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Original

Psoriasis disease severity affects patient satisfaction with treatment

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Abstract

Background: Patients with psoriasis are often dissatisfied with available treatments, but contributing factors are not well defined.

Objective: Examine relationships between psoriasis severity, patient characteristics, and treatment satisfaction.

Methods: Patients with psoriasis were classified into mild and moderate-to-severe groups based on self-reported data. Demographics, comorbidities, symptoms, and multiple treatment satisfaction outcomes were compared between groups. Predictors of patient satisfaction with treatment were examined using linear regression models.

Results: The analyses included 773 patients (407 mild; 366 moderate-to-severe). The percentage of patients reporting satisfaction with treatment was low overall, ranging from 8.6% to 61.7% for the mild and 13.9% to 49.5% for the moderate-to-severe group. Satisfaction among biologics users was also low ($\leq 53\%$; 50% of satisfaction rates $< 40\%$). Regression results consistently showed greater dissatisfaction with current treatment among moderately to severely affected patients.

Conclusion: Many psoriasis patients were dissatisfied with their treatment; moderate-to-severe patients expressed significantly less satisfaction than mild patients.

Key words: skin diseases; plaque psoriasis; biologicals; psoriasis symptoms; psoriasis severity; psoriasis treatment; patient satisfaction; survey; patient-reported outcomes

Introduction

Psoriasis is a chronic immune-mediated inflammatory disease of the skin that affects an estimated 7.5 million people in the US, or approximately 2.2% of the general population [1, 2]. The disease is typically characterized by raised scaly plaques on the skin, which may be painful, itchy, and burning, particularly during disease flares [3, 4]. Equally important, psoriasis is often associated with psychosocial issues, including negative body image and impairment of daily activities and social interactions, which adversely affect the patient's quality of life (QoL) [5, 6, 7]. Both the extent of skin involvement and the impact of the disease on QoL are used in clinical practice to classify the overall severity of psoriasis [8].

Numerous treatments are available, which provide varying degrees of symptom alleviation and temporary disease control, but none cures psoriasis. Treatment choices are guided by psoriasis severity, with topical agents generally used in patients with mild localized disease, and phototherapy and systemic agents, including biologics, typically used for moderate-to-severe disease [9, 10, 11, 12]. The presence of comorbid medical conditions may influence treatment selection and potentially complicate psoriasis management. Common comorbidities associated with psoriasis include cardiovascular disease, psoriatic arthritis, osteoarthritis, type 2 diabetes mellitus, and certain malignancies and autoimmune diseases [13, 14, 15, 16, 17]. Moreover, depression, anxiety, and sleep disturbances are common in patients with psoriasis [18, 19].

Many psoriasis patients are not content with their current therapy and are dissatisfied with treatment outcomes. In a population-based US survey, the rate of treatment dissatisfaction increased with greater body surface area (BSA) involvement and approached 50% among those with at least 3% BSA—a common breakpoint used to define moderate disease [20]. In a subsequent US survey, more than one-third of patients with psoriasis indicated dissatisfaction with traditional systemic therapies, including methotrexate, cyclosporine, and phototherapy [21].

More recent surveys of patients with psoriasis suggest that treatment satisfaction is associated with the type of therapy, particularly its effectiveness, safety, and convenience. Several studies have found biologic agents to be the most satisfactory psoriasis treatments from patients' perspective and topical medications the least satisfactory [22, 23, 24, 25]. However, the level of overall satisfaction with current psoriasis therapies was only moderate [24], and even those treatments associated with the greatest patient satisfaction, including biologics, received suboptimal ratings on key criteria.

Other than the type of therapy, factors contributing to psoriasis patients' satisfaction with treatment are complex and not well understood, particularly among patients in the United States, for whom satisfaction data are relatively sparse. A previous large study of US patients was based on data collected in 2010-2011 at 10 sites in 5 states; the Treatment Satisfaction Questionnaire for Medication, version II, which measures 4 dimensions of satisfaction, was administered to patients with moderate-to-severe plaque psoriasis [22]. Here we report an analysis of a more recent nationwide US survey sample, in which we examined the relationships among psoriasis overall disease severity, patient demographics, disease characteristics, and a more comprehensive set of factors relevant to treatment satisfaction outcomes.

