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Are Your Patients Satisfied? A Systematic Review of Treatment Satisfaction Measures in Psoriasis

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Keywords
Treatment satisfaction · Outcome measures · Psoriasis · Measurement properties · Treatment satisfaction measurement instruments · Treatment satisfaction measures · Patient-reported outcome measures · Psychometrics

Abstract
Treatment satisfaction is paramount to the field of dermatology. Treatment dissatisfaction directly impacts patient outcomes and health care delivery. A critical need exists for standardized, validated treatment satisfaction measures in dermatology. Comprehensive evaluation of the performance of treatment satisfaction instruments used in psoriasis is lacking. We sought to critically appraise the literature on measurement properties of treatment satisfaction instruments used in psoriasis. We performed a systematic review to identify treatment satisfaction instruments used in psoriasis and corresponding studies on their measurement properties. We followed the COnsensus-based Standards for the selection of health Measurement INstruments (COSMIN) methodology to inform a best evidence synthesis. Eleven instruments were identified. Six achieved positive content validity ratings, 2 achieved positive reliability and structural validity ratings, and 1 achieved a positive internal consistency rating. The REFlective evaLuation of psoriasis Efficacy of Treatment and Severity (REFLETS) and the Spanish Satisfaction With Treatment of Psoriasis Questionnaire (SSWTPQ) had the highest overall performance. Measurement property data for treatment satisfaction instruments were found to be insufficient in identifying a single best treatment satisfaction instrument for psoriasis. Additional studies are required to better characterize the measurement properties of treatment satisfaction measures and allow for standardized assessments across psoriasis clinical trials and clinical practice.

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Introduction

Treatment satisfaction in dermatology is a fundamental element to patient care that is frequently unexplored. As a predictor of adherence, satisfaction influences treatment optimization and, thus, patient outcomes [1, 2]. For chronic diseases, treatment satisfaction is an essential driver of disease control [3]. Up to one half of chronically ill patients are estimated to compromise their treatment due to nonadherence [4]. When their clinical course deteriorates, clinicians tend to modify treatment regimens [5]. Though treatment dissatisfaction is frequently the culprit, it is often not directly considered or measured.

Psoriasis is a chronic inflammatory disease with a profound burden on physical health and quality of life [6–8]. Despite the availability of increasingly effective therapies, up to 40% of patients do not adhere to their treatments in the long term [9–16]. Though the reasons for this nonadherence are not well understood, treatment dissatisfaction is proposed to be key in driving patient behavior in long-term management [13, 15, 17]. Thus, treatment satisfaction in psoriasis has become a critical and emerging area of research [17–19].

Treatment satisfaction is defined as the degree to which the patients perceive that the treatment fulfills their health needs [20]. It is a reflection of the patient's experience with attributes of the therapeutic process, such as treatment duration, and therapeutic outcome, such as treatment benefit [21–28]. Clinicians and researchers have developed treatment satisfaction "instruments" or "measures" to evaluate patient experiences with the therapeutic process and outcome [20, 21]. Though these measures are important for psoriasis management, their utility hinges on their performance.

Measurement properties are established ways of evaluating the performance of instruments [29]. Measurement properties fall into 3 domains: reliability, defined as the degree to which instruments are free from error; validity, defined as the degree to which instruments measure the construct they intend to measure; and responsiveness, defined as the ability of instruments to detect change over time [29]. For example, an instrument may appear to be a valid measure of satisfaction; however, if repeat measures produce different scores, it is not reliable.

Incorporating treatment satisfaction instruments into therapeutic decision-making promotes patient-centered care and improves long-term compliance [27, 28]. Determining the measurement properties of these instruments is paramount to the advancement of the field of dermatology, both in research and in clinical practice. This systematic review seeks to critically appraise the literature on measurement properties of treatment satisfaction instruments used in psoriasis.

Materials and Methods

See the online supplementary material (for all online suppl. materials and methods, online suppl. PROSPERO protocol, online suppl. PRISMA checklist, online suppl. stage 1 literature search strategy, and online suppl. stage 2 literature search strategy, see www.karger.com/doi/10.1159/000490413) [30–38, 45]. All steps of the study selection process are detailed in Figure 1.

