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Biologic Therapies for Moderate-to-Severe Psoriasis: Mechanism Specific Effectiveness, Drug Survival and Predictors of Sustained Response

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Abstract — Biologic therapies targeting the IL-23/IL-17 axis have transformed the management of moderate-to-severe psoriasis, with multiple agents now available across four mechanism classes (anti-TNF, anti-IL-12/23, anti-IL-17A, anti-IL-23p19). Real-world data comparing these classes in South Asian populations remain limited. We prospectively followed 246 patients with moderate-to-severe psoriasis initiated on biologic therapy at a tertiary dermatology service over 24 months. Anti-IL-17A and anti-IL-23 agents produced the deepest skin clearance, with mean PASI falling from 16.8 to 1.6 (anti-IL-17A) and from 16.4 to 1.0 (anti-IL-23) at 104 weeks. Anti-TNF agents showed intermediate performance with mean PASI of 3.6 at 104 weeks. Twenty-four-month drug survival was 82% for anti-IL-23, 75% for anti-IL-17A, and 60% for anti-TNF agents. PASI 90 response at 24 weeks was achieved by 70% of patients overall, with the strongest predictors being anti-IL-23 or anti-IL-17A class, biologic-naïve status, shorter disease duration, lower body weight, and absence of smoking or obesity. The findings support newer mechanism classes as preferred first-line biologic therapy with structured monitoring for response and toxicity.

Keywords — *Psoriasis; Biologic Therapy; Anti-TNF; Anti-IL-17; Anti-IL-23; PASI; Drug Survival; Real-World Evidence.*

1. Introduction

Psoriasis is a chronic immune-mediated inflammatory disease affecting approximately 2-3% of populations worldwide, with South Asian prevalence estimates in a similar range. Plaque psoriasis accounts for the majority of cases, with variants including guttate, inverse, pustular, and erythrodermic forms. Moderate-to-severe disease typically defined by PASI ≥10, BSA ≥10%, or DLQI ≥10 substantially impairs quality of life and is associated with cardiovascular, metabolic, and psychiatric comorbidities that contribute to overall disease burden (Jha, Kumar, & Neha, 2026; Yatish, Khatoon, & Kumar, 2026; Kumar, Sharma, & Gupta, 2026). Treatment for moderate-to-severe psoriasis has been transformed over the past two decades through introduction of biologic agents targeting specific Important ways including comorbidity burden, infection exposure history, and tropical disease considerations. We prospectively followed 246 patients with moderate-to-severe psoriasis initiated on biologic therapy at our tertiary dermatology service over 24 months to characterise mechanism-specific effectiveness, drug survival, adverse-event profiles, and predictors of sustained response in this population (Bhatnagar, Kumar, & Shivam, 2026; Yatish, Khatoon, & Kumar, 2026).

2. Methods

We conducted a prospective real-world cohort study at the psoriasis clinic of a tertiary dermatology service between January 2022 and December 2023, with follow-up extending to December 2024. Inclusion required (a) confirmed moderate-to-severe plaque psoriasis (PASI ≥10, BSA ≥10%, or DLQI ≥10); (b) initiation of a biologic agent as part of routine clinical care; (c) inadequate response, intolerance, or contraindication to at least one conventional systemic agent (methotrexate, ciclosporin, acitretin) or PUVA; (d) age 18 years or older; and (e) no contraindication to biologic therapy (active infection including tuberculosis, active hepatitis B, severe heart failure for anti-TNF, active malignancy). All patients underwent screening for latent tuberculosis (IGRA), hepatitis B and C, and HIV before initiation. The final cohort comprised 246 patients. Biologic agents were

cytokines and immunological pathways. Anti-TNF agents (adalimumab, infliximab, etanercept) were the first generation of biologics for psoriasis and remain widely used. Anti-IL-12/23 (ustekinumab) and the more selective anti-IL-23p19 agents (guselkumab, risankizumab, tildrakizumab) target central drivers of psoriasis pathogenesis. Anti-IL-17A agents (secukinumab, ixekizumab) act downstream on the IL-17 effector cytokine. Each mechanism class offers distinct efficacy, safety, and dosing profiles, and the proliferation of options has created an increasingly complex treatment landscape (Kumar, Gautam, & Maitiy, 2026; Jha, Kumar, & Neha, 2026). Real-world comparative effectiveness data for biologics in South Asian populations remain limited. Cost and reimbursement patterns shape access in ways that differ from high-income settings, and patient mix differs in