Methods

A. Data source

Cross-sectional analyses were performed using data from the National Health and Wellness Survey (NHWS; Kantar Health, New York, NY, USA), an annual, self-administered, healthcare-related survey of US adults. In the 2012 survey, 75,000 respondents were randomly polled and stratified for a nationally representative sample. The protocol for the NHWS is approved and overseen by the Essex Institutional Review Board (Lebanon, NJ, USA). Patients providing data for the present analyses were recruited through the NHWS. From November 28 to December 12, 2012, they anonymously provided answers to the *Psoriasis Wave 5 Survey*, an Internet-based survey consisting of 168 questions. Informed consent was electronically requested and provided by all participants prior to survey completion.

B. Sample

A total of 5,605 subjects with age ≥ 20 years and self-reported psoriasis were invited to complete the survey. Of these, 1,635 subjects agreed to participate. A total of 1,050 subjects completed the survey, and the remaining 585 subjects either dropped out during the survey or did not meet the screening criteria. Of the respondents who completed the survey, 773 subjects received treatment for psoriasis and were included in the analyses.

The severity of psoriasis was determined by each subject's response to the following question: "*How would you currently characterize the severity of your psoriasis — "mild," "moderate," or "severe"?*" Patients reporting moderate and severe psoriasis were combined into one group owing to the small number of participants reporting "severe" disease. Subjects also reported information on demographics (age, gender, race, and education level), presence or absence of comorbid medical conditions (joint

pain, depression, osteoarthritis, anxiety, type 2 diabetes mellitus, psoriatic arthritis, insomnia, and heart disease), and psoriasis treatment (biologic, oral, over-the-counter [OTC], topical, and phototherapy).

Subjects were queried about the frequency of key clinical symptoms during psoriatic flare-ups, in the absence of flare-ups, and within the past 7 days. Psoriasis-related pain was assessed on a 10-point scale ranging from 1 (no pain) to 10 (worst possible pain), with responses categorized as “no pain” (score =1), “mild pain” (score=2–3), or “moderate-to-severe pain” (score=4–10). Psoriasis-related itching, burning/stinging, hurting, and irritation were each rated on a scale from 0 (never bothered) to 6 (always bothered), with responses categorized as “never bothered” (score=0), “sometimes bothered” (score=1–2), or “frequently bothered” (score=3–6). All clinical symptom ratings, except for pain, were converted to a 0-100 point scale for analyses on mean values.

C. Patient-reported satisfaction

Satisfaction with current psoriasis treatment was elicited through a series of questions. Subjects were asked: “Which of the following have you actually experienced since taking current psoriasis medication?” They responded with yes or no answers to the following items: “Quality of life improvement”; “The treatment alleviates symptoms”; “This is a long-term cost-effective treatment”; “This is a fast-acting product”; “Treatment offers consistent control over my symptoms”; and “An improvement of my emotional health through treatment’s effectiveness.”

D. Data analyses

Demographic characteristics, comorbid medical conditions, patient-reported clinical symptoms, current psoriasis treatments, and patient satisfaction were compared between psoriasis severity groups (“mild” vs. “moderate-to-severe”). Between-group differences in categorical variables were assessed using the Chi-square test, and between-group differences in continuous variables were evaluated with the Wilcoxon rank sum test. Linear regression models were used to examine the impact of psoriasis disease severity on patient satisfaction with current treatment, controlling for age, gender, education, race, comorbidities, and treatment type. Statistical significance was set at the 0.05 level. All analyses were conducted using SAS[®] statistical software, version 9.3 (SAS Institute, Inc., Cary, NC, USA).

