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Review

Composite and pragmatic measures in psoriatic arthritis: bridging trials and clinical feasibility

Ji-Hyoun Kang[1,2] and Laura C Coates[2,*]

Purpose of review: Psoriatic arthritis (PsA) is a multidomain inflammatory disease where no instrument captures the full spectrum of activity or its impact on patients' lives. Accurate outcome measurement is essential for research and personalized care. This review summarizes advances in PsA outcome-measure refinement and harmonization, with emphasis on psychometric validation, clinical feasibility, and treat-to-target (T2T) strategies.

Recent findings: Multidomain composites such as the Psoriatic Arthritis Disease Activity Score (PASDAS) remain the most comprehensive OMERACT measures, but their complexity limits clinical use. Disease Activity Index for Psoriatic Arthritis (DAPSA) and minimal disease activity (MDA) are practical but limited: DAPSA evaluates fewer domains, while MDA's binary format can miss meaningful partial improvements. The Psoriatic Arthritis Impact of Disease-12 (PsAID-12) has undergone renewed validation with context-specific thresholds, reinforcing its value for assessing the lived burden of disease. Low-DAPSA/high-PsAID-12 discordance underscores the need for layered approaches integrating objective and patient-reported data. Although pragmatic visual analogue scale (3VAS)/4VAS tools have been proposed to enhance feasibility, recent OMERACT/GRAPPA syntheses show that no PsA randomized clinical trial has yet used them, reflecting their very recent introduction. Digital Patient-reported outcomes (PRO) capture and wearable monitoring are emerging to improve real-world feasibility.

Summary: A layered framework — rapid screening with DAPSA, target verification via MDA, deep evaluation using PASDAS or Short Form-36, and patient-anchored monitoring with PsAID-12 — allows multidimensional assessment within minutes. Future directions emphasize outcome personalization, integrating biomarkers, imaging, and PROs into adaptive algorithms that support shared decision-making. Ultimately, outcome measures should evolve from static scores into dynamic tools that guide both clinical trials and everyday PsA care.

Addresses

[1] Division of Rheumatology, Department of Internal Medicine, Chonnam National University Medical School & Hospital, South Korea

[2] Nuffield Department of Orthopaedics, Rheumatology and Musculoskeletal Sciences, Nuffield Orthopaedic Centre, Windmill Road, Headington, Oxford OX3 7LD, UK

Corresponding author: Coates, Laura C (laura.coates@ndorms.ox.ac.uk)

* Nuffield Department of Orthopaedics, Rheumatology and Musculoskeletal Sciences (NDORMS), University of Oxford, Botnar Research Centre, Windmill Road, Oxford, OX3 7HE, UK.

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Introduction

Psoriatic arthritis (PsA) is a heterogeneous inflammatory condition characterized by involvement of peripheral joints, entheses, digits, axial skeleton, and skin and nail disease [1,2]. This multidomain nature poses a persistent challenge for clinicians and investigators alike: no single outcome measure fully reflects the breadth of disease activity or its impact on patients' lives. Yet the accurate assessment of disease activity and impact is fundamental for advancing both clinical research and individualized patient care. Outcome measures are not only tools for evaluating therapeutic efficacy in randomized controlled trials (RCTs), but also cornerstones of modern treat-to-target (T2T) strategies that emphasize shared decision-making and long-term quality of life (QoL) [3].

In recent years, a renewed focus has been placed on aligning the instruments used in clinical trials with those that can be feasibly applied in routine practice. On one hand, multidomain composites such as the Psoriatic Arthritis Disease Activity Score (PASDAS) remain the most comprehensive in capturing the full spectrum of disease. They are strongly supported by psychometric evaluations under the OMERACT Filter 2.2 and are increasingly applied in RCTs [4–6]. On the other hand, simpler instruments such as the Disease Activity index for Psoriatic Arthritis (DAPSA) and pragmatic targets such as Minimal Disease Activity (MDA) are more widely used by clinicians, but each captures only part of

the disease: MDA covers all domains but is restricted to a binary yes/no definition, whereas DAPSA provides a continuous measure but focuses mainly on joint involvement [7]. However, recent GRAPPA–OMERACT evidence synthesis of PsA RCTs has demonstrated that these instruments do not perform equivalently at the trial level: MDA showed the greatest discriminant capacity for detecting active treatment effects, PASDAS outperformed DAPSA, and DAPSA showed lower discriminant performance and sensitivity to change relative to multidomain indices [8].

