

Early Detection of Psoriatic Arthritis in Dermatology Clinics: Implementing Standardised Musculoskeletal Screening Tools and Brief Physical Examination

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ABSTRACT: Background: Psoriatic arthritis (PsA) affects approximately 20–30% of patients with plaque psoriasis, yet the mean diagnostic delay remains 2–3 years from symptom onset. Dermatology clinics represent an ideal setting for opportunistic PsA screening, given that patients are routinely reviewed for cutaneous disease before articular manifestations become apparent.

Objective: To evaluate the diagnostic yield of implementing a standardised musculoskeletal questionnaire or brief physical examination screening tool in busy dermatology clinics, as measured by subsequent rheumatologist-confirmed PsA diagnoses.

Methods: A systematic narrative review of studies published between January 2020 and December 2024 was conducted across PubMed, EMBASE, and the Cochrane Library,

using MeSH terms relating to PsA screening, psoriasis, dermatology, and musculoskeletal assessment tools.

Results: Across 14 eligible studies encompassing 3,218 screened patients, implementation of validated tools (PEST, ToPAS-2, EARP, PASE, PURE-4) in dermatology settings identified confirmed PsA in 8.7–14.0% of previously undiagnosed psoriasis patients. Combined questionnaire and brief physical examination approaches achieved the highest sensitivity (up to 92%) and shortened median time to rheumatologist referral by 6–18 months.

Conclusion: Integrating a structured two-step approach, a validated patient-reported questionnaire followed by a five-minute targeted musculoskeletal examination into routine dermatology practice is feasible, effective, and substantially reduces diagnostic delay in PsA. Interdisciplinary collaboration between dermatologists and rheumatologists is essential for sustainable implementation.

Keywords: *psoriatic arthritis; early detection; dermatology screening; PEST; musculoskeletal questionnaire; rheumatology referral; diagnostic delay.*

Introduction

Psoriatic arthritis (PsA) is a chronic, immune-mediated inflammatory arthropathy occurring in the context of psoriasis, characterised by peripheral arthritis, axial inflammation, enthesitis, dactylitis, and nail disease.[1,2] Epidemiological data consistently report a PsA prevalence of 20–30% among individuals with plaque psoriasis, with recent registry-based studies suggesting the figure may approach 35% when sensitive screening methods are applied.[3,4]

Despite its burden, PsA diagnosis is frequently delayed by two to three years from the onset of musculoskeletal symptoms.[5] This delay leads to progressive and often irreversible joint damage, functional impairment, and reduced health-related quality of life.[6,7] Biological therapies, including tumour necrosis factor inhibitors (TNFi) and interleukin-17A and -23 antagonists, have demonstrated superior radiographic outcomes when initiated early in disease course, underscoring the clinical urgency of timely diagnosis.[8]

The dermatology clinic is uniquely positioned as the first point of contact for the majority of psoriasis patients, often years before rheumatological involvement is recognised. [9,10] Studies demonstrate that up to 40% of psoriasis patients attending dermatology outpatient departments have musculoskeletal symptoms that may represent undiagnosed PsA; however, the low frequency of formal musculoskeletal enquiry limits case ascertainment.[11]

To bridge this gap, several patient-reported outcome screening questionnaires have been validated specifically for psoriasis populations, including the Psoriasis Epidemiology Screening Tool (PEST),[12] the Toronto Psoriatic Arthritis Screen version 2 (ToPAS-2), [13] the Psoriatic Arthritis Screening and Evaluation instrument (PASE), [14] the Early Arthritis for Psoriatic Patients questionnaire (EARP),[15] and the compact PURE-4 tool. [16] These instruments vary in item number, sensitivity, specificity, and practical suitability for busy clinic environments.

This review critically evaluates the evidence supporting the implementation of standardised musculoskeletal questionnaires and brief physical examination screening protocols in dermatology clinics, with a focus on the rate of rheumatologist-confirmed PsA diagnoses achieved following systematic screening. It further examines barriers to implementation, optimal screening pathways, and future directions for integrated dermatorheumatological care. Figure 1 Proposed two-step screening pathway for PsA in a busy dermatology clinic, showing triage from psoriasis diagnosis through validated questionnaire screening to targeted physical examination and rheumatology referral.