Results

A. Demographic and baseline characteristics

Table 1. Demographic and clinical characteristics

Characteristic	All patients (N=773)	Psoriasis Severity	
		Mild (n=407)	Moderate-to-severe (n=366)
Age, years, mean (SD)	54.3 (13.9)	56.2 (13.3)	52.2 (14.2)*
Age category, n (%)			
20–40 y	145 (18.8)	62 (15.2)	83 (22.7)*
41–64 y	420 (54.3)	214 (52.6)	206 (56.3)
≥65 y	208 (26.9)	131 (32.2)	77 (21.0)
Female, n (%)	433 (56.0)	227 (55.8)	206 (56.3)
White, n (%)	690 (89.3)	372 (91.4)	318 (86.9)*
College degree or higher, n (%)	411 (53.2)	233 (57.2)	178 (48.6)*
Comorbidities, n (%)			
Joint pain	221 (28.6)	102 (25.1)	119 (32.5)*
Depression	176 (22.8)	81 (19.9)	95 (26.0)*
Osteoarthritis	159 (20.6)	81 (19.9)	78 (21.3)
Anxiety	141 (18.2)	65 (16.0)	76 (20.8)

Type 2 diabetes mellitus	131 (16.9)	66 (16.2)	65 (17.8)
Psoriatic arthritis	107 (13.8)	34 (8.4)	73 (19.9)*
Insomnia	91 (11.8)	33 (8.1)	58 (15.8)*
Heart disease	76 (9.8)	41 (10.1)	35 (9.6)
Current treatment, n (%)			
Topical	539 (69.7)	280 (68.8)	259 (70.8)
Over-the-counter	210 (27.2)	121 (29.7)	89 (24.3)
Biologic	160 (20.7)	30 (7.4)	130 (35.5)*
Phototherapy	102 (13.2)	43 (10.6)	59 (16.1)*
Oral	52 (6.7)	15 (3.7)	37 (10.1)*

SD, standard deviation. *p<0.05 compared with mild psoriasis group.

The study sample consisted of 773 patients, including 407 (52.7%) with self-reported mild psoriasis and 366 (47.3%) with moderate-to-severe psoriasis (Table 1). Patients with moderate-to-severe psoriasis were younger than those with mild disease (mean age: 52.2 vs. 56.2 years; p<0.05), and a significantly smaller proportion held a college degree (48.6% vs. 57.2%; p<0.05). Overall, 56% of the study sample was female and 89.3% was white, with a smaller proportion of white subjects in the moderate-to-severe psoriasis group (86.9% vs. 91.4%; p<0.05). The most common comorbidities in both groups were joint pain (28.6% of all patients), depression (22.8%), and osteoarthritis (20.6%). Compared with those with mild psoriasis, a significantly greater proportion of patients with moderate-to-severe psoriasis had joint pain (32.5% vs. 25.1%), depression (26.0% vs. 19.9%), psoriatic arthritis (19.9% vs. 8.4%), and insomnia (15.8% vs. 8.1%) (all p<0.05).

The most common current treatments were topical therapy (69.7% of all patients), OTC medications (27.2%), and biologics (20.7%). Compared with the mild psoriasis group, a significantly greater proportion of the moderate-to-severe psoriasis group was currently receiving biologics (35.5% vs. 7.4%), oral agents (10.1% vs. 3.7%), and phototherapy (16.1% vs. 10.6%) (all p<0.05).