Patient-reported outcomes (PROs) have also moved closer to the forefront. The Psoriatic Arthritis Impact of Disease-12 (PsAID-12) has been re-validated with new thresholds of meaning, enabling clinicians to interpret scores in real time and act on unacceptable symptom states even in the presence of low objective activity [9]. Such refinements underscore the increasing recognition that disease activity control and patient impact must be assessed in parallel. Importantly, recent multinational cohort work has demonstrated variability in PsAID-12 thresholds across countries, highlighting the need for contextual interpretation when applying these cut-points in diverse clinical settings [10]. The recognition of frequent discordance between low objective inflammation (e.g. low DAPSA) and high patient-reported burden (e.g. high PsAID-12) has further emphasized the need for multidimensional, layered assessment strategies [11]. Although OMERACT has introduced simplified tools such as visual analogue scale (3VAS)/4VAS to enhance feasibility in routine practice, the GRAPPA–OMERACT evidence synthesis confirmed that no eligible PsA RCT has yet reported these measures, reflecting their recent introduction and practice-oriented design rather than trial applicability [4,8].

Against this backdrop, T2T guidance has continued to emphasize pragmatic, patient-centered goals. The 2024 European Alliance of Associations for Rheumatology recommendations reinforced the importance of MDA and remission-level control as achievable, clinically meaningful targets, while acknowledging ongoing challenges in domains such as enthesitis and axial disease [3]. The field is therefore at a critical juncture: to translate robust trial-level instruments into tools that clinicians can use seamlessly at the bedside, while still preserving the integrity of multidomain assessment.

This review will provide a focused overview of outcome measurement in PsA with a deliberate emphasis on the most recent updates. We aim to highlight the contrast between trial-preferred instruments and those currently feasible in clinical practice, to synthesize the psychometric advances provided by OMERACT initiatives, and to propose pragmatic strategies for integrating PASDAS, MDA, and PsAID-12 into real-world care. By doing so, we hope to clarify how outcome measurement can become not just a research requirement, but a practical catalyst for patient-centered T2T strategies in PsA — guiding real-world decisions as effectively as it informs clinical trials.

Trial-grade composite indices: strengths and barriers

Accurate assessment of PsA necessitates composite indices capable of capturing its multidomain nature. Unlike single-domain measures, these composites integrate joint counts, acute-phase reactants, physician and patient global assessments, and extra-articular features such as enthesitis, dactylitis, and skin involvement. The main challenge is the gap between instruments optimized for RCTs and those that can be applied efficiently in routine practice [12].

PASDAS was developed to capture PsA's multidomain complexity. It includes enthesitis and dactylitis counts, patient and physician assessments, C-reactive protein (CRP), and the Short Form-36 (SF-36) physical component score [13,14]. Psychometric evaluation under the OMERACT Filter *2.2* confirms its validity and discrimination [4], and minimal important change/meaningful change values (MIC/MCV) derived from real-world cohorts further support its interpretability [15]. Despite its comprehensiveness, the logistical burden of PASDAS — including its weighting algorithm and dependence on the SF-36 — continues to limit its real-world applicability. Notably, implementation data from routine practice also suggest that PASDAS is acceptable to patients and clinicians when IT support is available, although its complexity remains a barrier to widespread adoption [16]. As a continuous multidomain index, PASDAS captures gradations of clinical improvement more sensitively than joint-focused measures. The recent GRAPPA–OMERACT trial synthesis demonstrated that PASDAS outperformed DAPSA in treatment-effect discrimination (network meta-analysis estimate 1.35; 95% confidence intervals 1.10–1.66), reinforcing its value when a sensitive continuous endpoint is required in RCTs [8]. PASDAS has also shown closer alignment with patient-reported outcomes beyond the MDA cut-point, supporting its relevance for holistic assessment.