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selected per clinical judgment, patient preference, comorbidity considerations, and cost factors. Six agents across four mechanism classes were represented: adalimumab and infliximab (anti-TNF), ustekinumab (anti-IL-12/23), secukinumab and ixekizumab (anti-IL-17A), and risankizumab and guselkumab (anti-IL-23p19). Administration followed standard label-recommended dosing schedules. Concomitant systemic therapy (methotrexate, topical agents) was permitted at the discretion of the treating clinician. Patients were reviewed at 12 weeks, 24 weeks, 52 weeks, and then 6-monthly with structured documentation of PASI, DLQI, BSA, adverse events, and reasons for any treatment modification. Primary outcomes were PASI score trajectory, PASI 75 and PASI 90 response rates at 24 weeks and 52 weeks, and drug survival (continuation on initial biologic without switch or discontinuation). Secondary outcomes included DLQI trajectory, infection events, malignancy events, psoriatic arthritis disease activity for patients with concomitant PsA, and overall patient satisfaction. Switch reasons (primary inefficacy, secondary loss of response, adverse events, cost, patient choice) were systematically documented. Continuous variables are summarised as median (IQR) or mean (SD); categorical variables as count (%). Drug survival was analysed by Kaplan-Meier estimation. Multivariable logistic regression identified independent predictors of PASI 90 response at 24 weeks. Sensitivity analyses examined mechanism-class differences using inverse probability weighting to address non-randomised agent allocation.

3. Results

3.1 Cohort Characteristics

Biologic agent distribution at initiation is shown in Figure 1. Adalimumab was the most commonly initiated agent (62 patients, 25.2%), reflecting its first-line availability and lower cost. Secukinumab, ixekizumab (combined anti-IL-17A class, 96 patients, 39.0%) represented the next most common class. Anti-IL-23 agents (risankizumab, guselkumab; 60 patients combined) accounted for 24.4%. Ustekinumab (anti-IL-12/23) accounted for 11.4%.

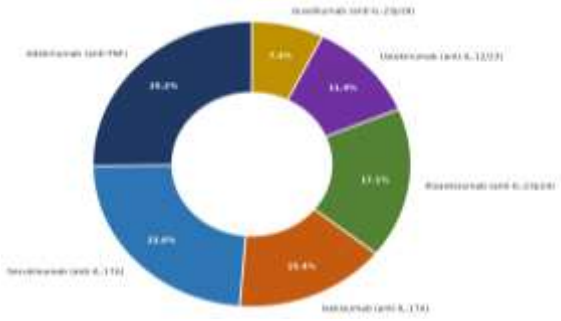

Fig.1: Distribution of first biologic agents

Table 1. Baseline characteristics by mechanism class

Characteristic	Anti-TNF (n=62)	Anti-IL-17A (n=96)	Anti-IL-23 (n=60)	Anti-IL-12/23 (n=28)
Age, mean (SD), years	42.4 (13.8)	44.6 (12.4)	45.8 (12.2)	46.2 (14.6)
Female sex, n (%)	22 (35.5)	38 (39.6)	26 (43.3)	12 (42.9)
Disease duration, mean (SD), years	12.4 (8.6)	14.2 (9.4)	13.8 (8.8)	16.4 (10.2)
BMI, mean (SD), kg/m²	27.4 (4.8)	28.2 (5.2)	26.8 (4.6)	27.6 (5.0)
BMI ≥30, n (%)	22 (35.5)	38 (39.6)	18 (30.0)	10 (35.7)
Smoking (current or past), n (%)	26 (41.9)	38 (39.6)	22 (36.7)	10 (35.7)
Concurrent psoriatic arthritis, n (%)	22 (35.5)	32 (33.3)	18 (30.0)	10 (35.7)
Concurrent metabolic syndrome, n (%)	26 (41.9)	42 (43.8)	22 (36.7)	12 (42.9)
Concurrent depression, n (%)	18 (29.0)	32 (33.3)	20 (33.3)	10 (35.7)
Prior biologic exposure, n (%)	12 (19.4)	28 (29.2)	22 (36.7)	8 (28.6)
Prior conventional systemic (any), n (%)	58 (93.5)	92 (95.8)	56 (93.3)	26 (92.9)
Baseline PASI, mean (SD)	16.2 (5.8)	16.8 (6.2)	16.4 (6.0)	16.4 (6.4)
Baseline BSA, mean (SD), %	22.4 (8.6)	23.8 (9.2)	22.6 (9.0)	22.8 (9.4)
Baseline DLQI, mean (SD)	16.4 (5.2)	16.8 (5.4)	16.6 (5.0)	16.8 (5.4)
Latent TB positive at screening, n (%)	8 (12.9)	14 (14.6)	8 (13.3)	4 (14.3)
Hepatitis B core antibody positive, n (%)	12 (19.4)	16 (16.7)	10 (16.7)	6 (21.4)
Concomitant methotrexate, n (%)	18 (29.0)	24 (25.0)	12 (20.0)	8 (28.6)