Results

Ten studies met eligibility criteria. From these studies, 11 instruments were analyzed: 5 psoriasis-specific, 4 dermatology-specific, and 2 generic, nondermatologic measures. Table 1 presents an overview of the instruments. Table 2 presents each instrument's best evidence synthesis (online suppl. Table 1 and online suppl. Table 2). Table 3 presents the COnsensus-based Standards for the selection of health Measurement INstruments (COSMIN) results.

See the online supplementary material for detailed population characteristics (online suppl. Table 3), instrument characteristics (online suppl. Table 4), and study results (online suppl. Table 5).

Analysis of each instrument's measurement property data is discussed below.

Psoriasis-Specific Measures

REFlective evaLuation of psoriasis Efficacy of Treatment and Severity (REFLETS)

Test-retest reliability achieved a "positive" rating due to an intraclass correlation coefficient >0.70 [39]. Internal consistency was rated "negative" due to a Cronbach's α <0.70 for one subdimension [39]. Due to "fair" COSMIN methodology, both ratings had "limited" levels of evidence.

REFLETS was relevant and comprehensive [39], resulting in a "positive" content validity rating. Its level of evidence was "strong" due to its "excellent" COSMIN methodology.

For structural validity, investigators did not report the variance explained by factors, resulting in an "indeterminate" rating [39]. Hypothesis testing revealed moderate-to-high correlations with clinical severity and quality of