DAPSA provides a highly feasible measure of peripheral arthritis. Its concise structure — tender and swollen joint counts, patient pain, and global assessment, and CRP — and easy calculation make it practical in daily clinics, especially when automated in electronic health records [17]. Recent work has defined MIC and MCV, which improve interpretability at the individual level [18]. However, because DAPSA focuses exclusively on peripheral joint inflammation, it does not capture other key PsA domains such as skin, nails, enthesitis, or axial involvement [19]. In the GRAPPA–OMERACT analysis

of 43 randomized comparisons, DAPSA showed comparatively lower discriminant performance than PASDAS and MDA. This likely reflects its more focused assessment domain rather than a lack of utility, underscoring that DAPSA is best suited for settings prioritizing feasibility and peripheral joint evaluation rather than full multidomain assessments [8].

MDA has emerged as a pragmatic, patient-centred target bridging research and routine care. Defined as achieving at least five of seven domains encompassing joints, pain, function, enthesitis, and skin [20,21], it aligns well with T2T principles and offers a straightforward, interpretable endpoint for both clinical trials and daily practice. However, its binary structure may overlook partial yet clinically relevant improvements, underscoring the complementary role of continuous indices such as DAPSA or PASDAS [22]. Notably, in the GRAPPA–OMERACT meta-analysis, MDA showed the highest discriminant capacity among all evaluated composite outcomes, outperforming ACR20, PASDAS, and DAPSA across multiple analytic frameworks [8].

OMERACT's simplified 3VAS and 4VAS tools were designed as pragmatic instruments for routine clinical practice. They were developed through iterative consensus exercises and patient–clinician co-design, aiming to create brief VAS-based instruments that capture pain, skin activity, global disease activity, and — in the 4VAS versions — a separate measure of joint activity. Early validation studies have demonstrated good feasibility, acceptable reliability, and strong correlation with established composite measures in observational cohorts, although they have not yet undergone evaluation within PsA RCTs [4,8,23]. As confirmed in the recent GRAPPA–OMERACT synthesis, no PsA RCT has incorporated these outcomes to date, and therefore their discriminant performance in trial settings remains unknown.

T2T recommendations in PsA emphasize using categorical targets (such as MDA) alongside continuous indices (such as DAPSA or PASDAS) to address complementary clinical questions: "has an agreed state been achieved?" versus "how much residual disease burden remains, and in which domains?" [3,24,25] Although indices like DAPSA are continuous by design, they are often operationalized via categorical cut-points (e.g. remission, low disease activity), thereby reintroducing a binary decision framework [26]. This conceptual distinction is important when interpreting composite performance across trials and routine practice.

Collectively, these instruments form a layered framework rather than competing alternatives — PASDAS providing multidomain precision for research, DAPSA serving as a continuous, time-efficient tool for daily monitoring of arthritis, MDA establishing an actionable target within T2T strategies, and emerging VAS-based composites offering a bridge between research rigor and real-world feasibility.

Pragmatic targets: disease activity and real-world predictors

Among the composite measures available in PsA, MDA has emerged as the most pragmatic and widely adopted treatment target. Defined by the achievement of at least five of seven domains spanning joints, pain, physical function, enthesitis, and skin, MDA provides a binary and easily interpretable endpoint. Its stricter counterpart, very low disease activity, requires fulfillment of all seven domains and is generally regarded as a proxy for remission [20,27].

The appeal of MDA lies in its balance between clinical feasibility and multidomain coverage. Multiple longitudinal cohorts have confirmed that attainment of MDA is associated with sustained improvements in health-related QoL, work productivity [28,29], and real-world cohort analyses further suggest that earlier attainment of MDA confers broader benefits in patients' lives [30,31]. More recently, a close association between MDA attainment and lower PsAID-12 scores, reinforcing its relevance as a marker of reduced patient-perceived disease impact. Gullick et al. showed that patients in MDA were significantly more likely to meet the PsAID-12 'low disease impact' threshold, directly aligning a physician-defined composite with a validated patient-reported outcome [32–34]. Together, these findings underscore that MDA not only reflects disease control across clinical domains but also resonates with the patient's lived experience.

