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Palmoplantar psoriasis is associated with greater impairment of health-related quality of life compared to moderate-to-severe plaque psoriasis

Jina Chung, BS[1], **Kristina Callis Duffin, MD, MS**[2], **Junko Takeshita, MD, PhD**[1,3], **Daniel B. Shin, MS**[1,3], **Gerald G. Krueger, MD**[2], **Andrew D. Robertson, PhD**[4], **Andrea B. Troxel, ScD**[3], **Abby S. Van Voorhees, MD**[1], **Emily Edson-Heredia, MPH**[5], and **Joel M. Gelfand, MD, MSCE**[1,3]

[1]Department of Dermatology, University of Pennsylvania Perelman School of Medicine, Philadelphia, PA

[2]Department of Dermatology, University of Utah School of Medicine, Salt Lake City, UT

[3]Center for Clinical Epidemiology and Biostatistics, University of Pennsylvania Perelman School of Medicine, Philadelphia, PA

[4]The National Psoriasis Foundation, Portland, OR

[5]Eli Lilly and Company, Lilly Corporate Center, Indianapolis, IN

Correspondence: Jina Chung, BS, Department of Dermatology, University of Pennsylvania, 1468 Penn Tower, One Convention Ave, Philadelphia, PA 19104 jchung39@jhmi.edu. Phone: 203-479-2349. Fax: 215-746-6370..

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Abstract

Background—The impact of palmoplantar psoriasis on health-related quality of life (QoL) is largely unknown.

Objective—To compare clinical characteristics and patient-reported outcomes between patients with palmoplantar psoriasis and moderate-to-severe plaque psoriasis.

Methods—We conducted a cross-sectional study of patients with plaque psoriasis (N=1,153) and palmoplantar psoriasis (N=66) currently receiving systemic or light treatment for psoriasis.

Results—Patients with palmoplantar psoriasis were more likely to report Dermatology Life Quality Index scores that correspond to at least a moderate impact on QoL (odds ratio [OR] 2.08; 95% confidence interval [CI], 1.20-3.61); problems with mobility (OR 1.98; 95% CI, 1.10-3.58), self-care (OR 3.12; 95% CI, 1.24-7.86), and usual activities (OR 2.47; 95% CI, 1.44-4.22) on the European Quality of Life-5 Dimensions questionnaire; and heavy topical prescription use of at least twice daily in the preceding week (OR 2.81; 95% CI, 1.63-4.85) than those with plaque psoriasis.

Limitations—Our assessment tools may not account for all dimensions of health-related QoL affected by palmoplantar disease, and these results may not be generalizable to patients with milder forms of psoriasis.

Conclusion—Patients with palmoplantar psoriasis suffer from greater health-related QoL impairment and are more likely to report heavy use of topical prescriptions than those with moderate-to-severe plaque psoriasis.

Keywords

Psoriasis; palmoplantar psoriasis; plaque psoriasis; health-related quality of life; patient-reported outcomes; epidemiology

Introduction

Psoriasis is a chronic inflammatory disease that affects 2-4% of the population worldwide.[1, 2] It is associated with a higher risk of cardiovascular,[3-6] metabolic,[7] and renal disease,[8] and patients may experience significant impairment of health-related quality of life (HRQoL) even with localized disease.[9-20] Palmoplantar psoriasis (psoriasis localized to the palms and/or soles) is reported to affect approximately 5% of all psoriasis patients, and although it is a disabling and difficult-to-treat variant of psoriasis, its epidemiology is poorly defined and few studies have evaluated its impact on patient-reported outcomes.[21-36] A study that surveyed 579 psoriasis patients found that palmoplantar psoriasis (n=124, 39%) causes greater physical disability than psoriasis without palm and sole involvement; however, no differences were observed in psychological distress, HRQoL, and global quality of life (QoL).[21] Data on potential confounders such as treatment information and co-morbidities were not available. Hence, there still exists a substantial need to augment our understanding of the impact of palmoplantar psoriasis on patients' subjective well-being.

The purpose of this study was to compare patient-reported outcomes and clinical characteristics between patients with plaque and palmoplantar psoriasis who were evaluated during routine follow-up and were receiving systemic or light therapy for their psoriasis at the time of data collection. We hypothesized that patients with palmoplantar psoriasis would have a lower HRQoL and report a greater negative impact of their skin disease on their lives than patients with plaque psoriasis.

