domains of satisfaction with the treatment. This may help physicians to identify patients facing satisfaction issues and needing additional support. Additional support may take

the form of providing further information and discussion about medication and disease, and may result in a change of medication, regimen or mode of administration.[6] In this way, shared decision-making is stimulated and optimal quality of care can be delivered that is tailored to the individual patient. Moreover, when physicians ask patients for their feedback, patients perceive this as a demonstration of care, respect and concern.[36]

Additionally, we recommend incorporating information about patients' treatment satisfaction in particular, as well as other patient-reported outcomes in general, in the development of evidence-based clinical practice guidelines. Evidence-based medicine is defined as 'the integration of best research evidence with clinical expertise and patient values'.[37] Moreover, patients themselves should be included in the development of treatment guidelines.[38] This was the case in the development of the latest Dutch evidence-based clinical practice guideline for psoriasis, which includes a chapter addressing the patient perspective (Zweegers J, de Jong EMGJ, Nijsten TEC *et al.*, Summary of the Dutch S3-Guidelines on the treatment of psoriasis 2011; submitted for publication). We believe that this is a step towards an increased awareness of the importance of the patient perspective.

Whereas our results indicate that biologics are promising in terms of patient satisfaction, future research is needed to determine their long-term effectiveness and safety. Also, more research is needed to examine if training doctors in communication skills enhances patients' satisfaction with treatment.

In conclusion, from the patients' point of view biologic treatment is promising, whereas patients with psoriasis are overall only moderately satisfied with their current treatment. Hence, there is room for improvement. To improve further the quality of psoriasis care, the effectiveness and convenience of topical therapies, the safety of systemic therapies and doctors' communication skills need to be addressed.

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Supporting Information

Additional Supporting Information may be found in the online version of this article:

Appendix S1. Questionnaire.