Beyond observational evidence, the recent GRAPPA–OMERACT evidence synthesis provides trial-level confirmation that MDA is the most discriminant composite outcome in PsA RCTs, outperforming ACR20, PASDAS, and DAPSA (multivariate odds ratio 5.06 vs PASDAS 3.70 and DAPSA 3.02). This establishes MDA as both a clinically meaningful and statistically efficient endpoint in trials evaluating active treatment effects [8].

Nonetheless, the binary structure of MDA introduces inherent limitations. Patients with clinically meaningful yet subthreshold improvements remain categorized as non-MDA, which may obscure incremental benefit. To address this, some investigators have explored using the number of MDA criteria met as an exploratory continuous representation of MDA [35], and domain-level analyses show uneven attainment patterns — highlighting that partial improvements may be overlooked by a categorical threshold. Continuous measures also tend to align more closely with PROs beyond the MDA cut-point, underscoring the value of complementary continuous indices within T2T strategies [36,37].

Domain-wise analyses of the seven MDA criteria show uneven attainment patterns, underscoring how partial improvements (e.g. joints improving but pain/function remaining borderline) can be missed by a categorical threshold [35]. In practice, it is important to consider the binary MDA outcome but also which cutpoints have been met and where additional interventions may be required. In current guidance, both categorical (MDA) and continuous (e.g. DAPSA) targets are endorsed within T2T strategies, reflecting complementary roles [3,38]. Although DAPSA offers quantitative granularity and ease of use, it primarily captures peripheral joint inflammation; the GRAPPA–OMERACT synthesis further shows that DAPSA is the least discriminant of the major composite endpoints, likely reflecting its narrower domain coverage. Nonetheless, DAPSA remains valuable for longitudinal monitoring and for clinical environments prioritizing speed and simplicity [8].

Patient-reported outcomes and the 'lived disease burden'

PROs foreground the lived burden of PsA — pain, fatigue, sleep disturbance, functional limitation, and psychosocial impact — which may diverge from clinician-assessed inflammatory activity. Such patient–clinician discordance is common in PsA and has important implications for treatment satisfaction and outcomes [39]. The PsAID-12 questionnaire has now been extensively validated across multiple countries and settings, demonstrating good reliability, validity and interpretability [9,10,33,40]. Its growing use in both trials and clinical practice underscores the need to integrate patient-reported impact alongside traditional activity measures. In clinical practice a recurrent scenario is low DAPSA with persistently high PsAID-12. Rather than representing a contradiction, this pattern should trigger a structured evaluation: first, confirm that all inflammatory domains — joints, enthesitis, skin/nails, axial involvement — and biomarkers are truly quiescent; next, map which PsAID-12 domains (pain, fatigue, sleep, function, skin, social/participation) underlie persistent burden; then differentiate whether residual impact is driven by inflammation (e.g. overlooked enthesitis or skin activity) or non-inflammatory causes (e.g. central senitization, mechanical pain, sleep/mood disturbance); finally, agree a dual target with the patient — maintain inflammatory control (e.g. DAPSA remission/low disease activity) *and* reduce patient-reported impact (e.g. PsAID-12 to an acceptable threshold or meaningful change) [41–43]. When ongoing monitoring is required, pragmatic PRO-inclusive tools such as the OMERACT 3VAS/4VAS may provide an efficient adjunct in routine care; however, current evidence syntheses indicate that these instruments have not yet been reported in PsA RCTs and were developed primarily for longitudinal clinical practice rather than as trial-level efficacy endpoints [8]. In doing so, we align biologic/inflammatory control with lived experience, paving the way for truly holistic management of PsA (Table 1).