B. Patient-reported clinical symptoms

Table 2. Patient-reported clinical symptoms

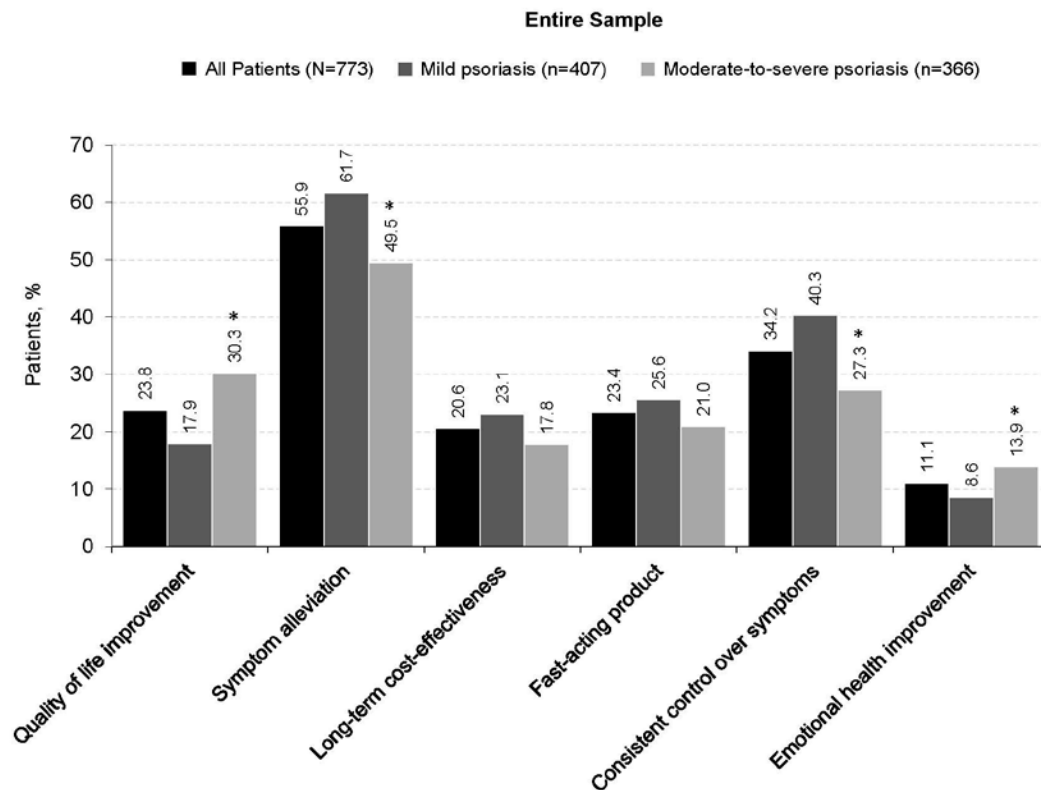
Characteristic, n (%)	All patients (N=773)	Psoriasis Severity	
		Mild (n=407)	Moderate-to-severe (n=366)
Pain without flare-ups			
No pain (score=1)	387 (50.1)	273 (67.1)	114 (31.1)
Mild pain (score=2–3)	208 (26.9)	100 (24.6)	108 (29.5)
Severe pain (score=4–10)	178 (23.0)	34 (8.4)	144 (39.3)
Pain during flare-ups			
No pain (score=1)	210 (27.2)	161 (39.6)	49 (13.4)
Mild pain (score=2–3)	187 (24.2)	137 (33.7)	50 (13.7)
Severe pain (score=4–10)	376 (48.6)	109 (26.8)	267 (73.0)
Itching			
Never bothered (score=0)	108 (14.0)	89 (21.9)	19 (5.2)
Sometimes bothered (score=1–2)	172 (22.3)	116 (28.5)	56 (15.3)
Frequently bothered (score=3–6)	493 (63.8)	202 (49.6)	291 (79.5)
Burning/stinging			

Never bothered (score=0)	295 (38.2)	216 (53.1)	79 (21.6)
Sometimes bothered (score=1–2)	194 (25.1)	121 (29.7)	73 (19.9)
Frequently bothered (score=3–6)	284 (36.7)	70 (17.2)	214 (58.5)
Hurting			
Never bothered (score=0)	328 (42.4)	234 (57.5)	94 (25.7)
Sometimes bothered (score=1–2)	170 (22.0)	102 (25.1)	68 (18.6)
Frequently bothered (score=3–6)	275 (35.6)	71 (17.4)	204 (55.7)
Irritation			
Never bothered (score=0)	145 (18.8)	112 (27.5)	33 (9.0)
Sometimes bothered (score=1–2)	178 (23.0)	127 (31.2)	51 (13.9)
Frequently bothered (score=3–6)	450 (58.2)	168 (41.3)	282 (77.0)

Clinical symptoms reported by patients with moderate-to-severe psoriasis were significantly more severe and bothersome than those reported by patients with mild psoriasis (Table 2). The mean value for pain, reported on a 1 (no pain) to 10 (worst possible pain) scale, was higher in patients with moderate-to-severe psoriasis than in patients with mild psoriasis during flare-ups (5.4 vs. 2.7) and between flare-ups (3.4 vs. 1.7). Additionally, a greater proportion of patients with moderate-to-severe psoriasis had severe pain during flare-ups (73.0% vs. 26.8%) and between flare-ups (39.3% vs. 8.4%). Similar patterns were observed for other psoriasis-related key clinical symptoms. Mean values on the 0-100 scale were higher in the moderate-to-severe psoriasis group compared with the mild psoriasis group for itching (65.5 vs. 41.9), burning/stinging (45.7 vs. 17.7), hurting (43.9 vs. 16.3), and irritation (61.7 vs. 35.0). Moreover, a greater proportion of patients with moderate-to-severe psoriasis was frequently bothered by these symptoms compared with those with mild psoriasis.