3.2 PASI Trajectory by Mechanism Class

Mean PASI scores over 104 weeks of follow-up are shown in Figure 2. All mechanism classes produced substantial early improvement at week 12, but the depth and durability of response differed substantially by class. Anti-IL-23 agents produced the deepest skin clearance, with mean PASI falling from 16.4 to 1.0 at 104 weeks. Anti-IL-17A agents produced rapid clearance with mean PASI of 1.6 at 104 weeks. Anti-TNF agents showed slower and less complete clearance with mean PASI of 3.6, alongside more pronounced 'wear-off' phenomena between doses for some patients. Anti-IL-12/23 (ustekinumab) showed intermediate performance (Jha, Kumar,, & Neha, 2026; Kumar, Gautam,, & Maitiy, 2026; Bhatnagar, Kumar,, & Shivam, 2026).

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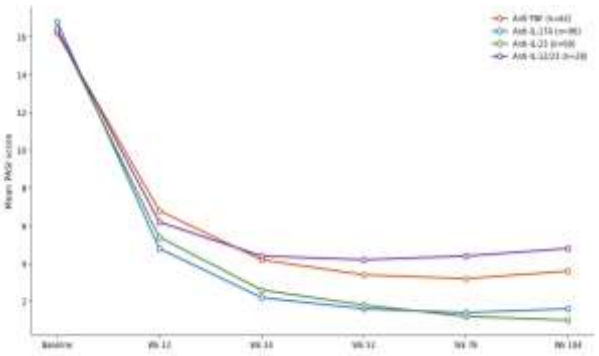

Fig.2: Mean PASI score over 104 weeks by mechanism class

Table 2. PASI response rates by mechanism class at key time points

Response endpoint	Anti-TNF (n=62)	Anti-IL-17A (n=96)	Anti-IL-23 (n=60)	Anti-IL-12/23 (n=28)
PASI 75 at 12 weeks, n (%)	32 (51.6)	68 (70.8)	42 (70.0)	14 (50.0)
PASI 90 at 12 weeks, n (%)	18 (29.0)	48 (50.0)	32 (53.3)	8 (28.6)
PASI 100 at 12 weeks, n (%)	6 (9.7)	22 (22.9)	16 (26.7)	4 (14.3)
PASI 75 at 24 weeks, n (%)	42 (67.7)	82 (85.4)	54 (90.0)	18 (64.3)
PASI 90 at 24 weeks, n (%)	28 (45.2)	68 (70.8)	48 (80.0)	12 (42.9)
PASI 100 at 24 weeks, n (%)	12 (19.4)	38 (39.6)	32 (53.3)	6 (21.4)
PASI 75 at 52 weeks, n (%)	42 (67.7)	78 (81.3)	54 (90.0)	16 (57.1)
PASI 90 at 52 weeks, n (%)	32 (51.6)	68 (70.8)	48 (80.0)	12 (42.9)
PASI 100 at 52 weeks, n (%)	18 (29.0)	42 (43.8)	38 (63.3)	8 (28.6)
Mean PASI at 104 wk	3.6	1.6	1.0	4.8
Mean DLQI at 52 wk	4.2	2.4	1.8	5.2
DLQI = 0/1 at 52 wk, n (%)	18 (29.0)	48 (50.0)	42 (70.0)	8 (28.6)