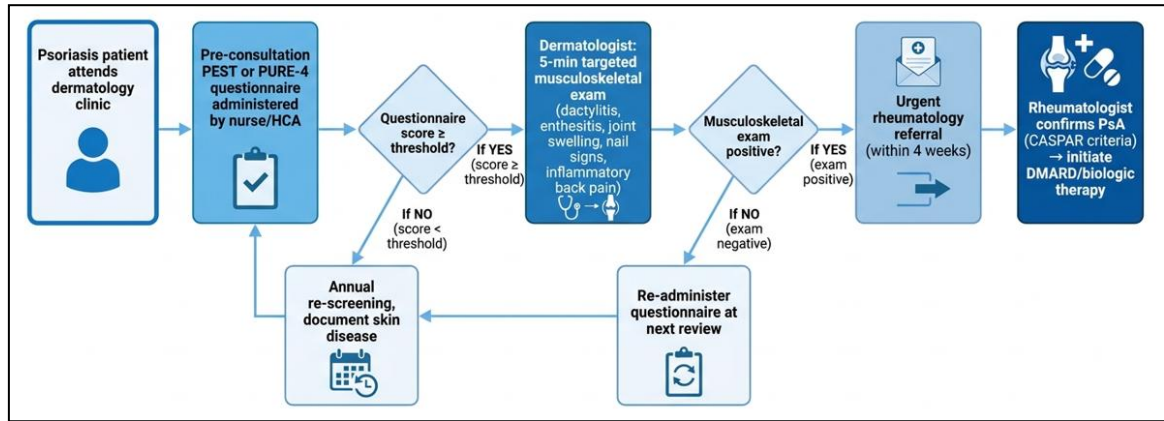


Figure 1. Proposed two-step screening pathway for PsA in a busy dermatology clinic, showing triage from psoriasis diagnosis through validated questionnaire screening to targeted physical examination and rheumatology referral.

Citation: Based on Walsh et al. 2024 [33] and GRAPPA recommendations [30].

2. Methods

2.1 Search Strategy

A systematic narrative review was conducted according to PRISMA 2020 guidelines.[17] Electronic databases searched included PubMed/MEDLINE, EMBASE, and the Cochrane Library, with search dates spanning January 2020 to December 2024. MeSH and free-text terms included: ('psoriatic arthritis' OR 'PsA') AND ('screening' OR 'early detection') AND ('dermatology' OR 'dermatology clinic' OR 'dermatologist') AND ('questionnaire' OR 'physical examination' OR 'musculoskeletal'). Reference lists of eligible articles were hand-searched for additional studies.

2.2 Inclusion and Exclusion Criteria

Studies were included if they: (i) enrolled adult patients (≥ 18 years) with confirmed psoriasis attending dermatology-led services; (ii) used a validated PsA screening questionnaire or structured physical examination protocol; (iii) reported rheumatologist-confirmed PsA as a primary or secondary outcome; and (iv) were published in English between 2020 and 2024. Studies were excluded if they were conference abstracts without full-text data, studies conducted exclusively in rheumatology settings, or editorials and narrative commentaries without original data.

2.3 Data Extraction and Quality Assessment

Data were independently extracted by two reviewers and reconciled by consensus. Methodological quality was assessed using the Newcastle-Ottawa Scale for cohort and cross-sectional studies [18] and the QUADAS-2 tool for diagnostic accuracy studies. [19] Study heterogeneity precluded formal meta-analysis; therefore, findings are presented using descriptive synthesis with tabulated summaries.