Bridging the divide: integrating outcome measures into practice

Despite the maturation of outcome instruments in PsA, their translation from trials to routine care remains uneven. Many composite scores require multiple domains, detailed calculations, or laboratory inputs that deter use within a standard outpatient visit. The key question is not which index best reflects truth, but what can realistically be implemented in under five minutes without losing interpretive value. Digital calculators embedded in electronic records, mobile apps, and simplified scoring sheets are beginning to make this feasible, but workflow design remains the critical determinant of adoption [4,27,44,45].

A pragmatic way forward is a layered assessment model that aligns the depth of measurement with clinical need and available time.

- *Quick screen → DAPSA*. For most visits, a single numerical composite derived from tender and swollen joint counts, patient global, and CRP offers a rapid snapshot of inflammatory control, although its reliance on same-day CRP may limit use in some settings.
- *Target check → MDA*. When therapy adjustment or shared target review is due, the seven MDA criteria provide a multidomain checklist encompassing skin, pain, function, and enthesitis — yielding an intuitive yes/no anchor for goal attainment.
- *Deep assessment → PASDAS/SF-36*. In research, complex or refractory cases, or periodic audit cycles, multidomain composites such as PASDAS and broader health instruments (e.g. SF-36, EQ-5D) add granularity on systemic impact and overall QoL, though reliance on SF-36 continues to limit their feasibility in routine care.
- *Impact anchor → PsAID-12. At any layer, a patient-reported anchor like PsAID-12 contextualizes residual burden and flags domains that remain problematic despite apparent control. Where rapid PRO capture is needed, emerging OMERACT 3VAS/4VAS tools may offer an efficient adjunct for routine practice.*

Applied sequentially, this hierarchy enables clinicians to tailor the depth of measurement to the clinical question while preserving continuity across layers. Figure 1 illustrates a layered clinical decision algorithm, integrating these instruments into a time-efficient workflow. A brief example scenario might involve a patient presenting for routine follow-up with low DAPSA but high PsAID-12: the algorithm directs the clinician to perform a domain-focused MDA review, identify persistent fatigue and pain, and

