



Understanding Treatment Preferences in Patients with Moderate to Severe Plaque Psoriasis in the USA: Results from a Cross-Sectional Patient Survey

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ABSTRACT

Introduction: The goal of psoriasis (PsO) treatment is to improve quality of life by lessening the extent and severity of the disease. Traditional systemic drugs and biologic agents are used for the treatment of moderate to severe PsO and recent research emphasizes understanding patient goals and preferences for treatment, to improve overall outcomes.

Methods: An online survey was administered to collect data from 500 adult patients with moderate to severe PsO in the USA. Patients were required to have current or previous systemic therapy use and were excluded if aged 75 or older. Data on demographics, disease burden,

treatment use, and patients' treatment goals and expectations were collected. Descriptive and multivariate analyses examined the factors that predict treatment goals. Subgroup analyses were performed for age, gender, severity, comorbid psoriatic arthritis (PsA), location of PsO, and biologic experience. All analyses were conducted using SAS v9.4 and R v3.4.

Results: Of the 500 adult patients included, 71.6% reported moderate PsO. Patients had a mean (SD) score of 62.4 (23.0) for skin pain, 60.0 (26.3) for fatigue, and 6.6 (2.1) for itch on a scale of 0–100, 0–100, and 0–10 respectively. Mean (SD) score for quality of life (QoL), assessed using Dermatology Life Quality Index (DLQI), was 18.3 (7.3), with more than 90% having moderate/very large/extremely large effect on life. The majority of patients considered “keeping skin clear for 2–3 years” (94%), “overall relief of symptoms” (93.8%), and effective in clearing certain areas” (92.2%) as important attributes of a systemic treatment. Overall, patients expected 50% clear skin in about 2 weeks and completely clear skin in about 4 weeks.

Conclusions: Overall, in this study with more than 70% of patients with moderate disease, patients reported high burden of disease and impact on QoL. This study demonstrates the importance of considering patient perspectives in treatment decisions that are critical for optimizing patient outcomes.

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INTRODUCTION

A chronic, immune-mediated skin disease, plaque psoriasis (PsO) is the most common form of psoriasis and can result in raised, red, silver, or flaky patches on the skin. Affecting 1–3% of the world's population, PsO is associated with significant disease burden, including poor quality of life (QoL), increased disability, social stigmatization, and decreased emotional and physical well-being [1–3]. In addition, PsO is linked to co-morbidities including psoriatic arthritis (PsA), obesity, diabetes mellitus, and cardiovascular disease [1–3]. Long-term management of PsO is essential for improving quality of life and lessening the burden of comorbid conditions. While mild disease is often controlled with topical agents, systemic therapy is often used to treat patients with moderate to severe disease, defined as involvement of 3–10 and greater than 10 percent of the body surface area (BSA), respectively [3]. Traditional systemic drugs include methotrexate, cyclosporine, and acitretin. More recently, a multitude of biologic therapies have been approved for PsO. Biologic and non-biologic therapies vary widely in their benefit/risk profiles, as well as in other aspects related to convenience.

Evidence is now accumulating that, to optimize patient outcomes, there should be a shared decision-making process between patients and physicians [1]. Patients are heterogeneous in terms of how PsO manifests, how severe it is, how much it impacts their lives, and what their specific treatment goals may be. To this end, American Academy of Dermatology (AAD) guidelines recommend tailoring treatment choices to the individual patient [4]. Ultimately, understanding patient attitudes and preferences for treatment attributes can lead to greater treatment satisfaction, treatment adherence and compliance, and better long-term outcomes [5–8].

For patients with moderate to severe psoriasis, data is accumulating on treatment preferences and expectations. The largest and most complete data sets from the German Psoriasis (PsoBest) and Swiss Dermatology Network of Targeted Therapies (SDNTT) registries highlight the value of obtaining completely clear skin and rapid onset for patients [9, 10]. Because treatment decisions or changes are likely to occur when patients do not have adequate disease control, the objectives of this study are to expand on previous findings and provide clinicians insights into the treatment preferences and disease burden of patients who are still impacted by PsO and are dissatisfied with their current therapy.

METHODS

Study Design and Participants

This study was executed as a cross-sectional online quantitative survey targeting adult patients ($n = 500$) with moderate to severe PsO in the USA. Patient inclusion criteria were adult patients with moderate to severe PsO (self-assessed based on $BSA \geq 3$), current or previous use of systemic therapy within the past 12 months (non-biologic and biologic systemic therapies), and a score of 7–10 (on a 10-point scale) for at least one of the following questions: Agreement on “I want a medication that clears my skin more effectively” or “I miss out on aspects of my life because of psoriasis”. Any respondent aged 75 or older or who was working for a pharmaceutical, health insurance, research, or advertising company was excluded as there may be self-presentation effects that could alter the interview answers. Medical professionals were also excluded as the intent was to obtain purely a patient perspective. Furthermore, any respondent unwilling or unable to provide informed consent was excluded from this study.