Methods

Study design

We conducted a descriptive, cross-sectional study to determine the impact of plaque or palmoplantar psoriasis on patients' HRQoL and their use of prescription topical medications. Consecutive patients being seen by their dermatology providers for routine follow-up care were enrolled, and data were collected using dermatologist assessments and patient questionnaires.[37] The study was approved by the Institutional Review Board and was conducted in accordance with the Declaration of Helsinki. Informed consent was obtained from all patients.

Setting

Data were collected by 10 dermatologists and 2 physician assistants from 1755 patients seen at 10 dermatology sites across the United States participating in the Dermatology Clinical Effectiveness Research Network (DCERN). Data were collected prospectively at a single regularly scheduled clinic appointment per patient, from February 2010 through June 2011, at 2 academic centers (University of Pennsylvania and University of Utah, each with a hospital-based site and a community-based site) and 6 private practices in Georgia, Pennsylvania, New York, and Colorado.[37]

Participants

Patients were enrolled consecutively under broad inclusion criteria, as previously described.[37] Participants were eligible if they were currently receiving or previously received systemic or light therapy for psoriasis, or had a history of at least 5% body surface area (BSA) involvement.[37] New patients became eligible at their next regular visit.[37] In the analyses presented herein, we included patients who were currently receiving systemic or light therapy for a primary indication of plaque or palmoplantar psoriasis as defined by the treating clinician. We excluded patients whose indication for treatment was another variant of psoriasis.

Variables

Data were collected by study coordinators using standardized forms. Detailed information was collected on medical and social history, psoriasis treatments, socio-demographic factors, and psoriasis characteristics.[37] Patient-reported data were confirmed using the dermatology clinic record and clinical assessments. Estimated total BSA involvement (%) and the Physician Global Assessment (PGA) scale (scored 0-5 for erythema, induration, and scaling, then averaged) were used by clinicians as measures of severity.[38] Primary psoriasis treatment indication served as the main exposure while other variables served as potential

confounders or effect modifiers. The patient-reported outcomes were the Dermatology Life Quality Index (DLQI),[39] the European Quality of Life-5 Dimensions (EQ-5D),[40] and the frequency of concurrent prescription topical medication use. The DLQI is a 10-question validated questionnaire that measures the degree to which a patient's life is affected by his/her skin condition (i.e., psoriasis), and the score ranges from 0 to 30 with higher scores indicating greater QoL impairment. The DLQI score was dichotomized into two categories: 0-5 indicating no to small impact and 6-30 indicating moderate to extremely large impact on QoL. The EQ-5D provides a generic measure of HRQoL using a descriptive profile consisting of five dimensions (mobility, self-care, usual activities, pain/discomfort, and anxiety/depression) with three levels per dimension (no problems, some/moderate problems, and extreme problems). We grouped the responses into two categories: no problems and any problems. We also calculated the U.S. population-based EQ-5D index score, which was dichotomized to below and above the sample population median.[41, 42] The EQ-5D also includes a single value for self-perceived health state on a scale of 0 to 100 (the visual analog scale, or VAS), with 100 being the best imaginable state. Lastly, patients were asked how often they had used topical prescription medications in the week prior to data collection, and heavy use (daily use with ≥ 2 applications per day) was assessed as an outcome.

Statistical analysis

Descriptive statistics were used to summarize demographics and clinical characteristics. Univariate analyses were conducted using Student's t-tests or Wilcoxon rank-sum tests for continuous variables, and χ^2 or Fisher's exact tests for categorical variables. Subjects with missing values (1.4%) were omitted from the analysis.

For multivariable analyses, logistic regression models were fitted for the dichotomized outcomes DLQI, EQ-5D index score, EQ-5D dimensions, and topical prescription use. A quantile regression model was fitted for the EQ-5D VAS outcome. Potential confounders were selected using a purposeful selection approach based on significant associations with both exposure and outcome ($p<0.25$).[43] We reached our final model using a backwards elimination approach, retaining predetermined confounders (age and sex) and significant covariates ($p<0.05$ on the Wald test or changing the effect of interest by >10%). Model fit was assessed using the Hosmer-Lemeshow goodness-of-fit test, and adjustments were made for multiple comparisons using the Holm-Bonferroni procedure.[44] The secondary analyses involving the EQ-5D domains were not adjusted for multiplicity because they were primarily exploratory. We also performed multiple sensitivity analyses: first, we included all 1600 plaque and palmoplantar psoriasis patients enrolled in DCERN regardless of current treatment; second, we excluded patients with overlapping disease (23 plaque psoriasis patients with palmoplantar involvement [2.0%] and 20 palmoplantar psoriasis patients with features of generalized plaque disease [30%]); and third, we adjusted all outcomes for type of current treatment (biologic, oral systemic, or phototherapy).