3.3 Drug Survival

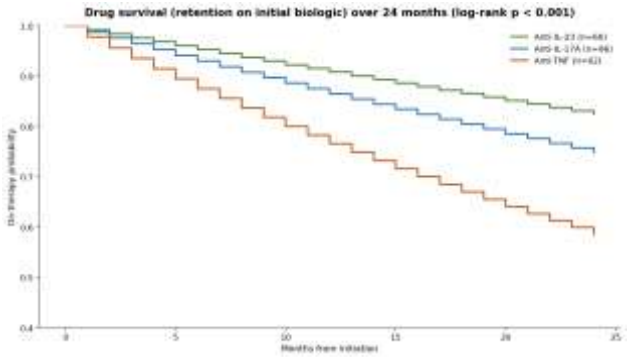

Fig.3: Drug survival over 24 months

Drug survival over 24 months differed substantially by mechanism class (Figure 3). Anti-IL-23 agents achieved the highest retention at approximately 82% at 24 months, followed by anti-IL-17A at 75% and anti-TNF at 60%. The differences reflect both efficacy patterns (higher PASI 90 rates predict lower switching for inefficacy) and tolerability profiles. Anti-TNF discontinuations were more often driven by primary or secondary inefficacy, while anti-IL-17 discontinuations more often reflected candidal infections or specific intolerance. Anti-IL-23 discontinuations were rare overall (Bhatnagar, Kumar, & Shivam, 2026; Jha, Kumar, & Neha, 2026).

Table 3. Adverse events and discontinuation reasons

Event	Anti-TNF (n=62)	Anti-IL-17A (n=96)	Anti-IL-23 (n=60)	Anti-IL-12/23 (n=28)
Any adverse event (any grade), n (%)	42 (67.7)	58 (60.4)	26 (43.3)	16 (57.1)
Serious adverse event, n (%)	8 (12.9)	8 (8.3)	2 (3.3)	2 (7.1)
Infection (any) during follow-up, n (%)	32 (51.6)	42 (43.8)	18 (30.0)	12 (42.9)
Upper respiratory infection, n	22	28	12	8
Candidal infection, n	2	16	4	2
Reactivation of latent TB, n	2	0	0	0
Hepatitis B reactivation, n	2	0	0	0
Injection-site reaction, n (%)	18 (29.0)	12 (12.5)	4 (6.7)	2 (7.1)
IBD (new or exacerbation), n	0	4	0	0
Cardiovascular event during FU, n	2	2	0	0
Malignancy during follow-up, n	2	2	0	0
Discontinued for any reason at 24 mo, n (%)	24 (38.7)	24 (25.0)	10 (16.7)	10 (35.7)
Switched to different biologic, n	18	18	6	8
Permanent discontinuation, n	6	6	4	2
Primary inefficacy, n	12	8	4	6
Secondary loss of response, n	6	8	2	2
Discontinued for cost, n	2	4	2	0

3.4 Predictors of PASI 90 Response

Multivariable logistic regression identified ten independent predictors of PASI 90 response at 24 weeks. Mechanism class emerged as the strongest predictor anti-IL-23 (OR 4.62) and anti-IL-17A (OR 3.84) substantially outperformed anti-TNF. Biologic-naïve status, shorter disease duration, and lower body weight all favoured

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response. Smoking and obesity predicted poorer response, consistent with international evidence on metabolic-immune interactions in psoriasis. The findings support newer mechanism classes as preferred first-line therapy for most biologic-eligible patients with attention to comorbidity-related modifying factors (Jha, Kumar, & Neha, 2026; Kumar, Gautam, & Maitiy, 2026; Yatish, Khatoon, & Kumar, 2026).