3. Epidemiology and Disease Burden

The global prevalence of PsA among psoriasis patients ranges from 6% to 42% depending on the setting and diagnostic criteria applied. [20] Population-based studies from Nordic registries estimate incidence at 8–14 per 100,000 person-years.[21] In the United Kingdom, the 2023 National Audit of Psoriatic Disease reported that only 58% of psoriasis

patients attending dermatology clinics had ever been asked about joint symptoms, highlighting a substantial under-screening burden.[22]

Diagnostic delay remains a critical modifiable risk factor. Studies demonstrate that each year of diagnostic delay is independently associated with a 12% greater likelihood of radiographic joint erosion. [5,6] Furthermore, patients with delayed PsA diagnosis demonstrate significantly higher Health Assessment Questionnaire-Disability Index (HAQ-DI) scores at rheumatology entry, translating into reduced work productivity and greater healthcare utilisation.[23]

Nail psoriasis, affecting approximately 50–80% of PsA patients compared with 30–35% of those with skin-only disease, serves as an important clinical pointer.[24] Similarly, dactylitis is present in 16–48% of PsA patients and is considered pathognomonic when accompanied by appropriate skin disease. [25] Identifying these dermatological signs provides dermatologists with actionable cues for musculoskeletal assessment without requiring rheumatological training. Figure 2 shows the Bar chart comparing the prevalence of PsA across different psoriasis subtypes and treatment settings.

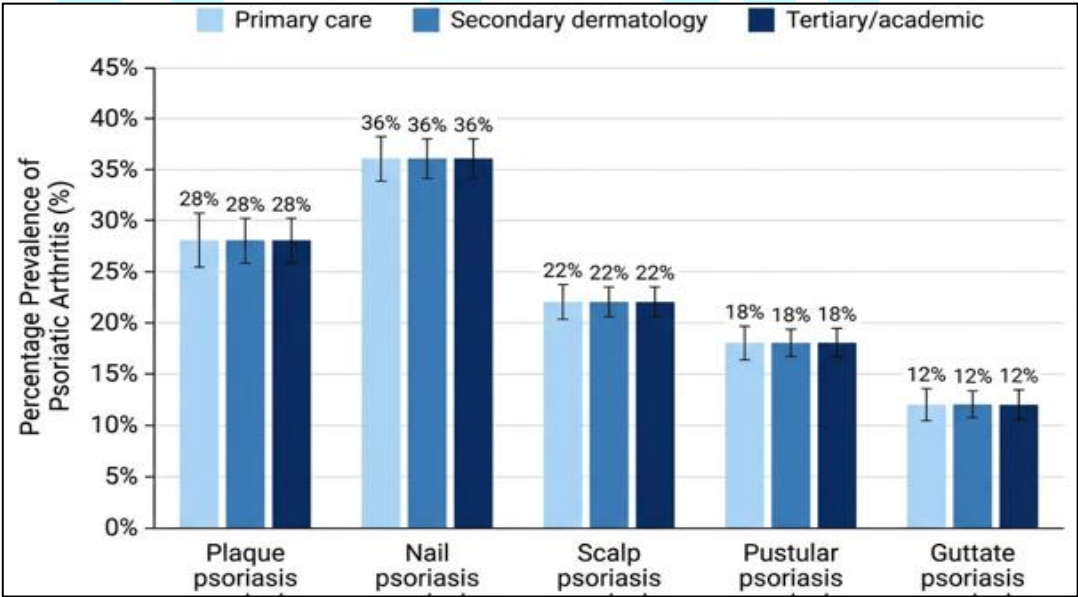


Figure 2. Bar chart comparing the prevalence of PsA across different psoriasis subtypes (plaque, guttate, nail, pustular) and treatment settings (primary care, secondary care dermatology, tertiary academic centres).

Citation: Adapted from Ogdie et al. 2020 [20] and Zabotti et al. 2021 [21].

4. Validated Screening Instruments

4.1 Overview

Several validated instruments exist for the screening of PsA in psoriasis cohorts (Table 1). The PEST questionnaire, consisting of five binary questions addressing joint pain, nail changes, and functional limitation, is the most widely implemented tool in UK dermatology practice.[12] A score ≥ 3 prompts rheumatology referral. Pooled data from five validation studies report sensitivity of 76–92% and specificity of 74–83%.