Results

We included 1153 plaque and 66 palmoplantar psoriasis patients currently receiving systemic or light therapy in our study (Figure 1). Their demographic information and clinical characteristics are shown in Table I. Patients with palmoplantar psoriasis were older than patients with plaque psoriasis with mean ages (standard deviation) of 53.8 years (12.6) vs. 48.7 years (15.2) ($p=0.007$) respectively, and were more likely to be female (75.8% vs. 48%; $p<0.001$) and to be current or past smokers (74.2% vs. 51.4%; $p=0.001$) than patients with plaque psoriasis.

Regarding psoriasis characteristics, patients with palmoplantar disease had a later median (interquartile range [IQR]) age of psoriasis onset (44 years [34, 53] vs. 25 years [16, 40]; $p<0.001$) and lower median (IQR) BSA involvement at the time of data collection (1% [0.3%, 2.1%] vs. 2.5% [0.8%, 6%]; $p<0.001$) than patients with plaque psoriasis. With respect to current treatments, a higher percentage of palmoplantar vs. plaque psoriasis patients were on oral systemic therapy (55% vs. 37%; $p=0.006$), with no significant differences in biologics or phototherapy. Of those receiving oral systemic therapy, 28.8% of palmoplantar psoriasis patients vs. 6.4% of plaque psoriasis patients were on acitretin, which is a widely used therapy for the pustular variant of palmoplantar psoriasis (i.e., palmoplantar pustulosis).[27, 45, 46] There were no significant differences in family history of psoriasis, prevalence of psoriatic arthritis, and PGA scores between the two groups.

The unadjusted outcome analyses are shown in Table II. There were no significant differences in the levels of pain/discomfort, anxiety/depression, and self-perceived health state between the two groups. The significantly different outcomes (DLQI, EQ-5D, and heavy topical prescription use) were further analyzed using adjusted regression models (Table III). Of note, the adjusted odds of reporting at least a moderate impact on skin-specific HRQoL (DLQI>5) were 2.08 (95% confidence interval [CI], 1.20-3.61) times higher for patients with palmoplantar psoriasis compared to those with plaque psoriasis. Patients with palmoplantar and plaque psoriasis were equally likely to report general HRQoL greater than the 50^{th} percentile (EQ-5D index score > median) (odds ratio [OR] 0.88; 95% CI, 0.51-1.51). The overall trend of palmoplantar psoriasis patients having lower EQ-5D scores than plaque psoriasis patients in unadjusted analyses was preserved in adjusted analyses (median [IQR] scores of 0.83 [0.75, 1.0] vs. 0.84 [0.80, 1.0], respectively; $p=0.02$), but this may not be clinically significant given that the minimally important difference in EQ-5D has been reported as 0.05.[47]

Exploratory multivariable regression analyses revealed that patients with palmoplantar psoriasis were significantly more likely to report problems with mobility (OR 1.98; 95% CI, 1.10-3.58), self-care (OR 3.12; 95% CI, 1.24-7.86), and usual activities (OR 2.47; 95% CI, 1.44-4.22). Finally, the odds of heavy topical prescription use were 2.81 (95% CI, 1.63-4.85) times higher for patients with palmoplantar psoriasis than those with plaque psoriasis. The findings were robust to multiple sensitivity analyses (Table IV).

Discussion

We found that palmoplantar psoriasis is associated with substantial impairment of HRQoL. Specifically, compared to moderate-to-severe plaque psoriasis, palmoplantar psoriasis is independently associated with a greater impact on skin-related QoL; a greater impairment of mobility, self-care, and usual activities; and a greater dependency on topical medications. Notably, palmoplantar psoriasis patients reported more difficulty with activities of daily living while no differences were observed for general pain/discomfort and anxiety/depression. This may suggest that the discomfort experienced by the palmoplantar group is related to psoriasis affecting locations that are crucial for function, whereas patients with plaque psoriasis and more extensive disease may experience similar levels of overall discomfort because of factors not captured by the EQ-5D. In terms of dermatologist assessments, the fact that there was no difference in PGA scores suggests that while palmoplantar patients typically have lower BSA involvement (usually <5%),[48] there is no significant difference in the composite of erythema, scaling, and induration.