The study (Protocol #18-045418) was approved by Pearl Institutional Review Board (IRB) and met the standards of both Food and Drug Administration (FDA) 21 Council of Federal Regulations (CFR) 56.104 and Department

of Health and Human Services (DHHS) 45 CFR 46.101 regulations. Informed consent was obtained from all participants prior to participating in the study. This study was conducted in full conformance with the Guidelines for Good Pharmacoepidemiology Practices (GPP) published by the International Society of Pharmacoepidemiology (ISPE) and the laws and regulations of the country in which the research was conducted.

The survey was executed between December 2018 and January 2019. Potential respondents were recruited from various internet patient panels to participate in the cross-sectional online survey, approximately 20 min in duration. The interview request included a statement of informed consent and a set of screening questions based on the inclusion/exclusion criteria. The respondent could choose to quit the survey at any point without penalty. Upon completion of the survey, they were compensated through their panel in the form of “points”, equivalent to \$10–15 USD, which can be redeemed for goods or the participant would be entered into a raffle.

Survey and Measures

Development of the survey content was facilitated by initial qualitative interviews conducted among 12 patients with moderate to severe PsO, approximately 45 min in length in September 2018. These interviews were exploratory tele-interviews in the USA which evaluated how PsO affects patients’ lives, and what great medication results look like from a patient’s perspective.

The final survey collected demographic information (including age, gender, race, gender, ethnicity, height/weight, employment status, and smoking history), disease characteristics, treatment use, and QoL. Disease characteristics included self-assessed BSA involvement, self-assessed severity, psoriasis location, and patient global assessment of genital PsO.

Self-assessed BSA involvement was measured by the number of palms that covered the patches on the body, 3–10 representing moderate

disease severity and more than 10 classified as severe disease [11]. Overall disease severity was also assessed using a self-reported rating scale of 0 (no PsO) to 100 (severe PsO) and genital PsO severity was assessed on a scale of 0 (clear, no PsO) to 5 (severe, the worse PsO). Psoriasis Skin Appearance Bothersomeness (PSAB), a validated tool on a scale of 0–10 in which in 0 is “not at all bothered” and 10 is “extremely bothered”, was used to determine the current extent of symptoms bothering the patients. Each of the symptoms (redness/discoloration, thickness, and scaling/flaking) was queried separately on a scale of 0–10. The three-item scores were summed for a total score ranging from 0 to 30 with higher scores indicating more bothersomeness due to skin appearance [12]. Current symptom assessments of skin pain (in the past week, on the visual analogue scale (VAS) 0–100, 0 being none and 100 being worst), itch (in the past 24 h was assessed using Itch Numeric Rating Scale (Itch NRS) 0–10, 0 being no itch and 10 being worst imaginable itch), and fatigue (in the past week, on VAS 0–100, 0 being none and 100 being worst) were also collected [13–16]. Patients’ current use of non-biologic (methotrexate, cyclosporine) and biologic systemic agents (tumor necrosis factor (TNFs), interleukin (IL)-17s, IL-12/23 s, IL-23, apremilast) was also collected.

Quality of life was captured using Dermatology Life Quality Index (DLQI, 0–30), with a recall period of 1 week. DLQI is a highly cited validated 10-question assessment of the effect of the patient’s dermatologic condition on QoL, with the following categories for scores: 0–1 (none), 2–5 (small), 6–10 (moderate), 11–20 (very large), and 21–30 (extremely large) for impact on QoL [17].

Patients’ Goals for New Treatment

The importance of treatment attributes was captured on a scale of 0–10, where 0 is not at all important and 10 is extremely important. Attributes assessed included probability of side effects, overall effectiveness (achieving clear skin), rapidity of response, overall relief of symptoms (e.g., itching and skin pain),

sustained response for longer time periods (2–3 years), and effectiveness in clearing certain hard-to-treat areas (i.e., nail, scalp, genitals, palms, and soles). A set of novel questions were designed to understand patient expectations for onset of efficacy as a treatment attribute. Specifically, patients were asked to report how many days they expect to see a 50% improvement or 100% improvement in their PsO, respectively.