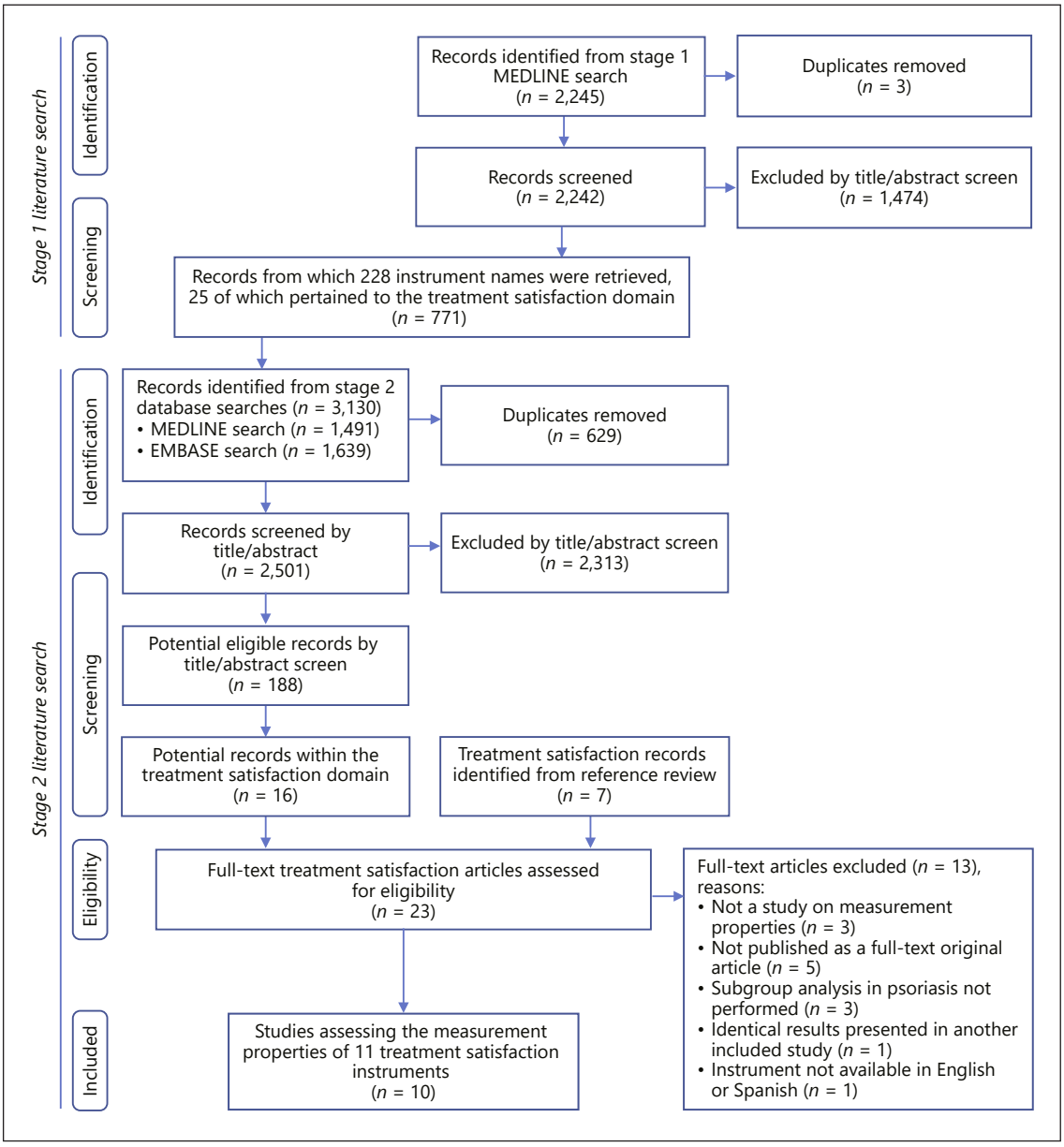

Fig. 1. Stage 1 and stage 2 flow diagram.

life measures [39]. However, this property was rated "indeterminate" because comparator instruments measured constructs other than treatment satisfaction. Because both properties had "fair" COSMIN methodology, their ratings had "limited" levels of evidence.

For responsiveness, investigators did not describe the comparator instruments' measurement properties, and their statistical methods were inappropriate [39]. Thus, it had "poor" COSMIN methodology and an "unknown" level of evidence.

Spanish Satisfaction With Treatment of Psoriasis Questionnaire (SSWTPQ)

SSWTPQ was comprehensive and relevant [40], resulting in a "positive" content validity rating. Due to "fair" COSMIN methodology, this rating had a "limited" level of evidence.

Internal consistency and test-retest reliability results revealed a Cronbach's α >0.70 and intraclass correlation coefficient >0.70 [31], respectively, which resulted in "positive" ratings. Due to both properties' "fair"

Table 1. Overview of treatment satisfaction instruments

Instrument	Description
Psoriasis-specific measures	
REFLETS	A 29-item questionnaire organized into 2 dimensions: psoriasis severity and treatment efficacy Two versions are available, one to be completed by patients and the other by clinicians Each item is scored on a 4-point Likert scale Higher scores in the psoriasis severity dimension indicate more severe disease Higher scores in the treatment efficacy dimension indicate more effective treatment [39]
SSWTPQ	A 12-item questionnaire on treatment satisfaction with 1 visual analog scale on global satisfaction Each item is scored on a 5-point Likert scale The visual analog scale ranges from 0 to 100 Higher scores indicate higher treatment satisfaction [40]
NAPPA-PBI	One of 3 components comprising the measure, Nail Assessment in Psoriasis and Psoriatic Arthritis (NAPPA) Consists of 24 items on treatment benefits in nail psoriasis completed in 2 parts: (1) the Importance of Treatment Goals section, administered prior to therapy to establish patient treatment goals, and (2) the Treatment Benefit section, administered following therapy to assess attainment of goals Items are scored on a 4-point Likert scale (0–4), and a global score is calculated based on importance-weighted benefit items Higher scores indicate improved treatment benefit [41]
PsoSat	An 8-item questionnaire on treatment satisfaction Each item is rated on a 5-point Likert scale An unweighted global score is calculated by summing all individual item scores Higher ratings indicate higher treatment satisfaction and therapeutic optimization [42]
DIT 1.0	A single-item instrument scored on an ordinal scale of 0–5 A score of 0 indicates satisfaction with disease level, while a score of 5 indicates a large amount of improvement is desired [43]
Dermatology-specific measures	
PBI	A 25-item questionnaire on treatment benefit with 5 subscales: (1) reducing social impairments; (2) reducing psychological impairments; (3) reducing impairments due to therapy; (4) reducing physical impairments; (5) having confidence in healing Consists of 2 questionnaires: the Patient Needs Questionnaire (PNQ), administered before therapy to establish patient treatment goals, and the Patient Benefit Questionnaire (PBQ), administered following therapy to assess attainment of goals A global score is calculated by weighting extent of treatment goals attained according to patient-defined importance of those goals Higher scores indicate improved treatment benefit [44]
TTAQ	A 40-item questionnaire for assessing factors influencing adherence in patients using topical therapy Consists of 3 subscales: (1) patient benefit; (2) knowledge, communication, and relationship with physician; (3) satisfaction with treatment Scored on a 4-point Likert scale Higher scores reflect the presence of favorable adherence-influencing factors Of note, TTAQ and PPQ were initially developed as one instrument and were subsequently divided due to differences in administration TTAQ is designed to be administered more than once during the patient's treatment course [46]
PPQ	A 10-item questionnaire for measuring patient preferences for topical therapy that contribute to adherence Scored on a 4-point Likert scale with higher scores reflecting the presence of favorable adherence-influencing patient preference factors Of note, TTAQ and PPQ were initially developed as one instrument and were subsequently divided due to differences in administration PPQ requires a single administration during the patient's treatment course [46]
Vehicle preference score	A 7-item question for measuring daytime and nighttime vehicle preferences for topical therapy Each item is rated on a 7-point Likert scale from –3 (extremely unappealing) to +3 (extremely appealing) Higher scores indicate favorable vehicle preference [47]
Generic, nondermatologic measures	
BMQ	An 18-item questionnaire with 2 subscales: (1) Beliefs about Medicines Questionnaire in general (BMQ-General) and (2) Beliefs about Medicines Questionnaire for specific conditions (BMQ-Specific) Subscales may be completed independently or in combination Scored on a 5-point Likert scale with higher scores indicating stronger medication beliefs [48]
TSQM II	An 11-item questionnaire with 4 subscales: (1) effectiveness; (2) side effects; (3) convenience; (4) overall satisfaction Scored on a 5-point or 7-point Likert scale Higher scores indicate increased treatment satisfaction [49]