Our findings are consistent with the few epidemiological studies on palmoplantar psoriasis,[49-54] and build upon the study of Pettey et al, which found that palmoplantar involvement causes more physical disability as measured by the Psoriasis Disability Scale, but found no differences in generic HRQoL using the Short Form-36 Health Survey.[21] Like Pettey et al,[21] we also observed a significant difference between plaque and palmoplantar psoriasis patients using a dermatology-specific measure (DLQI), without differences in generic HRQoL (EQ-5D index). However, our participation rate was considerably higher (95% vs. 54.7%), and the DLQI and EQ-5D have better correlations with clinical endpoints than the SF-36 and are used more frequently in the literature than the PDS.[55]

Our study has several strengths. To our knowledge, this is the first multi-center study to assess differences in patient-reported outcomes between plaque and palmoplantar psoriasis patients. It includes patients who were seen by general dermatologists and psoriasis specialists, and we minimized selection bias by consecutively including routine patients at a high participation rate. We had clinicians determine the primary exposure to reduce misclassification bias, and we adjusted for many potential confounders in our primary and sensitivity analyses, including age, sex, number of co-morbidities, psoriatic arthritis, education, employment, smoking/drinking history, marital status, psoriasis severity, age of psoriasis onset, and type of therapy. We minimized type I errors by adjusting for multiple comparisons for all outcomes other than exploratory analyses.

Important limitations to consider include the possibility of remaining unmeasured or unknown confounders. Moreover, because only patients currently receiving systemic or light therapy were included, our results may not be generalizable to patients with milder forms of psoriasis. Misclassification of the exposure may have also occurred, given the possibility of clinical overlap between plaque and palmoplantar psoriasis. However, when we performed sensitivity analyses excluding patients with overlapping features to reduce potential misclassification, we observed stronger associations, suggesting that such misclassification is more likely to bias our results towards the null. Additionally, since there is no universal method for evaluating HRQoL in palmoplantar psoriasis, it is possible that the tools we used

(DLQI and EQ-5D) do not account for all dimensions of HRQoL affected by palmoplantar disease. The DLQI is used frequently in psoriasis studies, but has not been validated in palmoplantar psoriasis. Similarly, the EQ-5D was developed for general medical conditions and may not capture all relevant aspects of dermatologic disease.[10] Other QoL assessment tools that were suggested for use in palmoplantar psoriasis have not been validated.[22]

There is also a lack of effective tools to compare disease severity across different variants of psoriasis. Existing severity measures such as BSA involvement and the PGA were developed for plaque psoriasis, and may be inadequate for assessing palmoplantar psoriasis severity by failing to capture features that are specific to palmoplantar disease, such as the presence of pustules, fissures, or edema. Moreover, since this is a descriptive study with a relatively small sample size, it may not have been powered to detect differences that may exist in the EQ-5D dimensions of pain/discomfort and anxiety/depression.

Finally, we evaluated palmoplantar psoriasis as a single disease and did not make distinctions between its two phenotypes, palmoplantar plaque psoriasis and palmoplantar pustulosis. While these two types overlap clinically, some evidence suggests that palmoplantar pustulosis may be a genetically distinct form of psoriasis.[51, 56, 57] In this study we focused on investigating the effects that anatomical involvement of the palms and soles can have on QoL, but future endeavors to compare patient-reported outcomes between the two subtypes of palmoplantar psoriasis may provide further insight.

Conclusions

In palmoplantar psoriasis, there appears to be a clear disconnect between severity measured using traditional psoriasis assessment tools and impact of the disease on patients' HRQoL. Our study shows that even with less BSA involvement and similar PGA scores, patients with palmoplantar disease are more likely to suffer from a significant impact on skin-related QoL, have problems with activities of daily living, and rely on topical prescription medications than patients with moderate-to-severe plaque psoriasis. Clinicians should pay particular attention to level of functional impairment rather than relying on traditional instruments to evaluate severity, and be aware of a greater tendency for heavy topical use in this patient group, even in those who are on other treatments. Further research is warranted to confirm our findings and examine the validity of applying existing HRQoL measures to palmoplantar psoriasis.