C. Patient satisfaction with current treatment

1A.



*p<0.05

1B.

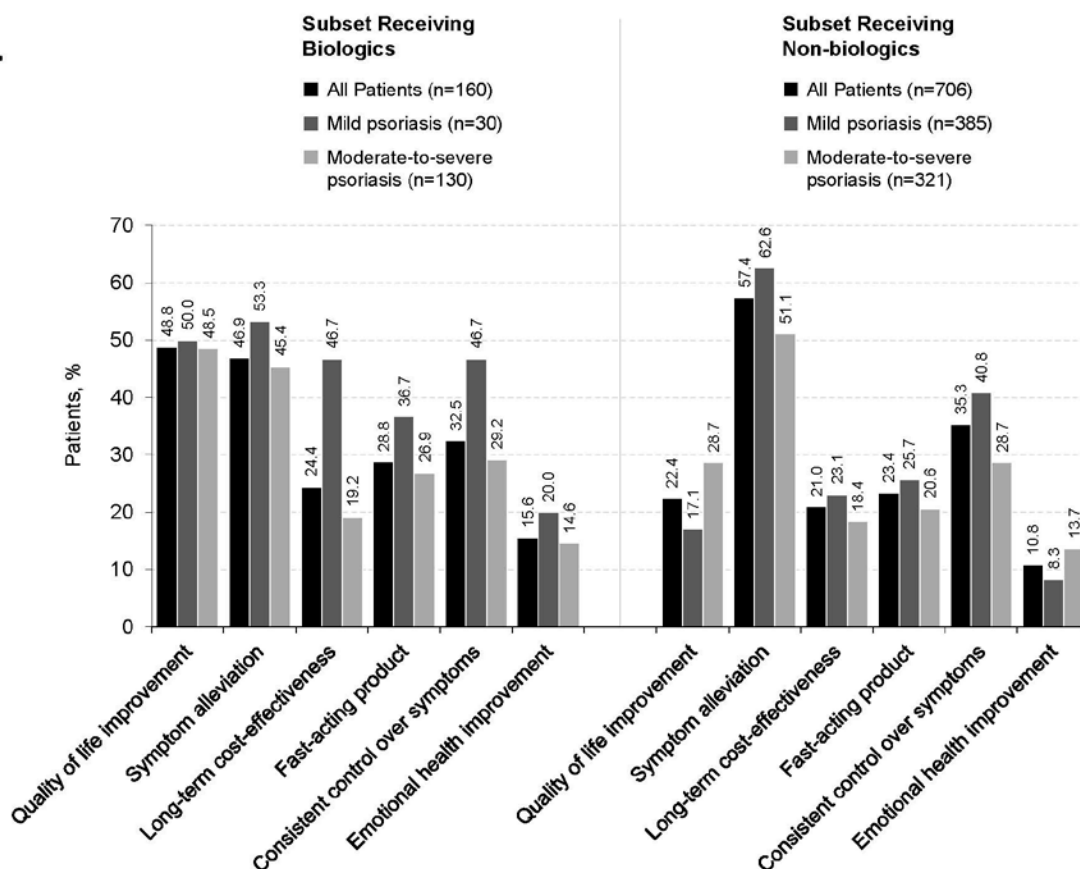


Figure 1. Patient satisfaction with current treatment among the entire sample (A) and among users versus non-users of biologic agents (B).

The proportion of patients reporting satisfaction with their current treatment was low overall, with rates ranging from 11.1% for emotional health improvement to 55.9% for symptom alleviation (Figure 1). When analyzed by psoriasis severity, significantly fewer patients with moderate-to-severe disease compared with mild disease were satisfied with current treatment for alleviating symptoms (49.5% vs. 61.7%) and for providing consistent control over symptoms (27.3% vs. 40.3%) (both $p < 0.05$). Conversely, significantly more patients with moderate-to-severe disease were satisfied with current treatment for improving QoL (30.3% vs. 17.9%) and emotional health (13.9% vs. 8.6%) (both $p < 0.05$).