REFLETS, REFlective evaLuation of psoriasis Efficacy of Treatment and Severity; SSWTPQ, Spanish Satisfaction With Treatment of Psoriasis Questionnaire; PsoSat, Psoriasis Satisfaction Questionnaire; NAPPA-PBI, Nail Assessment in Psoriasis and Psoriatic Arthritis – Patient Benefit Index; DIT, Desired Improvement Tool; PBI, Patient Benefit Index; PNQ, Patient Needs Questionnaire; PBQ, Patient Benefit Questionnaire; TTAQ, Topical Therapy Adherence Questionnaire; PPQ, Patient Preference Questionnaire; BMQ, Beliefs about Medicines Questionnaire; TSQM, Treatment Satisfaction Questionnaire for Medication.

Table 2. Best evidence synthesis for the measurement properties of each instrument

Instrument	Internal consistency	Reliability	Content validity	Structural validity	Hypothesis testing	Cross-cultural validity	Responsiveness
Psoriasis-specific measures							
REFLETS [39]	–	+	+++	? (limited)	? (limited)	0	?
SSWTPQ [40]	+	+	+	+	?	0	?
NAPPA-PBI [41]	0	0	+++	0	? (limited)	[a]	?
PsoSat [42]	?	0	?	+++	0	0	0
DIT 1.0 [43]	0	?	0	0	? (limited)	0	? (limited)
Dermatology-specific measures							
PBI [44]	–	0	0	0	? (limited)	0	0
TTAQ and PPQ [46]	?	0	++	0	0	0	0
Vehicle preference score [47]	0	0	0	0	?	0	0
Generic, nondermatologic measures							
BMQ [48]	0	0	+++	0	0	0	0
TSQM II [49]	0	0	0	0	? (limited)	0	0

REFLETS, REFlective evaLuation of psoriasis Efficacy of Treatment and Severity; SSWTPQ, Spanish Satisfaction With Treatment of Psoriasis Questionnaire; PsoSat, Psoriasis Satisfaction Questionnaire; NAPPA-PBI, Nail Assessment in Psoriasis and Psoriatic Arthritis – Patient Benefit Index; DIT, Desired Improvement Tool; PBI, Patient Benefit Index; TTAQ, Topical Therapy Adherence Questionnaire; PPQ, Patient Preference Questionnaire; BMQ, Beliefs about Medicines Questionnaire; TSQM, Treatment Satisfaction Questionnaire for Medication. +++ or –––, positive or negative rating with strong level of evidence; ++ or ––, positive or negative rating with moderate level of evidence; + or –, positive or negative rating with limited level of evidence; ? (strong), indeterminate rating with strong level of evidence; ? (moderate), indeterminate rating with moderate level of evidence; ? (limited), indeterminate rating with limited level of evidence; ?, unknown rating due to poor COSMIN methodological quality; 0, no information. Criterion validity was not evaluated as no gold standard exists for measuring treatment satisfaction.