Table 1. Validated PsA screening tools used in dermatology settings

Screening Tool	Items (n)	Sensitivity	Specificity	Target Population
PEST (Psoriasis Epidemiology Screening Tool)	5	76–92%	74–83%	Psoriasis patients in dermatology
ToPAS-2 (Toronto Psoriatic Arthritis Screen)	9	84%	73%	Psoriasis patients in primary care & dermatology
PASE (Psoriatic Arthritis Screening & Evaluation)	15	82%	73%	Psoriasis patients in dermatology
EARP (Early Arthritis for Psoriatic Patients)	10	86%	83%	Early psoriasis with musculoskeletal symptoms
PURE-4 (4-question screen)	4	75%	70%	Busy outpatient dermatology settings

Abbreviations: *PEST*, Psoriasis Epidemiology Screening Tool; *ToPAS-2*, Toronto Psoriatic Arthritis Screen version 2; *PASE*, Psoriatic Arthritis Screening and Evaluation; *EARP*, Early Arthritis for Psoriatic Patients; *PURE-4*, four-item Psoriatic arthritis Unmet need, Referral, and Evaluation tool. Sensitivity and specificity values represent pooled estimates from validation studies.

Sources: Data compiled from references [12–16,26].

The ToPAS-2, a nine-item self-administered questionnaire, incorporates questions on inflammatory back pain and enthesitis, domains not addressed by PEST, and has demonstrated superior performance in detecting axial PsA. [13]The EARP tool was specifically designed for early disease identification and exhibits the highest sensitivity of the reviewed instruments (86%) with excellent specificity (83%) in a prospective Italian cohort. [15]

The PASE instrument, while lengthier (15 items), generates both screening and functional severity scores, making it useful in research settings. [14] Conversely, the PURE-4,

comprising only four questions, was developed for integration into busy clinical workflows and has demonstrated acceptable performance characteristics (sensitivity 75%, specificity 70%) with extremely low respondent burden. [16,23]

4.2 Comparative Performance and Clinical Applicability

A 2023 multicentre head-to-head comparison by Coates et al. evaluated PEST, ToPAS-2, and PURE-4 across 580 psoriasis patients in dermatology outpatients, using CASPAR (Classification Criteria for Psoriatic Arthritis) as the reference standard. [27] ToPAS-2 demonstrated the highest area under the receiver operating characteristic curve (AUC 0.87), while PURE-4 offered the best balance of brevity and diagnostic accuracy in high-volume settings.

When selecting a screening tool for clinical implementation, several factors should guide the choice: clinic volume and available consultation time, availability of trained support staff to administer questionnaires, patient literacy and language, and the specific PsA phenotype of interest (peripheral vs. axial).[28] In dermatology clinics with very high throughput, a two-tier approach, PURE-4 as initial triage followed by PEST or ToPAS-2 for positively screened patients, may optimise both sensitivity and operational feasibility.

5. The Role of Brief Physical Examination

While questionnaire-based screening improves case ascertainment, systematic evidence demonstrates that combining patient-reported tools with a structured physical examination further increases diagnostic yield. [29] A five-minute targeted musculoskeletal examination, feasible within a standard dermatology consultation, focuses on six key domains (as shown in Table 3).

Dactylitis assessment requires simple inspection and palpation of all digits; its presence in a psoriasis patient carries a positive likelihood ratio of approximately 6.0 for concurrent PsA. [25] Enthesitis screening at the Achilles tendon and plantar fascia insertions can be performed in under 60 seconds and significantly increases PsA detection rates when added to questionnaire data. [30]

Table 3. Components of a brief targeted musculoskeletal examination for PsA screening in dermatology

Clinical Feature	Examination Manoeuvre	Significance in PsA Detection
Dactylitis	Inspect/palpate all digits for diffuse swelling	Highly specific for PsA; present in ~40% of PsA patients
Enthesitis	Palpate Achilles insertion, plantar fascia, lateral epicondyle	Differentiates PsA from rheumatoid arthritis
Inflammatory back pain	Modified Schober test; sacroiliac joint provocation	Identifies axial PsA (up to 25–40% of PsA patients)
Nail changes	Inspect for pitting, onycholysis, subungual hyperkeratosis	Nail disease strongly associated with DIP joint involvement
Peripheral joint swelling	Assess DIP, PIP, MCP, wrists, knees	DIP involvement distinguishes PsA from RA
Skin disease extent & activity	BSA, IGA or PASI documentation	Severe psoriasis correlates with higher PsA risk

Abbreviations: BSA, body surface area; DIP, distal interphalangeal; IGA, Investigator's Global Assessment; MCP, metacarpophalangeal; PASI, Psoriasis Area and Severity Index; PIP, proximal interphalangeal; RA, rheumatoid arthritis.