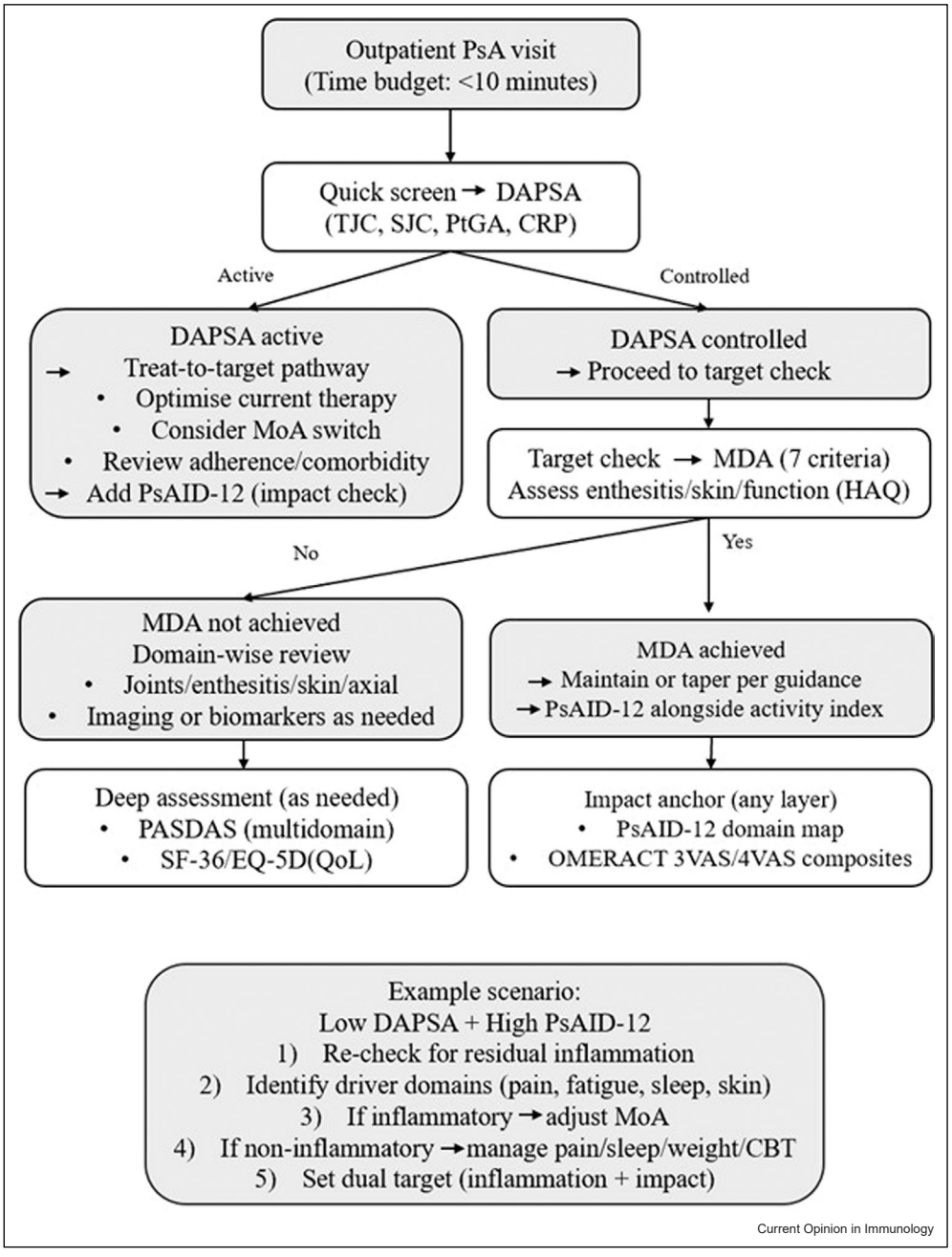
Table 1

Comparison of commonly used composite outcome measures in PsA.

Instrument	Domains covered	Structure and calculation	Target/thresholds	Feasibility and time burden	Major strengths	Major limitations
PASDAS	Peripheral joints, skin, enthesitis, dactylitis, patient global, physician global, CRP, physical function (SF-36 PCS)	Weighted continuous composite index combining clinical counts, PROs, laboratory marker, and SF-36 PCS	Continuous score with validated cut-points for low, moderate, and high disease activity	High time and logistical burden; requires SF-36 and weighted algorithm; feasible mainly with IT support	Comprehensive multidomain coverage; high sensitivity to change; strong discrimination in RCTs; close alignment with PROs	Complex calculation; dependence on SF-36 limits routine use
DAPSA	Peripheral joints, patient pain, patient global, CRP	Simple unweighted continuous sum score (TJC, SJC, pain, global, CRP)	Continuous score with established remission and low disease activity cut-points	High feasibility; rapid calculation; easily automated in electronic health record	Simple, practical, quantitative; well-suited for routine monitoring of peripheral arthritis	Does not capture skin, enthesitis, dactylitis, axial disease, or broader impact
MDA	Peripheral joints, skin, enthesitis, pain, physical function, patient global	Binary composite: achievement of ≥5 of 7 predefined criteria	Categorical target (achieved vs not achieved)	Moderate feasibility; checklist-based; feasible in trials and routine care	Clinically intuitive; aligns with T2T; strong association with QoL, work productivity, and PsAID	Binary structure may miss partial improvement; limited sensitivity to gradations of change
CPDAI	Peripheral joints, skin, enthesitis, axial disease, physical function	Domain-based weighted score combining severity across domains	Continuous score with severity strata	Moderate time burden; requires multiple domain assessments	Explicit multidomain structure; conceptually holistic	More complex than DAPSA; less frequently used; limited contemporary validation
OMERACT 3VAS/4VAS	Pain, skin activity, global disease activity (±joint activity in 4VAS)	Brief VAS-based continuous measures	Continuous scores; no validated trial cut-points	Very high feasibility; minimal time burden	Highly pragmatic; co-designed with patients; suitable for routine care	Limited validation in RCTs; discriminant performance in trials unknown

CPDAI, Composite Psoriatic Disease Activity Index; PCS, physical component summary; TJC, tender joint count; SJC, swollen joint count.