[a] Instrument translation was performed without formal cross-cultural validity assessments. Only studies that address measurement invariance between countries are considered true assessments of cross-cultural validity.

COSMIN methodology, these ratings achieved "limited" levels of evidence.

For structural validity, factors explained over 50% of the variance [40], resulting in a "positive" rating. Due to the property's "fair" COSMIN methodology, this rating had a "limited" level of evidence.

Hypothesis testing and responsiveness were assessed using the Psoriasis Area Severity Index (PASI) [40]. Because investigators did not describe PASI's measurement properties, both hypothesis testing and responsiveness received "poor" COSMIN methodology ratings and "unknown" levels of evidence.

Nail Assessment in Psoriasis and Psoriatic Arthritis – Patient Benefit Index (NAPPA-PBI)

NAPPA-PBI was reliable and comprehensive [41], resulting in a "positive" content validity rating. This rating had a "strong" level of evidence due to its "excellent" COSMIN methodology.

Hypothesis testing revealed low correlations with clinical severity and quality of life instruments [41]. Because these instruments measured constructs other than treatment satisfaction and no a priori hypotheses were formulated, hypothesis testing was rated as "indeterminate." Due to "fair" COSMIN methodology, this rating achieved a "limited" level of evidence.

For responsiveness, investigators did not report score correlations [41]. Due to inappropriate statistics, its COSMIN methodology was "poor," resulting in an "unknown" level of evidence.

Psoriasis Satisfaction Questionnaire (PsoSat)

For internal consistency, investigators did not calculate a Cronbach's α for PsoSat subscales [42]. Consequently, it had "poor" COSMIN methodology and an "unknown" level of evidence.

Table 3. Assessment of the quality of studies examining measurement properties: COSMIN results

Instrument	Study	Internal consistency	Reliability	Content validity	Structural validity	Hypothesis testing	Cross-cultural validity	Responsiveness
Psoriasis-specific measures								
REFLETS	Gilet et al. [39]	fair	fair	excellent	fair	fair	–	poor
SSWTPQ	Ribera et al. [40]	fair	fair	fair	fair	poor	–	poor
NAPPA-PBI	Augustin et al. [41]	–	–	excellent	–	fair	[a]	poor
PsoSat	Radtke et al. [42]	poor	–	poor	excellent	–	–	–
DIT 1.0	Zaghi et al. [43]	–	poor	–	–	fair	–	fair
Dermatology-specific measures								
PBI	Feuerhahn et al. [44]	fair	–	–	–	fair	–	–
TTAQ and PPQ	Zschocke et al. [46]	poor	–	good	–	–	–	–
Vehicle preference score	Housman et al. [47]	–	–	–	–	poor	–	–
Generic, nondermatologic measures								
BMQ	Thorneloe et al. [48]	–	–	excellent	–	–	–	–
TSQM II	Duffin et al. [49]	–	–	–	–	fair	–	–

REFLETS, REFlective evaLuation of psoriasis Efficacy of Treatment and Severity; SSWTPQ, Spanish Satisfaction With Treatment of Psoriasis Questionnaire; PsoSat, Psoriasis Satisfaction Questionnaire; NAPPA-PBI, Nail Assessment in Psoriasis and Psoriatic Arthritis – Patient Benefit Index; DIT, Desired Improvement Tool; PBI, Patient Benefit index; TTAQ, Topical Therapy Adherence Questionnaire; PPQ, Patient Preference Questionnaire; BMQ, Beliefs about Medicines Questionnaire; TSQM, Treatment Satisfaction Questionnaire for Medication. These ratings refer to the methodological quality of the studies. These ratings do not refer to the measurement properties themselves.