Statistical Analysis

Descriptive analyses were conducted to describe the patient sample with respect to patient demographics, disease characteristics, treatment use, and treatment goals/expectations. Frequencies and percentages were reported for categorical outcomes and means, standard deviations (SD), medians and first and third quartiles were reported for continuous outcomes. Descriptive statistics were used to inform the exact variables in the multivariable logistic regression model.

A multivariate logistic regression model was conducted to examine the impact of different factors on patient preferences towards treatment goals. The dependent variable (patient preference towards each of the treatment goals) was defined as those who had high preference (a score of at least 7 on a 0–10 scale, 0 being low importance and 10 being high importance) vs. those who had low preference to the treatment goals. Age, gender, disease duration, and biologic experience were included as a priori independent covariates in the models. The final models were assessed for parsimony using the Akaike information criterion (AIC), area under the curve (AUC), and a pseudo r^2 . Independent variables (IVs) that did not add enough information to the final models were considered for removal to keep the number of IVs minimal while still ensuring a strong model fit. The final model was presented as parameter estimates with standard errors and Z scores. Odds ratios (OR) and confidence intervals (CI) were also presented. The overall model X^2 was presented along with the AUC and final pseudo r^2 values. Models were run for the following dependent

(outcome) variables: “rapid response”, “keeping skin clear for 2–3 years”, “overall relief of symptoms”, and “effective in clearing in certain areas like nail, scalp, genitals, palms, and soles”, after adjusting for the a priori covariates mentioned above.

In addition to the multivariate analyses, descriptive analyses on different subgroups of interest were also performed for gender (male vs. female), age groups (18–30, 31–40, 41–50, and 51+), disease severity (moderate vs. severe), comorbid PsA (PsO only vs. PsO + PsA), location of PsO (trunk, extremities, palms/soles, nails, scalp, genitals, face, ears, and other) and biologic experience (biologic-naïve vs. biologic-experienced) to assess if the treatment goals and expectations were different between these subgroups.

All analyses were conducted using statistical analysis software (SAS, Cary, NC) v9.4 or R v3.4. On the basis of the programming of the survey all relevant questions required a response, though options for “unknown” or “decline to answer” (or similar values as appropriate for the specific question) were available. As a result, missing data was kept to a minimum. Missing responses were reported as such. For instances in which missing data were observed for an explanatory variable, the explanatory variable was coded in such a way as to combine with the separate category of “unknown/missing.” Missing data for an outcome variable was addressed using case-wise deletion; no imputation strategy was used.

RESULTS

Patient Population and Clinical Characteristics

Of the approximately 14,000 patients with PsO that were invited to participate in the quantitative study, 18.5% ($n = 2596$) responded to the invitation. Of those 2596 patients, 67.4% ($n = 1749$) did not meet the inclusion criteria, 12.2% ($n = 316$) started the survey but did not complete it, 31 (1.2%) qualified for the survey but responded after the maximum quota of 500 participants was met, and 19.3% ($n = 500$) met