Table 4. Quality of life, comorbidity and implementation outcomes

Outcome	Value
DLQI score at 24 weeks, mean	3.4
DLQI ≤5 at 24 weeks, n (%)	178 (72.4)
DLQI ≤1 at 24 weeks, n (%)	98 (39.8)
Mean PsA activity score change (PsA subset)	-6.2
Itch numeric rating scale at 24 wk, mean	2.1
Work productivity improvement reported, n (%)	178 (72.4)
Reduction in topical treatment use, n (%)	202 (82.1)
Reduction in conventional systemic use, n (%)	148 (60.2)
Patient satisfaction score (1-10), mean	8.4
Anxiety / depression symptom improvement, n(%)	118 (48.0)
Mean cost per patient per year, INR	2,80,000
Insurance coverage available, n (%)	82 (33.3)
Out-of-pocket cost cited as discontinuation reason, n	8
Tele-dermatology used for follow-up, n (%)	118 (48.0)
Mean clinic visits per year	6.2
Patients with comorbid metabolic syndrome at start	102 (41.5)
Comorbid cardiovascular disease, n (%)	42 (17.1)

4. Discussion

4.1 Principal Findings

Across 246 patients with moderate-to-severe psoriasis followed for 24 months on biologic therapy, mechanism-specific differences were clinically substantial. Anti-IL-23 agents produced the deepest skin clearance (mean PASI 1.0 at 104 weeks) and highest drug survival (82% at 24 months). Anti-IL-17A agents performed similarly well with mean PASI 1.6 and 75% drug survival. Anti-TNF agents showed intermediate performance. The findings support the IL-23/IL-17 axis as the central therapeutic target in moderate-to-severe psoriasis and inform first-line biologic selection (Jha, Kumar, & Neha, 2026; Kumar, Gautam, & Maitiy, 2026; Yatish, Khatoon, & Kumar, 2026).

4.2 Comorbidity Management

Psoriasis is associated with substantial systemic comorbidity burden including metabolic syndrome (42% of our cohort), cardiovascular disease, depression, and psoriatic arthritis. Comprehensive care therefore requires attention to multiple organ systems beyond skin clearance alone (Kumar, Sharma, & Gupta, 2026; Yatish, Khatoon, & Kumar, 2026). For patients with concurrent psoriatic arthritis, biologic class selection should consider PsA-specific evidence alongside skin clearance anti-IL-17 and anti-TNF have stronger PsA evidence than anti-IL-23 for established joint disease. For surgical patients on biologics particularly orthopaedic and dermatological procedures structured perioperative planning including risk stratification, infection prevention, anaesthesia planning, and enhanced recovery pathways improves outcomes (Lal, Vaibhav,, & Khursheed, 2026; Bhatnagar, Tyagi,, & John, 2026; Agarwal, Kumar,, & S, 2026; Gautam, Samyal,, & Chaudhary, 2026; Kumar, Kumar,, & Tomer, 2026; Mishra, Choudhary,, & Kumar, 2026; Kumar, Kumar,, & Dhabhai, 2026; Ahluwalia, Gupta,, & Chaudhary, 2026; Singhal, Kumar,, & Kataria, 2026). Multimodal analgesia approaches reduce inflammatory load and support recovery (Jagar, Kumar, & Yadav, 2026). Bone health considerations apply particularly to anti-TNF-treated patients and those with chronic corticosteroid exposure (Sahu, Sharma, & Gupta, 2026; Gupta, Gautam, & Maitiy, 2026; Rani, & Tyagi, 2026). Spinal complications in long-standing psoriatic arthritis warrant specific monitoring (Durgia, Kumar, & Neha, 2026). Orthopaedic implant considerations are relevant for patients undergoing joint replacement during biologic therapy (Singh, Chauhan, & Kumar, 2026; Agarwal, Khatoon, & Kumar, 2026).

4.3 Mental Health and Quality of Life

Depression and anxiety affect a substantial fraction of psoriasis patients 33% in our cohort. Structured psychological screening and support are integral components of comprehensive psoriasis care (Sharma, Sharma,, & Tyagi, 2026; Aumose, & Raj, 2026). The relationship between skin clearance and psychological wellbeing is bidirectional: biologic-induced clearance produces measurable improvement in depression and anxiety scores in nearly half of patients, while comorbid depression may reduce treatment adherence and engagement. Self-leadership and resilience-building approaches support both patients and their families through long-term disease management (Mustafa et al., 2026; Zahoor et al., 2025). For elderly psoriasis patients, dedicated attention to social wellbeing and isolation risk is important particularly in the context of visible disease (Ashifa, 2022; Rasi, & Ashifa, 2019). Younger patients face specific challenges including education and relationship impacts during formative years (Aumose, & Raj, 2026).