Additional analyses of patient satisfaction were performed by comparing responses from patients who were and patients who were not receiving treatment with a biologic. The rates of satisfaction ranged from 15.6% for emotional health improvement to 48.8% for QoL improvement among patients receiving biologics. Among patients on non-biologic therapy, the satisfaction rates ranged from 10.8% for emotional health improvement to 57.4% for symptom alleviation. Similar trends for biologic and non-biologic users were observed separately in each disease severity cohort. However, the number of patients receiving biologics in the mild disease group was too small to derive any meaningful findings.

D. Predictors of patient satisfaction

Table 3. Predictors of patient satisfaction outcomes in logistic regression models

Variable	Odds ratio (95% confidence interval)					
	Symptom alleviation	Fast-acting product	Consistent control over symptoms	Quality of life improvement	Emotional health improvement	Long-term cost-effective
Moderate-to-severe psoriasis	0.65 (0.47, 0.90)*	0.61 (0.42, 0.91)*	0.48 (0.34, 0.68)*	1.19 (0.80, 1.76)	1.22 (0.73, 2.05)	0.57 (0.38, 0.86)*

Biologic therapy	1.17 (0.75, 1.82)	1.90 (1.14, 3.17)*	1.37 (0.86, 2.20)	3.24 (2.01, 5.22)*	1.25 (0.65, 2.38)	1.67 (0.98, 2.84)
Oral therapy	1.44 (0.76, 2.71)	0.70 (0.32, 1.55)	1.17 (0.61, 2.26)	1.06 (0.53, 2.11)	3.15 (1.47, 6.77)*	1.41 (0.69, 2.86)
Topical therapy	1.69 (1.15, 2.47)*	1.73 (1.10, 2.73)*	1.65 (1.11, 2.47)*	1.14 (0.74, 1.77)	1.09 (0.61, 1.94)	1.33 (0.85, 2.10)
Phototherapy	1.22 (0.78, 1.91)	0.74 (0.43, 1.28)	1.06 (0.66, 1.68)	1.68 (1.02, 2.74)*	2.53 (1.43, 4.47)*	1.22 (0.72, 2.05)
Over-the-counter therapy	1.71 (1.15, 2.55)*	0.90 (0.56, 1.43)	1.44 (0.96, 2.15)	0.73 (0.45, 1.19)	0.76 (0.40, 1.43)	1.26 (0.79, 2.00)
Age 41–64 years	1.63 (1.08, 2.47)*	0.66 (0.41, 1.05)	1.15 (0.73, 1.80)	0.66 (0.41, 1.06)	1.13 (0.60, 2.13)	0.75 (0.46, 1.23)
Age ≥65 years	1.48 (0.90, 2.44)	0.40 (0.22, 0.73)*	1.17 (0.69, 2.00)	0.57 (0.31, 1.05)	0.69 (0.29, 1.64)	0.98 (0.54, 1.79)
Male gender	0.89 (0.65, 1.23)	0.98 (0.67, 1.42)	1.57 (1.12, 2.19)*	1.54 (1.05, 2.26)*	1.10 (0.61, 1.66)	1.25 (0.85, 1.84)
College degree or higher	1.49 (1.11, 2.01)*	0.93 (0.66, 1.33)	0.91 (0.66, 1.25)	0.88 (0.61, 1.26)	0.75 (0.46, 1.21)	0.93 (0.65, 1.35)

Additional variables included in the model were race and comorbidities (anxiety, depression, heart disease, insomnia, joint pain, osteoarthritis, psoriatic arthritis, and type 2 diabetes mellitus).

*p<0.05 compared with corresponding reference group.