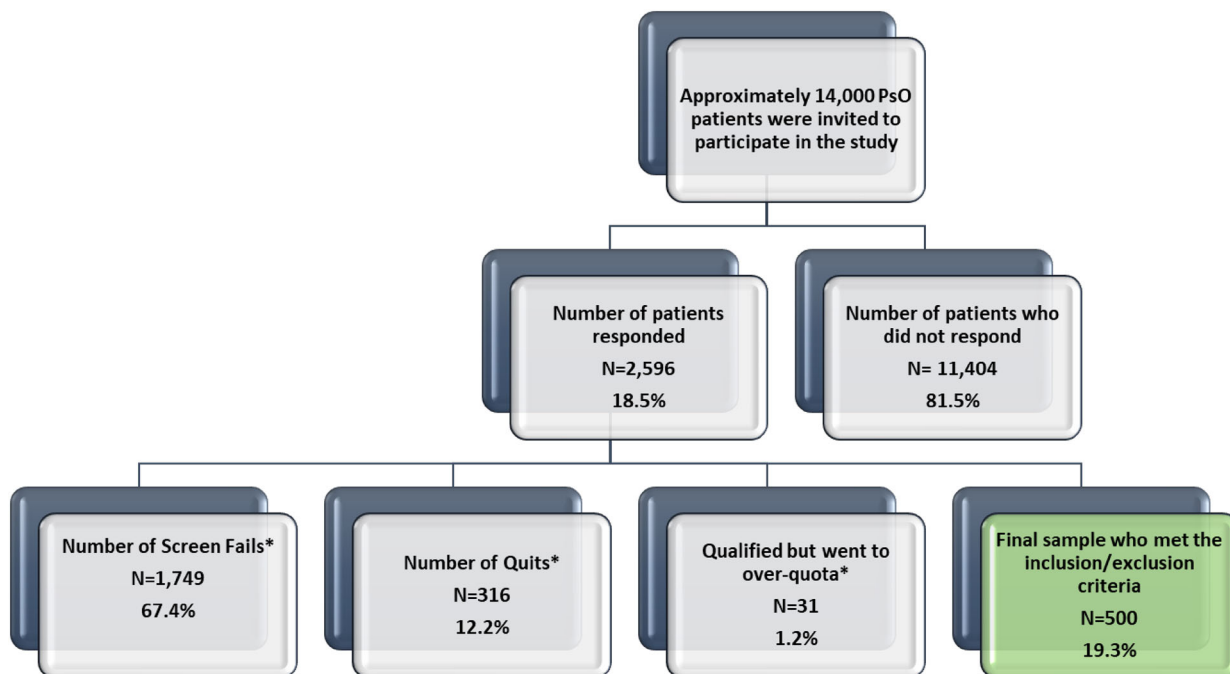


Fig. 1 Patient recruitment flow chart. *‘Screen fails’ defined as those who did not meet the inclusion criteria. ‘Quits’ defined as those who started the survey but failed

the inclusion and exclusion criteria and were included in the final sample (Fig. 1).

All demographic characteristics of this sample are shown in Table 1. The 500 adult US patients included 231 (46.2%) men and 269 (53.8%) women with mean age of 39.9 (12.0) years. Most patients were white (77.4%), employed full time (72.8% full time) and had prescription drug insurance/coverage through a current or former employer or union (58.2%). Less than one-third (26.2%) of the patients were ‘current smokers’ and almost half of the patients were ‘never smokers’ (46.4%). Mean body mass index (BMI) was 27.5 (7.1), with more than half of them (56%) in the overweight and obese categories.

Disease Burden

When assessing clinical characteristics, as displayed in Table 2, patients had a mean (SD) disease duration of 8.7 (8.8) years and, according to the BSA definition outlined above in the ‘Survey and Measures’ section, 71.6% of patients had moderate PsO (BSA 3–10) and

to complete it. ‘Qualified but went to over-quota’ defined as those who responded after we met the quota of $n = 500$

28.4% of patients with severe PsO (BSA > 10). A higher proportion of patients reported PsO in hard-to-treat areas like scalp (65.6%), face (52.8%), nails (22%), and genitals (25.2%). In terms of current symptom assessment, the mean score for skin pain in the past week on a scale of 0–100 was reported to be 62.4 (23.0), mean itch in the past 24 h was 6.6 (2.1) on a scale 0–10, and mean score for fatigue in the past week on a scale of 0–100 was reported to be 60.0 (26.3). Mean scores for PSAB in these patients was 23.5 (5.5), on a scale of 0–30, with higher scores indicating greater severity and annoyance for the patients. About 90% of the patients with genital PsO reported a score of at least 3 for severity of genital psoriasis on a scale of 0–5, where 0 is clear/no PsO and 5 is severe/worst PsO has ever been. Mean score for QoL, assessed using DLQI, was 18.3 (7.3), with most patients (more than 90%) having moderate or very large or extremely large effect on life as shown below (Table 2). Almost 70% of the patients were currently on a biologic, with the majority of them on their first biologic.

Table 1 Patient demographics ($n = 500$)

	Number (percentage)
Age in years	
Mean (SD)	39.9 (12.0)
Median (Q1, Q3)	39 (30, 48)
Gender	
Male	231 (46.2)
Female	269 (53.8)
Race/ethnicity ^a	
Caucasian/White	387 (77.4)
African American/Black	59 (11.8)
Hispanic/Latino	79 (15.8)
Asian	15 (3)
Native American/Alaskan Native	7 (1.4)
Pacific Islander	1 (0.2)
Other/unknown	6 (1.2)
Employment status	
Working full-time	364 (72.8)
Working part-time	37 (7.4)
Homemaker, no outside employment	23 (4.6)
Student	12 (2.4)
Unemployed	15 (3)
Retired	23 (4.6)
Disabled	26 (5.2)
Insurance coverage ^a	
Prescription drug insurance/coverage through a current or former employer or union	291 (58.2)
Prescription drug insurance/coverage purchased directly from an insurance company	128 (25.6)
Medicare Part D	38 (7.6)
Medicaid, Medical Assistance, or any kind of government-assistance plan for those with low income or a disability	75 (15)