[a] Instrument translation was performed without formal cross-cultural validity assessments. Only studies that address measurement invariance between countries are considered true assessments of cross-cultural validity.

For content validity, investigators did not perform face validity assessments [42]. Thus, it had "poor" COSMIN methodology and an "unknown" level of evidence.

Structural validity was given a "positive" rating because the total variance explained by factors was >50% [42]. This rating had a "strong" level of evidence due to its "excellent" COSMIN methodology.

Desired Improvement Tool (DIT) 1.0

The COSMIN methodology rating for test-retest reliability was "poor" due to the inappropriate time interval between assessments [43]. This resulted in an "unknown" level of evidence.

For hypothesis testing and responsiveness, the DIT correlated best with Body Surface Area (BSA), and scores were responsive to changes in BSA [43]. Because BSA is not a treatment satisfaction measure, both properties were rated "indeterminate." These ratings had a "limited" level of evidence due to "fair" COSMIN methodology.

Dermatology-Specific Measures

Patient Benefit Index (PBI)

Internal consistency was rated "negative" due to a Cronbach's α <0.70 for one subscale [44]. However, unidimensionality was assessed in a previous study with a different patient population [45]. Thus, internal consistency had "fair" COSMIN methodology and its rating achieved a "limited"' level of evidence.

Hypothesis testing revealed low correlations with clinical severity and quality of life measures [44]. Because comparator instruments were not treatment satisfaction measures, hypothesis testing was rated "indeterminate." This rating achieved a "limited" level of evidence due to "fair" COSMIN methodology.

Topical Therapy Adherence Questionnaire (TTAQ) and Patient Preference Questionnaire (PPQ)

Investigators performed assessments before separating the original questionnaire into the two instruments, TTAQ and PPQ [46]. The original questionnaire was comprehensive and relevant to the psoriasis population,

resulting in a "positive" content validity rating. This rating had a "moderate" level of evidence due to the property's "good" COSMIN methodology.

For internal consistency, factor analysis was not conducted and internal consistency statistics were not calculated for each subscale [46]. Consequently, it had "poor" COSMIN methodology and an "unknown" level of evidence.

Vehicle Preference Score

Content validity assessments involved an inadequate sample size [47]. Thus, it had "poor" COSMIN methodology and an "unknown" level of evidence.

Generic, Nondermatologic Measures

Beliefs about Medicines Questionnaire (BMQ)

BMQ lacked relevance and comprehensiveness among psoriasis patients [48]. Content validity was rated "positive" with a "strong" level of evidence due to its "excellent" COSMIN methodology.

Treatment Satisfaction Questionnaire for Medication (TSQM) Version II

Hypothesis testing showed weak-to-moderate correlations with quality of life and clinical severity instruments [49]. Because comparator instruments were not treatment satisfaction measures, hypothesis testing was rated "indeterminate." This rating had a "limited" level of evidence due to "fair" COSMIN methodology.

Discussion

This study provided a critical appraisal of the measurement properties of treatment satisfaction instruments used in psoriasis. Eleven instruments were analyzed.

Treatment satisfaction encompasses elements of the therapeutic process and therapeutic outcome [21–28]. In comparison, factors that are associated with treatment satisfaction include treatment preference, medication beliefs, and adherence [27, 28]. Analyzed instruments exhibited significant heterogeneity in the constructs they measured – efficacy (REFLETS, NAPPA-PBI, PBI, DIT), satisfaction (SSWTQ, PsoSat, TSQM), preference (PPQ, vehicle preference score), adherence (TTAQ), and beliefs (BMQ). Due to limited consensus on how to measure treatment satisfaction, these instruments have been inconsistently used in clinical trials; this precludes comparison across trials and prevents clinicians and payers from assessing the true treatment value [32].

Additionally, the majority of analyzed instruments measure satisfaction across multiple therapeutic classes, including topical, oral, biologic, and phototherapy. Only the TTAQ, PPQ, and vehicle preference score were designed for use in a specific therapeutic class (topical). However, the literature informs us that attributes of the therapeutic process, such as route of administration, strongly influence adherence and satisfaction [21–28]. For example, therapeutic classes requiring multiple administrations, such as topical therapies and phototherapy, are associated with treatment dissatisfaction [50, 51]. Thus, instruments for specific therapeutic classes are required to accurately measure satisfaction in clinical practice.