Use of logistic regression analysis to examine the impact of psoriasis overall severity on patient satisfaction with existing treatment showed that patients with moderate-to-severe psoriasis were significantly less satisfied than patients with mild psoriasis on four outcome measures: symptom alleviation (odds ratio [OR]=0.65, 95% confidence interval [CI]=0.47-0.90), consistent control over symptoms (OR=0.48, 95% CI=0.34-0.68), long-term cost-effectiveness (OR=0.57, 95% CI=0.38-0.86), and fast-acting product (OR=0.61, 95% CI=0.42-0.91) (Table 3). Patient satisfaction with improvement of QoL or emotional health was not significantly associated with overall disease severity.

The type of current treatment also influenced patient satisfaction. Patients receiving biologics were significantly more likely than those who were not receiving biologics to report satisfaction with QoL improvement (OR=3.24, 95% CI=2.01-5.22) and with how fast the product worked (OR=1.90, 95% CI=1.14-3.17). The use of oral therapy was associated with significantly greater satisfaction with emotional health improvement (OR=3.15, 95% CI=1.47-6.77) compared with no use of oral agents. Topical therapy was associated with significantly greater likelihood of satisfaction with symptom alleviation (OR=1.69, 95% CI=1.15-2.47), consistent control over symptoms (OR=1.65, 95% CI=1.11-2.47), and how fast the product worked (OR=1.73, 95% CI=1.10-2.73) compared with no topical therapy. Phototherapy was associated with greater satisfaction in terms of improvements in emotional health (OR=2.53, 95% CI=1.43-4.47) and QoL (OR=1.68, 95% CI=1.02-2.74), and OTC therapy was associated with greater satisfaction with symptom alleviation (OR=1.71, 95% CI=1.15-2.55), compared with no use of these therapies.

Several demographic factors were significantly associated with patient satisfaction with current treatment. Compared with patients aged 20–40 years, those aged 41–64 years were more likely to be satisfied with symptom alleviation (OR=1.63, 95% CI=1.08-2.47), and those aged ≥65 years were less likely to be satisfied with how fast the product worked (OR=0.40, 95% CI=0.22-0.73) (both p<0.05). Men were more likely than women to be satisfied with consistent control over symptoms (OR=1.57, 95% CI=1.12-2.19) and QoL improvement (OR=1.54, 95% CI=1.05-2.26) (both p<0.05). Patients with a college degree were more likely to be satisfied with symptom alleviation (OR=1.49, 95% CI=1.11-2.01; p<0.05) compared with those having less than a college degree.

Discussion

Using data from a large, recent sample of US patients with psoriasis, this study examined the relationship between psoriasis disease severity and patient demographics, disease characteristics, and satisfaction with psoriasis therapy. All patients in the analysis reported receiving treatment for their psoriasis; however, bothersome psoriasis-related symptoms and painful flare-ups

were common. The overall level of satisfaction with current psoriasis therapies was low, particularly among the patients reporting moderate-to-severe disease. Although the satisfaction rates were somewhat higher for patients who were receiving biologics compared with those who were not, the overall satisfaction rates for biologics still remained low (<50%).

A major component of our study was analysis of patient-reported symptoms, a relatively neglected area in recent psoriasis treatment-satisfaction research. The majority of subjects in our cohort reported being bothered by psoriasis-related itching, burning/stinging, hurting, or irritation at least sometimes, despite receiving therapy. Consistent with the findings of previous large surveys [29, 30], itching was the most bothersome symptom, reported as a frequent occurrence by nearly two-thirds of subjects; more than half were also frequently bothered by skin irritation. Although the patients with moderate-to-severe psoriasis experienced symptoms more often, frequent discomfort from symptoms was not confined to this group. Among the patients with mild psoriasis, 50% reported frequently bothersome itching and 41% reported frequently bothersome irritation. A particularly noteworthy finding was the high prevalence of psoriasis-related pain in our cohort, affecting 33% of mild patients and 69% of moderate-to-severe patients even in the absence of any psoriasis disease flare. Therefore, we suggest that more attention needs to be paid to psoriasis-related symptoms regardless of the overall psoriasis severity. Discussion of these key symptoms needs be part of the physician and patient interaction and communication.