Table 1 continued

	Number (percentage)
TRICARE or other military health care	6 (1.2)
Veteran Affairs (VA; including those who have ever used/enrolled for VA health care)	9 (1.8)
Indian Health Service	3 (0.6)
None	29 (5.8)
Other	8 (1.6)
Smoking history	
Current smoker [Yes, I currently smoke]	131 (26.2)
Past smoker [Yes, I smoked regularly in the past, but do not currently OR Yes, I smoked occasionally in the past, but do not currently]	137 (27.4)
Never smoker [No, I have never smoked]	232 (46.4)
Weight [pounds]	
Mean (SD)	178.4 (48.9)
Median (Q1, Q3)	173 (145, 200)
BMI, calculated ^b	
Mean (SD)	27.5 (7.1)
Median (Q1, Q3)	25.8 (22.9, 30.5)
Underweight (< 18.5)	14 (2.8)
Normal (18.5–24.9)	206 (41.2)
Overweight (25.0, 29.9)	144 (28.8)
Obese (≥ 30)	136 (27.2)

All variables are presented as n (%) unless otherwise noted

^a Not mutually exclusive

^b Body mass index (BMI) = weight in pounds/(height in inches)² \times 703

Table 2 Clinical characteristics, treatment use, and QoL measures ($n = 500$)

	Number (percentage)
Clinical characteristics	
Disease severity	
Moderate (body surface area [BSA] 3–10)	358 (71.6)
Severe (body surface area [BSA] > 10)	142 (28.4)
PsO severity [range 0–100] (0, no PsO; 100, severe PsO)	
Mean (SD)	75.3 (16.1)
Median (Q1, Q3)	80 (70, 90)
Disease duration (time from diagnosis to date of survey completion), years	
Mean (SD)	8.7 (8.8)
Median (Q1, Q3)	5 (3, 10)
Current PsO location ^a	
Trunk	236 (47.2)
Extremities	318 (63.6)
Palms/soles	212 (42.4)
Nails	110 (22)
Scalp	328 (65.6)
Genitals	126 (25.2)
Face	264 (52.8)
Ears	202 (40.4)
Other	42 (8.4)
Severity of genital PsO [range 0–5]	
n	126 (0.25)
0 (Clear; no PsO)	1 (0.79)
1	5 (3.97)
2	6 (4.76)
3	35 (27.78)
4	46 (36.51)
5 (severe; the worst your PsO has ever been)	33 (26.19)

Table 2 continued

	Number (percentage)
Treatment use	
Therapy class	
Light and laser therapy	90 (18)
Corticosteroids	147 (29.4)
Topical therapies	172 (34.4)
Non-biologic systemics ^d	106 (21.2)
Non-steroidal anti-inflammatory drugs	88 (17.6)
Biologics ^c	348 (69.6)
Biologic experience (including the current biologic)	
0	152 (30.4)
1	294 (58.8)
2	35 (7)
3+	19 (3.8)
Patient-reported outcomes	
Current symptom assessment	
Skin pain (in the past week) [range 0–100 (0, none; 100, worst)]	
Mean (SD)	62.4 (23.0)
Median (Q1, Q3)	67 (50, 79.3)
Itch NRS (in the past 24 h) [range 0–10 (0, no itch; 10, worst imaginable itch)]	
Mean (SD)	6.6 (2.1)
Median (Q1, Q3)	7 (6, 8)
7+	275 (55)
Fatigue (in the past week) [range 0–100 (0, none; 10, worst)]	
Mean (SD)	60.0 (26.3)
Median (Q1, Q3)	66 (46, 79)
7+	210 (42)
DLQ1 score, calculated ($n = 463$) ^e	
Mean (SD)	18.3 (7.3)

Table 2 continued

	Number (percentage)
Median (Q1, Q3)	19 (13, 24)
DLQI, categorical	
0–1 (no effect)	4 (0.86)
2–5 (small effect)	24 (5.18)
6–10 (moderate effect)	51 (11.02)
11–20 (very large effect)	179 (38.66)
21–30 (extremely large effect)	205 (44.28)

All variables are presented as *n* (%) unless otherwise noted
PsO psoriasis, *QoL* quality of life

^a Not mutually exclusive

^b *n* = 37 dropped because of 2 or more “no” responses per Dermatology Life Quality Index (DLQI) scoring instructions

^c Non-biologic systemics include cyclosporine, methotrexate, soriatane, sulfasalazine

^d Biologics include Otezla, Amevive, Cimzia, Costenyx, Enbrel, Humira, Ilumya, Remicade, Siliq, Simponi, Stelara, Taltz, and Tremfya