We identified shared limitations across studies. First, assessments were done with comparator instruments that measure constructs other than treatment satisfaction. By definition, "hypothesis testing" examines score correlations between instruments that measure the same construct [29]. Furthermore, investigators did not establish a priori hypotheses. This hinders meaningful discussion of the instruments' construct validity results. Finally, we detected important limitations involving interpretability of the instruments' scores, as no studies reported the minimal important change or floor and ceiling effects.

An evidence-based approach considering all measurement properties in a best evidence synthesis is essential to selecting the best instrument. Emphasis should be placed on the properties most important for the desired application [36]. Among the instruments, REFLETS, SSWTPQ, NAPPA-PBI, TTAQ, and PPQ were found to have appropriate content validity for use in the psoriasis population. Additionally, investigators may choose REFLETS or SSWTPQ for studies prioritizing instrument discrimination due to their positive reliability ratings [36].

Treatment satisfaction measures are crucial to psoriasis management. Dissatisfaction often results in nonadherence, which may be misinterpreted as treatment failure; this then leads to discontinuation of an otherwise effective therapy [5]. In addition, health care delivery systems and pharmaceutical industries use treatment satisfaction data to make decisions regarding cost-effectiveness and utility [20, 52]. Thus, failure to adequately measure treatment satisfaction is detrimental to patient access to dermatologic care.

There is a critical need for standardized, validated treatment satisfaction measures in psoriasis. These measures identify treatment accessibility, treatment efficacy, treatments requiring modification, and patients at risk for nonadherence [53]. These measures additionally in-

vite patients to participate in their care, creating a collaborative health care delivery model with improved therapeutic success [27, 28]. This synthesis highlights the need for further research to better characterize the measurement properties of treatment satisfaction instruments and allow for standardized assessments across psoriasis clinical trials and clinical practice.

Key Message

Current literature provides insufficient evidence for identifying a single best treatment satisfaction instrument for psoriasis.

Statement of Ethics

Ethical clearance is not applicable as this review utilizes secondary, nonconfidential data from published studies and does not involve any direct patient interventions.

Disclosure Statement

Dr. Callis Duffin has served as a consultant, advisor and/or investigator for Amgen, Abbvie, Astra-Zeneca, Boehringer-Ingelheim, Bristol-Myers Squibb, Celgene, Eli Lilly, Janssen, Novartis, Pfizer, Regeneron, Sienna, Stiefel, UCB, and Xenoport. Dr. Garg has served as a consultant for Abbvie, Asana Biosciences, Janssen, Pfizer, and Merck, receiving honoraria. Also, he received research/educational grants from AbbVie, Merck, and UCB. Dr. Gottlieb has served as a consultant/advisor for Amgen Inc., Astellas, Akros, Centocor (Janssen) Inc., Celgene Corp., Bristol Myers Squibb Co., Beiersdorf Inc., Abbott Labs (AbbVie), TEVA, Actelion, UCB, Novo Nordisk, Novartis, Dermipsor Ltd., Incyte, Pfizer, Canfite, Lilly, Coronado, Vertex, Karyopharm, CSL Behring Biotherapies for Life, Glaxo Smith Kline, Xenoport, Catabasis, Meiji Seika Pharma Co. Ltd., Takeda, Mitsubishi, Tanabe Pharma Development America Inc., Genentech, Baxalta, Kineta One, KPI Therapeutics, Crescendo Bioscience, Aclaris, Amicus, and Reddy Labs. Also, she received research/educational grants from Centocor (Janssen), Amgen, Abbott (AbbVie), Novartis, Celgene, Pfizer, Lilly, Levia, Merck, Xenoport, Dermira, and Baxalta. John Latella is a Patient Advocate for Boehringer Ingelheim and GsF. Dr. Merola has served as a consultant and/or investigator for Biogen IDEC, AbbVie, Eli Lilly, Novartis, Pfizer, Janssen, UCB, Samumed, Science 37, Celgene, Sanofi, Regeneron, Merck, and GSK. Dr. Armstrong has served as an investigator and/or consultant for Amgen, AbbVie, Janssen, Lilly, Pfizer, Celgene, and Merck.

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