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Abbreviations and acronyms

BMI	Body mass index
BSA	Body surface area
CI	Confidence interval
DCERN	Dermatology Clinical Effectiveness Research Network
DLQI	Dermatology Life Quality Index
EQ-5D	European Quality of Life-5 Dimensions
HRQoL	Health-related quality of life
IQR	Interquartile range
OR	Odds ratio
PASI	Psoriasis Area and Severity Index
PGA	Physician Global Assessment
QoL	Quality of life
SD	Standard deviation
VAS	Visual analog scale (part of EQ-5D)

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Capsule summary

- Palmoplantar psoriasis is a disabling variant of psoriasis that primarily affects the palms and soles.
- Patients with palmoplantar psoriasis suffer from greater health-related quality of life impairment than those with moderate-to-severe plaque psoriasis.
- Clinicians should pay particular attention to functional impairment when treating palmoplantar psoriasis.

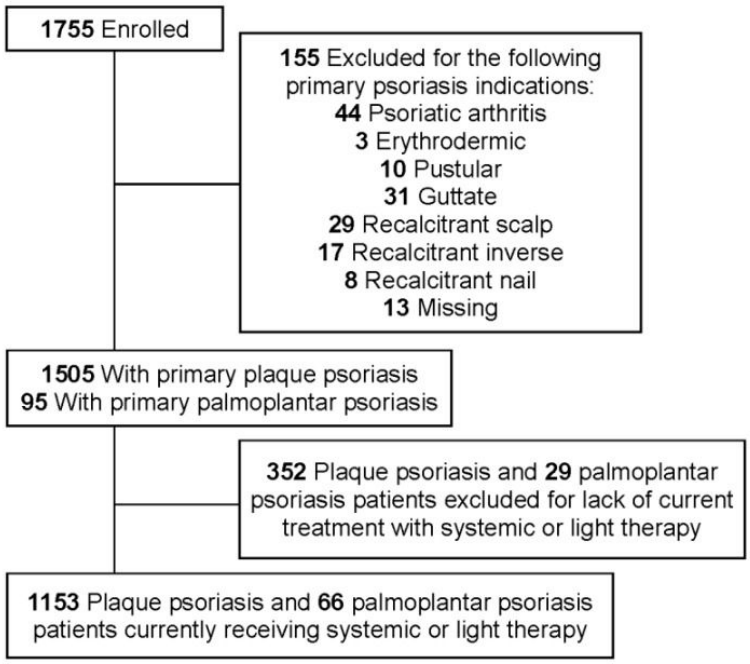

Figure 1.
Flow diagram of patient inclusion.

Table I

Baseline and psoriasis characteristics of patients with plaque versus palmoplantar psoriasis.

Characteristic	Plaque Psoriasis (N=1153)	Palmoplantar Psoriasis (N=66)	P-value
Age, year			
Mean (SD)	48.7 (15.2)	53.8 (12.6)	**0.007** [a]
Median (IQR)	49 (38, 59)	54.5 (46, 62)	**0.005** [b]
Female sex, N (%)	554 (48)	50 (75.8)	<**0.001** [c]
Smoking status, N (%)			**0.001** [c]
Current smoker	198 (17.2)	16 (24.2)	
Past smoker	394 (34.2)	33 (50)	
Never smoked	561 (48.7)	17 (25.8)	
Current drinking status, N (%)			0.69 [c]
Heavy [d]	53 (4.6)	4 (6.1)	
Moderate	741 (64.3)	40 (60.6)	
None in last year	359 (31.1)	22 (33.3)	
BMI, median (IQR)	28.9 (25.2, 33.3)	30.1 (26.2, 34.3)	0.35 [b]
Total number of co-morbidities, median (IQR)	2 (1, 4)	3 (1, 4)	**0.024** [b]
Practice setting of dermatologist, N (%)			**0.009** [c]
Academic	688 (59.7)	50 (75.8)	
Private	465 (40.3)	16 (24.2)	
Age of psoriasis onset, median (IQR)	25 (16, 40)	44 (34, 53)	<**0.001** [b]
Psoriasis severity at its worst, N (%)			<**0.001** [c]
Mild, <3 palms	109 (9.5)	19 (29.2)	
Moderate, 3-10 palms	362 (31.4)	34 (52.3)	
Severe, >10 palms	682 (59.2)	12 (18.5)	
Family history, N (%)			0.34 [c]
Yes	481 (45.8)	22 (38.6)	
No	570 (54.2)	35 (61.4)	
Median duration of psoriasis, y (IQR)	19 (8, 30)	6.5 (2, 19)	<**0.001** [b]
Psoriatic arthritis diagnosed by a physician, N (%)	298 (25.9)	14 (21.2)	0.47 [c]
Total body surface area involved (BSA), %			