Treatment Goals and Treatment Change

We found that patients generally valued effectiveness more than the side effects of a therapy when we queried how much they valued various treatment attributes when considering treatment change; with 94% of the patients rating a score of at least 7 for “high probability of achieving clear skin” and 82.6% rating a score of at least 7 for “low probability of side effects”, on a scale of 0–10 (where 0 is not at all important and 10 is extremely important) (Fig. 2). Additionally, the vast majority of patients (at least 90%) gave high importance (score of at least 7) to all efficacy attributes, namely rapid response, keeping skin clear for 2–3 years, overall relief of symptoms, and effective in clearing skin in certain areas (Fig. 2). When patients’ expectations of time to see a treatment response were examined, overall patients expected to see 50% clear skin in about 2 weeks

(mean 16.4 days) and achieve completely clear skin in about 4 weeks (mean 33.8 days).

We further explored the expectations for rapid response across different subgroups. Patient expectations for a new systemic therapy to deliver 50% improvement varied across different subgroups, compared to the overall results (mean (SD) of 16.4 (19.2) days to achieve 50% improvement in symptoms and know that medication is working). Across all age groups examined (18–30, 31–40, 41–50, 51+), younger age groups (18–30 and 31–40) expected to achieve 50% improvement from a new systemic therapy sooner than the older age groups: mean (SD) of 14.8 (13.2) and 15.3 (18.8) days, respectively. Among the disease severity subgroups, patients with moderate disease (BSA 3–10) expected the new systemic therapy to show 50% improvement sooner than the patients with severe disease (BSA > 10) (mean (SD) 15.5 (18.1) days vs. 18.5 (21.8) days, respectively). Similar findings were seen among the patients with PsO only compared to patients with PsO and PsA (mean (SD) 14.5 (16.2) days vs. 18.3 (21.9) days, respectively). Among the biologic experience subgroups, biologic-experienced patients expected the new systemic therapy to show 50% improvement sooner than the biologic-naïve patients (mean (SD) 15.4 (17.4) days vs. 18.6 (22.8) days, respectively) (Fig. 3a).

Among all the location subgroups analyzed (trunk, extremities, palms/soles, nails, scalp, genitals, face, ears, and other), patients with genital PsO expected the lowest number of days for a new systemic therapy to show 50% improvement (mean (SD) 13.3 (11.3) days). Interestingly, patients with PsO on nails and scalp reported higher number of days for expectations from a new systemic therapy to show 50% improvement (mean (SD) 18.4 (22.3) and 17.8 (21.8) days, respectively) (Fig. 3b).

Multivariate models were completed to evaluate treatment goals. However, as a result of the high percentage of patients indicating a strong preference of 7 or higher (above 90% in all categories except “low probability of side effects”), models were deemed largely inappropriate. The age of the patient was the only factor which was identified as having a significant

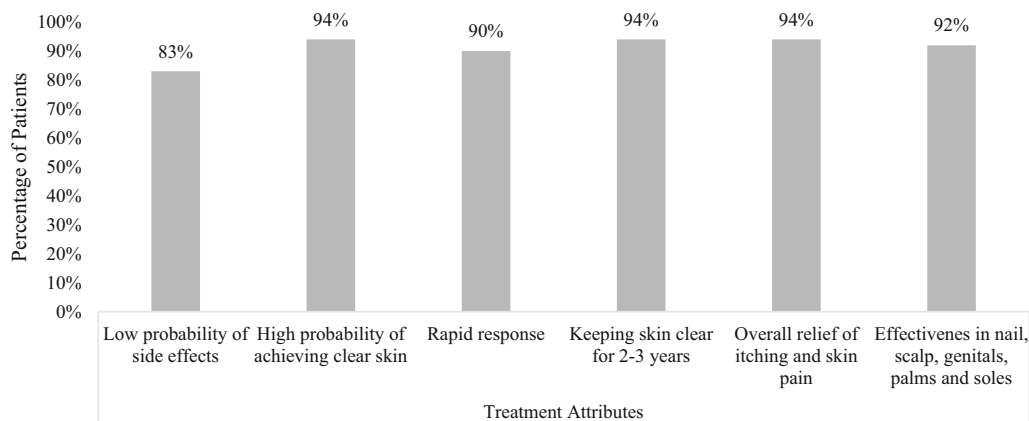


Fig. 2 Percentage of patients indicating high importance for treatment attributes (score of at least 7, on a scale of 1–10 where 1 is not at all important and 10 is extremely important) ($n = 500$)