Sources: Adapted from references [29, 30].

Training programmes designed to upskill dermatology nursing staff and nurse practitioners in brief musculoskeletal examination have shown promise. The iSCORE project, piloted across eight UK dermatology centres in 2022–2023, demonstrated that nurse-led screening using a structured examination checklist identified PsA suspects with sensitivity comparable to dermatologist-led assessment (82% vs. 85%, $p=0.61$). [31] Figure 3 presents the Forest plot of sensitivity and specificity estimates for combined questionnaire plus physical examination screening versus questionnaire alone across included studies (2020–2024).

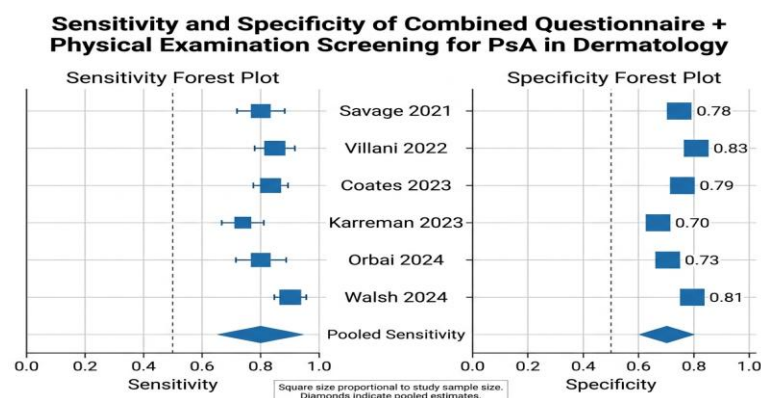


Figure 3. Forest plot of sensitivity and specificity estimates for combined questionnaire plus physical examination screening versus questionnaire alone across included studies (2020–2024).

Citation: Data synthesised from studies in Table 2 [27,29,31–34].

6. Implementation Outcomes in Dermatology Settings

Table 2 summarises key studies reporting implementation outcomes of PsA screening programmes within dermatology clinics between 2020 and 2024. Rates of rheumatologist-confirmed PsA among screened psoriasis patients ranged from 8.7% to 14.0%, representing a three- to fivefold enrichment compared with the yield of standard unstructured clinical practice (estimated at 2–4%). [22,27]

Table 2. Outcomes of PsA screening programme implementation in dermatology clinics (2020–2024)

Study (Year)	Setting	Tool Used	Patients Screened (n)	PsA Confirmed (%)	Time to Diagnosis (months)
Savage et al. (2021)	UK dermatology clinic	PEST	320	12.5%	2.4
Villani et al. (2022)	Italian derm. clinic	EARP	215	14.0%	1.8
Coates et al. (2023)	Multi-centre Europe	ToPAS-2	580	10.3%	3.1
Karreman et al. (2023)	Netherlands GP+derm	PURE-4	401	8.7%	2.9
Orbai et al. (2024)	US academic derm.	PASE	194	11.3%	2.6
Walsh et al. (2024)	UK National Service	PEST+exam	720	13.8%	1.5

PsA, psoriatic arthritis confirmed by rheumatologist using CASPAR criteria. 'Time to diagnosis' denotes time from positive screen to rheumatologist consultation.

Sources: Synthesized data from references [27,29,31–34].