Characteristic	Plaque Psoriasis (N=1153)	Palmoplantar Psoriasis (N=66)	P-value
Median (IQR)	2.5 (0.8, 6)	1 (0.3, 2.1)	<**0.001** [b]
Physician Global Assessment (PGA)			
Median (IQR)	1.67 (1, 2)	1.33 (1, 2)	0.68 [b]
Type of current treatment [e]			
Biologic, N (%)	643 (55.8)	29 (43.9)	0.074 [c,f]
Adalimumab	224 (19.4)	6 (9.1)	
Etanercept	245 (21.3)	17 (25.8)	
Infliximab	86 (7.5)	1 (15)	
Alefacept	1 (0.1)	0 (0)	
Ustekinumab	87 (7.6)	5 (7.6)	
Oral systemic, N (%)	429 (37.2)	36 (54.6)	**0.006** [c,f]
Methotrexate	316 (27.4)	14 (21.2)	
Cyclosporine	30 (2.6)	5 (7.6)	
Acitretin	73 (6.3)	19 (28.8)	
Intramuscular steroids	3 (0.3)	0 (0)	
6-thioguanine/Other	21 (1.8)	3 (4.5)	
Phototherapy, N (%)	335 (29.1)	13 (19.7)	0.12 [c,f]
Non-prescribed light [g]	153 (13.3)	5 (7.6)	
UVB [h]	182 (15.8)	1 (15)	
PUVA (oral and topical)	5 (0.7)	6 (9.1)	
Excimer laser	24 (2.1)	1 (1.5)	
Number of current treatments, N (%)			0.45 [c]
1	875 (75.9)	51 (77.3)	
2	260 (22.6)	13 (19.7)	
>2	18 (1.5)	2 (3.0)	

Significant values with P < 0.05 are shown in bold.

[a] Student's t-test

[b] Wilcoxon rank-sum test

[c] Fisher's exact

[d] >2 Drinks per day for men and >1 drink per day for women.

[e] Proportions add up to >100 because of patients who are on multiple therapies.

[f] The total proportions of patients in each category of treatment (biologic, oral systemic or phototherapy) were used for comparison.

[g] Includes natural sunlight and tanning beds.

[h] Includes UVB, broadband UVB, narrowband UVB, and home UVB.

Table II

Patient-reported outcomes in patients with plaque psoriasis versus palmoplantar psoriasis.

	Plaque psoriasis (N=1153)	Palmoplantar Psoriasis (N=66)	P-value
DLQI			
DLQI, median (IQR)	3 (1, 6)	4 (1, 9)	**0.037** [a]
DLQI category, N (%)			**0.004** [b]
0-5 No-small effect	839 (73.5)	37 (56.1)	
6-30 Moderate-extremely large effect	302 (26.5)	29 (43.9)	
EQ-5D			
EQ-5D index (U.S.) median (IQR)	0.84 (0.80, 1.0)	0.83 (0.75, 1.0)	**0.022** [a]
EQ-5D Mobility [c], N (%)			**0.027** [b]
No problems	918 (79.8)	44 (67.7)	
Problems	232 (20.2)	21 (32.3)	
EQ-5D Self-care [c], N (%)			**0.019** [b]
No problems	1094 (95.0)	57 (87.7)	
Problems	57 (5.0)	8 (12.3)	
EQ-5D Usual Activities [c], N (%)			<**0.001** [b]
No problems	949 (82.5)	40 (61.5)	
Problems	201 (17.5)	25 (38.5)	
EQ-5D Pain/Discomfort [c], N (%)			0.053 [b]
No problems	659 (57.3)	29 (44.6)	
Problems	492 (42.7)	36 (55.4)	
EQ-5D Anxiety/Depression [c], N (%)			0.21 [b]
No problems	817 (71)	41 (63.1)	
Problems	334 (29)	24 (36.9)	
EQ-5D VAS score			
Mean (SD)	78.1 (18.3)	74.3 (19.3)	0.098 [d]
Median (IQR)	80 (70, 90)	80 (70, 90)	0.072 [a]
Topical prescription use in the last week			
Median number of days used (IQR)	3 (0, 7)	7 (1, 7)	**0.001** [a]
Number of patients who reported no use, N (%)	416 (36.1)	15 (22.7)	**0.033** [b]

	Plaque psoriasis (N=1153)	**Palmoplantar Psoriasis (N=66)**	**P-value**
Number of patients who reported heavy use (daily use with ≥ 2 applications per day), N (%)	158 (13.7)	23 (34.9)	<**0.001** [b]

Significant values with P < 0.05 are shown in bold.