The most common current treatment among all patients in our study was topical medication, used by approximately 70%, followed by OTC remedies, used by 27%. Less than one-quarter reported receiving biologics, phototherapy, or oral agents. Among all patients, the proportions receiving biologics or phototherapy were generally comparable to those in recent studies, whereas more of our patients were currently using topical therapy and somewhat fewer were on oral medications [22, 23, 24, 30, 31, 32, 33]. The high percentage of topical medication users in our analysis may reflect combination therapy or duplication of OTC responses in the topical category on the survey. Nevertheless, a high prevalence of topical use, in the 40%-to-60% range, is a consistent finding in recent research [22, 23, 24, 30, 31, 32, 33]. As expected, we found that significantly more patients with moderate-to-severe psoriasis reported receiving phototherapy or systemic treatments, including biologics, than patients with mild psoriasis. However, the proportions of moderate-to-severe patients who used these more potent therapies were low: 10% for oral agents, 16% for phototherapy, and 36% for biologics. The proportions of patients using topical or OTC medications did not differ significantly between the disease-severity groups. Overall, our results demonstrate that psoriasis is undertreated, even taking into account possible concurrent use of multiple medications by the patients in our analysis. Other investigators have also reported evidence of undertreatment [29, 30, 31, 33]. The finding that OTC preparations were the second most commonly used treatments in our study raises the question whether some patients might have been “self-medicating” when the therapies prescribed for them did not provide satisfactory results. Clinical practice guidelines recommend systemic therapy for the management of “extensive” psoriasis [10]. The low utilization of systemic agents by the moderate-to-severe group in our study may be due to several reasons. These could include disparities between patients’ and physicians’ perceptions of disease severity, reluctance on the part of patients or physicians to take or prescribe systemic agents due to concern regarding the risk-benefit ratio of systemic agents, or the need for improved psoriasis assessment tools or updated treatment recommendations, among other factors.

Our analysis of patient satisfaction showed that current therapies were not highly rated, with overall satisfaction levels ranging from 11% to 56% on the six outcome measures. Again, these results are consistent with previous findings [30, 33]. The most commonly used treatment among the patients in our study was the one identified in prior research as the least satisfactory: topical medication [22, 23, 24, 32]. The analysis by disease severity showed that patients with moderate-to-severe psoriasis were less satisfied with current therapies than those with mild disease, and they were most dissatisfied with symptom-relief attributes and cost-effectiveness. The analysis of patients who were and were not receiving treatment with a biologic confirmed the higher satisfaction among biologics users reported in other studies [22, 23, 24, 25, 32]. However, we found significant differences favoring current biologic therapy only for QOL improvement and fast product action. These results suggest that even the treatment that patients rated as most satisfactory was not perceived as satisfactory enough.

The substantial body of psoriasis patient satisfaction research, including this analysis, reported over the past 10 years has demonstrated that many patients experience their treatments as inadequate to their needs [29, 30, 33]. This finding has been remarkably consistent despite the rapid expansion of the psoriasis armamentarium during the same period. The challenge for further research is to investigate the reasons for the persistent patient unhappiness with therapeutic outcomes. Examining components of patient satisfaction, such as expectations for treatment, is one potential avenue for future study. Do today’s psoriasis patients expect too much (or too little) from their care, considering that a cure is still not in sight? Have biologic therapies raised the satisfaction threshold? Are current methodologies enabling us to ask subjects the right questions about their treatment experience? Other satisfaction-relevant factors not captured in the present analysis but potentially warranting additional research include the roles of patient education, physician-patient communication, adherence to therapy, and dermatologists’ level of engagement with psoriasis in their daily practice.

Our study has some limitations. First, it was retrospective in design and relied on patient self-reporting and recollection for clinical information, including disease severity, comorbidities, and symptoms. It is well recognized that patient recollection can be

unreliable, and the classification of psoriasis as mild versus moderate-to-severe may not be fully reliable in the absence of clinical examination. Second, the study may be limited by self-selection bias, in that study participants who chose to complete the survey may be different from a national representative sample of psoriasis patients.

In conclusion, this study demonstrated that a majority of psoriasis patients in a large sample were unsatisfied with their current treatment, particularly those with moderate-to-severe disease. After controlling for between-group differences, the patients with moderate-to-severe psoriasis compared with those with mild disease were significantly more likely to be dissatisfied with their current treatment for symptom alleviation, consistent symptom control, fast action, and long-term cost-effectiveness.

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