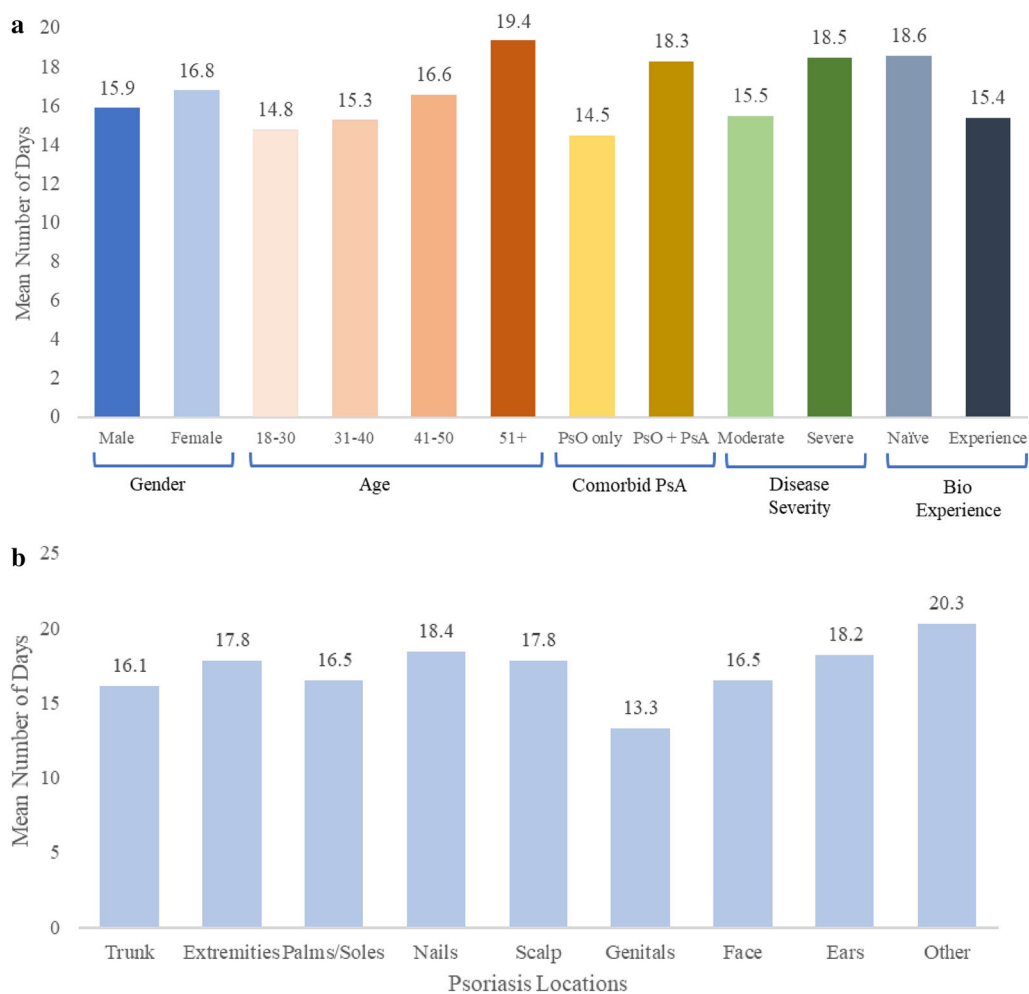


Fig. 3 Patient expectation of a systemic treatment for achieving 50% clear skin **a** among different subgroups ($n = 500$) and **b** based on PsO location (not mutually exclusive) ($n = 500$)

association with preference for the treatment attributes of rapid response, keeping skin clear for 2–3 years, and overall relief of symptoms, and effectiveness of clearing certain areas.

DISCUSSION

Recent research and guidelines indicate that considering the patient perspective in treatment decisions is essential to improve treatment satisfaction, adherence, and to achieve optimal patient outcomes [5–8]. In this study, our goal was to provide clinicians with important information on the patient perspective when facing a treatment change decision. To this end, our study included patients who were not satisfied with the current level of disease control and wanted to consider a new treatment option, and we reported not only the treatment preferences and expectations for these patients but also the current burden of their symptoms and impact on their QoL.