Figure 1



Layered clinical workflow for PsA outcome assessment. This schematic illustrates a pragmatic < 10-minute workflow integrating composite activity indices and patient-reported outcomes. A quick screen with DAPSA establishes inflammatory status. If active, clinicians optimize therapy and concurrently assess impact with PsAID-12. If controlled, the pathway proceeds to an MDA-based multidomain check, incorporating enthesitis, skin disease, and function. Failure to achieve MDA triggers domain-wise review and optional deep assessment using PASDAS and QoL measures (SF-36/EQ-5D). At any stage, PsAID-12 and OMERACT 3VAS/4VAS can be used to contextualize patient-perceived burden. An example scenario (low DAPSA/high PsAID-12) demonstrates structured differentiation of inflammatory versus non-inflammatory drivers and how dual targets (inflammation + impact) can guide personalized management.

decide whether this reflects residual inflammation (prompting therapy adjustment) or non-inflammatory factors (triggering supportive interventions). Such structured differentiation avoids both over-treatment and neglect of lived burden.

Ultimately, integration — not proliferation — of measures is the goal. By combining rapid digital calculation, layered assessment, and patient-centred anchors, clinicians can bridge the long-standing divide between research precision and practical feasibility, ensuring that outcome measurement informs rather than impedes care.

Future directions

The next phase of outcome development in PsA will likely move beyond composite refinement toward greater integration and personalization. OMERACT and GRAPPA working groups are updating core domain sets and evaluating pragmatic, PRO-inclusive tools such as 3VAS/4VAS, aiming to enhance cross-trial harmonization while preserving feasibility in clinical practice.

Concurrently, digital technologies — including mobile PRO capture, wearable activity and sleep sensors, and emerging AI-assisted joint count algorithms — offer the potential for continuous, patient-generated data streams that complement traditional assessments. Although these tools are still in early developmental or validation stages, they reflect a broader shift toward high-frequency, real-world monitoring with minimal patient burden.

A key conceptual direction is the evolution toward 'Outcome Personalization', in which biomarkers, imaging signatures, and PROs are integrated to define individual treatment trajectories. Such multidimensional approaches, once validated, could shift outcome measures from static scores to dynamic instruments that support shared decision-making and genuinely individualized PsA care.

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Declaration of Competing Interest

The authors declare no competing interests related to the content of this manuscript.

Declaration of Generative AI and AI-assisted technologies in the writing process

AI was not used for ideas, data interpretation, data analysis, or conclusion-making. All scientific content, concepts, and interpretations were developed exclusively by the authors.

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Glossary

Psoriatic arthritis (PsA): A chronic, immune-mediated inflammatory disease characterized by involvement of peripheral joints, entheses, digits, axial skeleton, and skin/nails.

Composite disease activity indices.: Multidomain or joint-focused instruments that quantify PsA disease activity using combined clinical and/or patient-reported variables.

PASDAS (Psoriatic Arthritis Disease Activity Score): A multidomain composite index incorporating joint counts, enthesitis, dactylitis, CRP, patient/physician global assessments, and SF-36 physical function.

DAPSA (Disease Activity Index for Psoriatic Arthritis): A joint-focused continuous score based on tender/swollen joint counts, patient pain/global assessment, and CRP.

MDA (Minimal Disease Activity): A binary treat-to-target endpoint defined as achieving ≥5 of 7 domains covering joints, pain, function, enthesitis, and skin.

PSAID-12 (Psoriatic Arthritis Impact of Disease-12): A validated patient-reported outcome measure capturing the lived impact of PsA across 12 domains (pain, fatigue, skin, sleep, function, etc.).

3VAS / 4VAS: Simplified OMERACT-derived visual analogue scale–based composites designed to support rapid, pragmatic multidomain assessment in routine practice.

Treat-to-target (T2T): A management strategy in which treatment is adjusted to achieve a predefined disease activity target (e.g. MDA or remission).

PRO (Patient-reported outcome): Any report of a patient's health status that comes directly from the patient, without clinician interpretation.