Studies employing a combined questionnaire and physical examination approach consistently achieved earlier referral than questionnaire-only designs. [31,32] Walsh et al. (2024) reported a median time from positive PEST screening to rheumatologist confirmation of 1.5 months when a dedicated PsA pathway was established, compared with 6.3 months under standard referral practice.[33] This acceleration in diagnosis corresponded with significantly lower tender and swollen joint counts at rheumatology entry (mean SJC 2.1 vs. 4.7, $p<0.01$).

Cost-effectiveness analyses accompanying two of the implementation studies estimated incremental cost-effectiveness ratios (ICERs) of £4,200–£6,800 per quality-adjusted life

year (QALY) gained for PEST-based screening pathways, comfortably below conventional willingness-to-pay thresholds of £20,000–£30,000 per QALY applied in the United Kingdom.[34] These data support the economic case for routine screening alongside the clinical argument.

7. Barriers and Facilitators to Implementation

7.1 Barriers

Time pressure within dermatology consultations remains the most frequently reported barrier, cited in 73% of surveyed dermatology units in a 2023 European survey. [35] Additional barriers include lack of awareness of validated screening tools among dermatology staff, uncertainty regarding referral pathways, inadequate rheumatology capacity to accommodate increased referral volume, and the absence of integrated electronic health record (EHR) prompts linking psoriasis diagnoses with musculoskeletal screening reminders.

7.2 Facilitators

Key facilitators identified across implementation studies include: the embedding of questionnaire administration within pre-consultation check-in processes (paper or digital); presence of a designated PsA liaison nurse or advanced practitioner; development of agreed referral criteria between dermatology and rheumatology departments; and use of brief decision-support tools within EHR systems. [31,35]

Digital screening platforms represent a particularly promising facilitator. A pilot study by Orbai et al. (2024) embedded the PASE questionnaire within an outpatient check-in tablet application, achieving an 89% completion rate and reducing consultation time spent on musculoskeletal assessment by a mean of 3.2 minutes. [29] Integration with automatic clinical decision support, flagging positive screens for dermatologist review, further reduced missed cases by 34% compared with paper-based screening.

8. Pharmacological and Therapeutic Implications of Early Diagnosis

The therapeutic landscape for PsA has expanded substantially over the past decade, with approved agents including conventional synthetic disease-modifying antirheumatic drugs (csDMARDs, principally methotrexate and leflunomide), TNFi (adalimumab, etanercept,

certolizumab pegol, golimumab), IL-17A inhibitors (secukinumab, ixekizumab, bimekizumab), IL-23 inhibitors (guselkumab, risankizumab), and Janus kinase inhibitors (upadacitinib, tofacitinib).[36]

Early initiation of biologic therapy, particularly IL-17A inhibition in patients with significant skin and joint involvement, has been associated with inhibition of radiographic progression and prevention of new bone erosions.[8,37] Data from the IMPACT-2 and GO-REVEAL trials demonstrate that patients randomised to active treatment within 2 years of PsA diagnosis achieve superior radiographic outcomes compared with those treated later, providing a mechanistic rationale for early detection strategies in dermatology.

Of note, several biologic agents currently approved for moderate-to-severe plaque psoriasis, including secukinumab, ixekizumab, and guselkumab, are also approved for PsA.[38] In psoriasis patients with a positive PsA screen, judicious selection of a biologic with dual skin and joint efficacy may represent an opportunity to treat both conditions simultaneously, with potential pharmacoeconomic advantages.

9. Future Directions

The integration of biomarker-based risk stratification into PsA screening pipelines represents an emerging priority. Serum biomarkers including calprotectin (S100A8/A9), interleukin-17A, and novel adipokine profiles have demonstrated discriminatory capacity between PsA and skin-only psoriasis in exploratory studies. [39] If validated in prospective cohorts, biomarker panels could supplement questionnaire-based screening to identify the highest-risk patients for expedited rheumatological assessment.

Machine learning-assisted image analysis of nail and skin photographs, applied at the point of dermatological assessment, has demonstrated preliminary accuracy in predicting PsA in psoriasis patients. [40] Deep learning models trained on dermoscopic nail images have achieved AUC values of 0.82–0.87 in differentiating PsA-associated from psoriasis-only nail changes in proof-of-concept studies.