Overall, the patient population in this study was similar to those in previous studies examining patient preferences and treatment goals in terms of disease severity and impact on QoL [2, 18]. The patients with psoriasis in this study were slightly younger (39.9 years), had a shorter mean disease duration (8.7 years), slightly lower BMI (27.5 kg/m²), and the majority were female (54%) when compared to patients from a study using the PsoBest registry (47.2 years, 18.3 years, 28.4 kg/m², and 40.40%, respectively) [5], which is a German PsO registry that assesses long-term efficacy, safety, patient benefit, and treatment regimens of PsO. In addition, mean age and BMI among patients with psoriasis in this study were also lower than those in a study using a pool of PsoBest and SDNTT registry patients (47.6 years and 28.4 kg/m², respectively) [19]. In our study, self-assessment of BSA revealed that 72% and 28% of patients in this study had moderate (BSA 3–10) and severe PsO (BSA > 10), comparable to other studies examining treatment goals among patients with PsO (mean Psoriasis Area and Severity Index (PASI) score of 14.5 indicating moderate to severe disease severity [5] and 53.5% of patients with moderate/severe disease

in the Japanese study [20]. A higher percentage of patients were biologic-experienced, with 69.6% of the patients in this sample having any biologic experience. Interestingly, approximately 25% of patients reported PsO on the genitalia, consistent with other reports [18, 21–26].

Despite consisting primarily of patients with moderate disease, this patient population experienced a particularly high impact on QoL (as measured by DLQI) and symptom burden, including itch, skin pain, fatigue, and PSAB, a finding that is consistent with other studies [5, 19]. While this study did not directly measure PsO severity using PASI, it did assess bothersomeness of current PsO symptoms using PSAB, which indicated great bothersomeness of current PsO symptoms with a mean score of 23.5 (out of 30 maximum). A greater percentage of patients with PsO in this study were observed to have PsA (48%) compared to the study with pooled patients from PsoBest and SDNTT registries (19.1%), as well as patients in the PsoBest registry (22%) alone [5, 19]. Furthermore, the patients in this study had considerable involvement of hard-to-treat areas (palms/soles, scalp, genitals), and QoL was found to be significantly impacted, with a mean DLQI score of 18.3, which is higher compared to the studies from PsOBest and SDNTT (mean DLQI of 11.3) [5, 19].

In our study, patients placed high importance of a new treatment's overall efficacy and safety while considering a new treatment (94% and 82.6%, respectively), consistent with other studies wherein treatment efficacy was valued higher than the treatment safety among the patients [15, 27]. At least 90% of patients valued “rapid response where you can see that the medication is clearing skin quickly”, “keeping skin clear for 2–3 years”, and “overall relief of symptoms (e.g., itching and skin pain)”. Overall this data is consistent with previous reports (PsOBest and SDNTT) [5, 19].

On the basis of our knowledge, this is the first study to understand what “rapid” means in terms of treatment expectations, with patients reporting that approximately 2 weeks as an expectation for achieving a 50% improvement in skin and approximately 4 weeks to achieve

completely clear skin. There were certain numerical differences among the different subgroups analyzed, with younger age groups expecting response sooner than the older age groups and quite interestingly patients with moderate disease expecting a much faster response compared to patients with severe disease. Previous research has indicated that even residual disease can have a meaningful impact on QoL [28]. The data from this study may suggest that patients with moderate PsO who experience recurrence have a stronger desire to achieve clear skin more quickly compared to patients with severe PsO.

One of the strengths of this study is the high number of respondents, the largest in the USA evaluating treatment goals among the patients. Additionally, the study did a comprehensive assessment of disease burden and also administered novel questions on treatment preferences, allowing for a comprehensive assessment of treatment goals and expectations. However, limitations should be noted and include the nature of the sample, as patients were recruited from an online panel, which may not be representative of the overall population of patients with PsO in the USA. This data may also not reflect the beliefs of patients who are not Caucasian or from countries other than the USA. There was also no comparison group in the study and the symptoms and severity levels were self-reported by the patients, which can lead to subjective responses leading to biased estimates. However, findings from this study provide insights for dermatologists into patient preferences toward treatment goals among patients who are unsatisfied with their current treatment and looking for a treatment change.

CONCLUSIONS

In this survey, patients with moderate to severe PsO who are on systemic therapies and are not satisfied with their current level of disease control place high value on treatment attributes related to efficacy with at least 90% of patients valuing clear skin, sustained response, and rapid onset of action. These patients had a very high disease burden and impact on QoL despite the

majority of patients having only moderate disease. This data should provide valuable information to clinicians evaluating new treatment options for their patients who desire a treatment change or improved treatment outcomes. Considering these patient perspectives in treatment decisions is critical for optimizing patient outcomes.

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Compliance with Ethics Guidelines. The study (Protocol #18-045418) was approved by Pearl IRB and met the standards of both FDA 21 CFR 56.104 and DHHS 45 CFR 46.101 regulations. Informed consent (ICF) was obtained from all participants prior to participating in the study. This study was conducted in full conformance with the Guidelines for GPP published by ISPE and the laws and regulations of the country in which the research was conducted.

Data Availability. The datasets analyzed during the current study are available from the corresponding author on reasonable request.

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