[a] Wilcoxon rank-sum test

[b] Fisher's exact

[c] Of the three possible responses for each EQ-5D dimension (no problems/some or moderate problems/severe problems), we combined responses to the moderate and severe categories to form two levels: no problems and problems.

[d] Student's t-test

Table III

Patient-reported outcomes for palmoplantar psoriasis patients compared to plaque psoriasis patients.

	Unadjusted OR (95% CI)	Adjusted OR (95% CI)	Adjusted P-value	Adjusted P-value for Multiple Comparisons [a]
DLQI score 6-30 (Moderate-Extremely Large impact on HRQoL)	2.18 (1.32-3.60)	2.08 (1.20-3.61) [b]	**0.009**	**0.036**
EQ-5D index score > median	0.68 (0.41-1.14)	0.88 (0.51-1.51) [c]	0.63	0.63
Problems with Mobility (EQ-5D)	1.89 (1.10-3.24)	1.98 (1.10-3.58) [d]	**0.023**	
Problems with Self-Care (EQ-5D)	2.69 (1.23-5.92)	3.12 (1.24-7.86) [e]	**0.016**	
Problems with Usual Activities (EQ-5D)	2.95 (1.75-4.98)	2.47 (1.44-4.22) [f]	**0.001**	
Heavy prescription topical use in the last week [g]	3.37 (1.98-5.74)	2.81 (1.63-4.85) [h]	**0.0002**	**0.001**

Significant values with $P < 0.05$ are shown in bold.

[a] Adjusted for multiple comparisons using the Holm-Bonferroni procedure.

[b] Adjusted for age, sex, ethnicity, site, number of co-morbidities, psoriasis duration, and psoriasis severity at its worst.

[c] Adjusted for age, sex, number of co-morbidities, smoking status, and marital status.

[d] Adjusted for age, sex, marital status, number of co-morbidities, smoking status, and psoriasis severity at its worst.

[e] Adjusted for age, sex, number of co-morbidities, psoriasis severity at its worst, and age of psoriasis onset.

[f] Adjusted for age, sex, smoking status, number of co-morbidities.

[g] Daily use with at least two applications per day.

[h] Adjusted for age, sex, and type of therapy.

Table IV

Adjusted odds ratios and 95% confidence intervals for sensitivity analyses.

	Primary analysis	Sensitivity Analyses		
		Excluding patients with overlapping features	Including all patients regardless of current treatment	Adjusted for type of therapy [a]
N	1219	1176	1600	1219
DLQI score 6-30 (Moderate-Extremely Large impact on HRQoL)	2.08 (1.20-3.61)	2.78 (1.45-5.33)	1.65 (1.03-2.63)	2.19 (1.25- 3.83)
EQ-5D index score > median	0.88 (0.51-1.51)	0.88 (0.46-1.69)	0.81 (0.50- 1.30)	0.87 (0.51-1.51)
Problems with Mobility (EQ-5D)	1.98 (1.10-3.58)	2.40 (1.20- 4.82)	1.90 (1.13- 3.20)	1.87 (1.04- 3.39)
Problems with Self-Care (EQ-5D)	3.12 (1.24-7.86)	5.38 (1.95- 14.8)	2.86 (1.17- 6.98)	1.87 (1.23- 7.65)
Problems with Usual Activities (EQ-5D)	2.47 (1.44-4.22)	3.27 (1.76- 6.06)	2.17 (1.35- 3.48)	2.42 (1.39- 4.23)
Heavy prescription topical use in the last week	2.81 (1.63-4.85)	3.54 (1.89-6.66)	2.50 (1.58-3.94)	N/A [b]

[a] Biologic, oral systemic or light therapy.

[b] Not applicable; primary analysis was adjusted for type of therapy.