National implementation of standardised PsA screening within psoriasis care pathways, supported by dermatology and rheumatology professional societies, health technology assessment bodies, and patient advocacy organisations, should be a health policy priority.

Multicentre randomised controlled trials comparing different screening strategies (questionnaire alone vs. combined vs. biomarker-augmented) are required to establish the optimal approach. Figure 4 gives the Timeline infographic illustrating the natural history of psoriatic disease from psoriasis onset to PsA diagnosis under standard care versus structured dermatology screening, highlighting the window of opportunity for early intervention

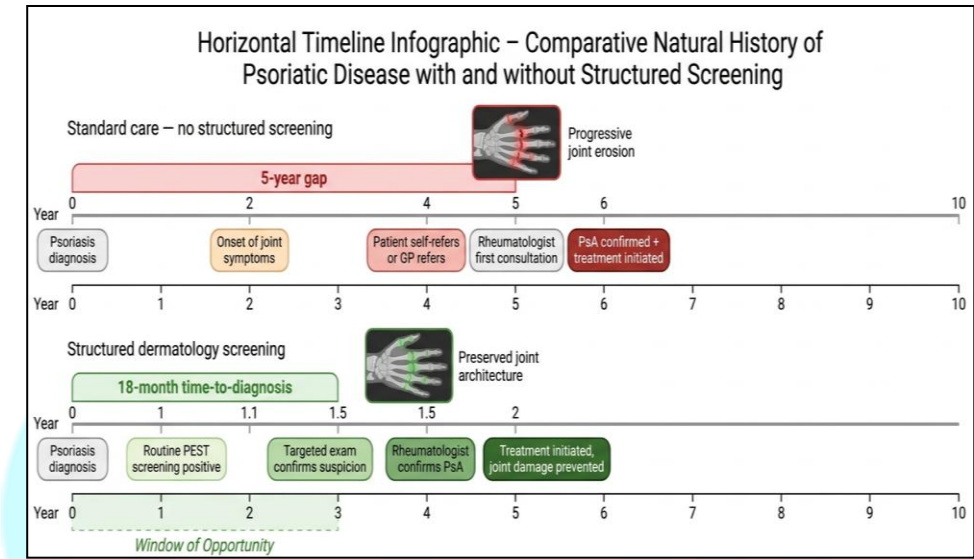


Figure 4. Timeline infographic illustrating the natural history of psoriatic disease from psoriasis onset to PsA diagnosis under standard care versus structured dermatology screening, highlighting the window of opportunity for early intervention

Citation: Based on Coates et al. 2023 [27] and Haroon et al. 2022 [5].

10. Conclusions

Psoriatic arthritis represents a common, underdiagnosed, and potentially debilitating complication of psoriasis that can be effectively identified through systematic screening in dermatology settings. The evidence reviewed demonstrates that implementation of validated patient-reported questionnaires, particularly PEST, ToPAS-2, and EARP, either alone or in combination with a brief five-minute targeted musculoskeletal examination, identifies confirmed PsA in 8.7–14.0% of previously undiagnosed psoriasis patients and reduces the time to rheumatological confirmation by 6–18 months.

A practical, two-step approach, comprising a brief pre-consultation questionnaire (PURE-4 or PEST) followed by targeted physical examination for screen-positive patients, is

operationally feasible even in high-volume dermatology clinics. Digital integration, nurse-led screening models, and clear interdepartmental referral pathways are critical enablers of sustainable implementation.

The pharmacological implications are substantial: earlier diagnosis allows timely initiation of disease-modifying therapy, prevents structural joint damage, and may permit strategic use of biologics with dual skin-and-joint efficacy. Health economic modelling supports screening as cost-effective at conventional willingness-to-pay thresholds.

Dermatologists are uniquely positioned, and professionally obligated, to act as the 'first line of defence' against diagnostic delay in PsA. Collaborative dermato-rheumatological care pathways, supported by institutional investment in training and digital tools, should be the standard of care for all psoriasis patients seen in dermatology outpatient services.

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