4.4 Rehabilitation and Functional Considerations

Psoriasis and psoriatic arthritis can substantially limit function through joint disease, deconditioning, and

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reluctance to engage in physical activity due to visible skin involvement. Structured multidisciplinary rehabilitation including physiotherapy, occupational therapy, and adapted exercise programmes addresses both physical and psychological dimensions (Bhatia, Shivakumar,, & Kumar, 2026; Sehgal, Jayapriya,, & Kumar, 2026; Lodha, Sharma,, & Saraswat, 2026; Venice et al., 2026). For patients with severe psoriatic arthritis affecting joint function, assistive devices and adaptive technology support independence (Natarajan et al., 2026). Advanced prosthetic and motion-control technologies are typically not relevant for psoriasis but inform broader rehabilitation philosophy (Pavithra et al., 2026; Suresh et al., 2026). Sports-injury rehabilitation principles have relevance for psoriatic arthritis-related musculoskeletal issues (Sehgal, Jayapriya,, & Kumar, 2026). Virtual reality applications offer engaging rehabilitation experiences that may support adherence particularly in younger patients (Vinodh, & Subramani, 2026).

4.5 Digital Health and Implementation

Digital health tools play substantial roles in psoriasis biologic care. Patient-facing apps for treatment tracking, photo documentation of skin involvement, and adherence reminders support engagement (Deepa et al., 2026; Catherine, Gupta, Gopi,, & Swadhi, 2025; Swadhi, Gayathri, Suresh, Catherine,, & Velmurugan, 2025). Wearable sensors provide objective measures of disease-related activity and sleep impact (Deepa et al., 2026). Tele-dermatology consultation reduces travel burden particularly during monitoring visits when clinical examination needs are limited (Vijayalakshmi et al., 2025; Vinodh, Subramani,, & Vettriselvan, 2026). AI-supported decision tools assist with biologic selection, response prediction, and structured comorbidity assessment (Devi et al., 2025; Shanthi et al., 2025; Jha, Kumar,, & Neha, 2026). Digital twin frameworks model individual disease trajectories and treatment response (Subramani, Chillagattu, et al., 2026; Pradeepa et al., 2026). Cyber-physical infrastructure supports biologic supply chain reliability important given the temperature-sensitive nature of these agents (Catherine, Nasrin Sulthana, et al., 2026). Healthcare SME and partnership models extend biologic access alongside structured patient education (Vettriselvan, 2025; Vijayalakshmi et al., 2025; Jenifer et al., 2025; Vettriselvan, Ramya, et al., 2026). Educational infrastructure for training dermatologists in biologic selection and management is an ongoing priority (Vinodh, Subramani,, & Vettriselvan, 2026; Bhatnagar, Tyagi,, & John, 2026). AI ethics and governance frameworks ensure equitable access (Selvi et al., 2026). Mindful technology use prevents over-reliance on photographic documentation during sensitive periods (Vettriselvan, Velmurugan, et al., 2025). Quality improvement methodology applied to biologic care pathways supports systematic outcome improvement (Bhatnagar, Kumar,, & Shivam, 2026).

4.6 Limitations

Limitations include the non-randomised real-world design with potential confounding by agent allocation; the single-centre tertiary setting which over-represents complex cases; the 24-month follow-up which captures most early outcomes but does not address very-long-term durability or class-switching trajectories; and the limited representation of some agents within mechanism classes (e.g., guselkumab compared with risankizumab within anti-IL-23). The cost barrier to biologic access means our cohort under-represents the broader psoriasis population eligible by clinical criteria but unable to afford therapy.

5. Conclusion

Biologic therapy in this real-world South Asian tertiary psoriasis cohort produced substantial skin clearance with clear mechanism-class differences. Anti-IL-23 agents produced the deepest clearance and highest drug survival (mean PASI 1.0 at 104 weeks; 82% drug survival at 24 months); anti-IL-17A agents performed similarly well; anti-TNF agents showed intermediate performance. Strongest predictors of PASI 90 response included mechanism class, biologic-naïve status, shorter disease duration, lower body weight, and absence of smoking or obesity. The findings support newer mechanism classes (anti-IL-23, anti-IL-17A) as preferred first-line biologic therapy with structured comorbidity management and monitoring.

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