

Original Article

## Evaluation of The Assessment of Spondyloarthritis International Society Non-Steroidal Anti-Inflammatory Drug (ASAS-NSAID) Score In Patients With Ankylosing Spondylitis Presenting To The Rheumatology Clinic at A Tertiary Care Hospital

Qurat-ul-Ain Abbasi<sup>1</sup>, Taqdees Khaliq<sup>2</sup>, Sarah Azam Shah<sup>3</sup>, Saira Shafqat<sup>4</sup>, Abdur Rehman<sup>5</sup>

### Abstract

**Objective:** This study aimed to evaluate cumulative nonsteroidal anti-inflammatory drug (NSAID) usage in patients with ankylosing spondylitis (AS) using the Assessment of SpondyloArthritis International Society (ASAS)-NSAID score and to assess its changes following the initiation of biological disease-modifying anti-rheumatic drugs (bDMARDs) or targeted synthetic DMARDs (tsDMARDs).

**Methods:** A quasi-experimental cross-sectional study was conducted at the Rheumatology Clinic of the Federal Government Polyclinic Hospital from July to December 2024. Sixty patients with spondyloarthritis (SpA), diagnosed according to the ASAS criteria, were enrolled. The ASAS-NSAID score was calculated at baseline and reassessed after six months in 43 patients receiving b/tsDMARDs. Disease activity was measured using the Bath Ankylosing Spondylitis Disease Activity Index (BASDAI) and Ankylosing Spondylitis Disease Activity Score with C-reactive protein (ASDAS-CRP). Statistical analyses included the Wilcoxon Signed-Rank Test, Mann-Whitney U test, and Kruskal-Wallis test.

**Results:** Of 60 patients (73.3% male; mean age, 32.97 ± 8.96 years), the baseline mean ASAS-NSAID score was 30.15 ± 25.63. In the 43 patients receiving b/tsDMARDs, the score significantly decreased to 1.28 ± 1.80 ( $p < 0.001$ ) post-treatment. The ASAS-NSAID score showed a statistically significant association with disease activity, as measured by the BASDAI ( $p = 0.007$ ), and with NSAID dosage groups ( $p = 0.002$ ; Kruskal-Wallis test). No significant association was found with ASDAS-CRP ( $p = 0.242$ ), NSAID type ( $p = 0.107$ ), or sex ( $p = 0.069$ ).

**Conclusions:** The ASAS-NSAID score effectively quantifies NSAID use in AS, with a significant reduction after b/tsDMARDs, highlighting the NSAID-sparing effect and supporting early biologic intervention to minimise NSAID-related risks.

Word count: 3,578 words, excluding references.

Funding Statement: The study was not funded by any external source.

Data Access Statement: The author has been permitted to give access to data on request.

**Keywords:** Spondylitis, Ankylosing; Anti-Inflammatory Agents, Non-Steroidal; Disease Progression; Biological Products; Treatment Outcome.

### Introduction

Spondyloarthritis (SpA) is a chronic inflammatory disorder that primarily affects the axial skeleton and entheses and is strongly associated with HLA-B27 and extra-articular features, such as uveitis, psoriasis, and inflammatory bowel disease.<sup>1</sup> Axial SpA includes both non-radiographic and radiographic forms; the latter is termed Ankylosing Spondylitis (AS).<sup>2</sup> The diagnosis relies on imaging and clinical criteria, as defined by the Modified New York and ASAS classification systems.<sup>3 3</sup>

A cohort published in 2020 in Lahore, Pakistan, found that axSpA was present in approximately 1% of the population. In AS, the level of underlying inflammation is the main factor affecting disease activity.<sup>4</sup> This information helps doctors make treatment and prognosis decisions. The Bath Ankylosing Spondylitis Disease Activity Index (BASDAI) remains the most widely used patient-reported measure of disease activity.<sup>5</sup> The Ankylosing Spondylitis Disease Activity Score (ASDAS) has recently become a reliable method to measure disease activity in axSpA. The ASDAS-CRP combines clinical symptoms with C-reactive protein to provide an objective assessment of disease activity.<sup>6</sup>

Despite advances in therapy, NSAIDs remain the first-line treatment for AS, although their long-term use carries gastrointestinal, renal, and cardiovascular risks.<sup>7</sup> The Assessment of SpondyloArthritis International Society (ASAS) working group proposed an NSAID scoring system to standardise and quantify cumulative NSAID exposure in patients with AS or SpA. The score is calculated based on the type of NSAID used, its

### Contributions:

QUAA TK - Conception, Design  
SAS SS AR - Acquisition, Analysis, Interpretation  
QUAA SS - Drafting  
TK SAS AR - Critical Review

All authors approved the final version to be published & agreed to be accountable for all aspects of the work.

**Conflicts of Interest:** None

**Financial Support:** None to report

**Potential Competing Interests:**

None to report

### Institutional Review Board

#### Approval

FGPC.1/12/2024/E-Committee  
30-05-2024  
FG Polyclinic, Islamabad

Review began 11/09/2025

Review ended 03/03/2026

Published 31/03/2026

© Copyright 2026

Abbasi et al. This is an open access article distributed under the terms of the Creative Commons Attribution License CC-BY-SA 4.0., which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.



**How to cite this article:** Abbasi Q- ul-A, Khaliq T, Shah SA, Shafqat S, Rehman A. Evaluation of The Assessment of Spondyloarthritis International Society Non-Steroidal Anti-Inflammatory Drug (ASAS-NSAID) Score In Patients With Ankylosing Spondylitis Presenting To The Rheumatology Clinic at A Tertiary Care Hospital. JRMC. 2026 Mar. 31;30(1).

<https://doi.org/10.37939/jrnc.v30i1.3004>

daily dose, and the number of days it was taken during the defined observation period. An equivalence scale is applied, in which a score of 100 corresponds to a full daily dose equivalent to 150 mg of diclofenac, 1000 mg of naproxen, or 200 mg of aceclofenac. The mean daily intake represents the average NSAID dose actually taken per day over the period, calculated by multiplying the relative daily dose by the proportion of days the NSAID was used. The final ASAS-NSAID score ranges from 0 to 200, reflecting standardised cumulative NSAID consumption.<sup>8</sup> The goal of this study was to use the ASAS-NSAID score to determine the total dose of NSAIDs and prevent overuse. Additionally, this study compared ASAS-NSAID scores before and after the initiation of biological agents in a specific subgroup of patients.

## Materials And Methods

This quasi-experimental, cross-sectional study was conducted over six months (July 2024-December to 2024) at the Rheumatology Clinic of the Federal Government Polyclinic Hospital. A total of 60 patients diagnosed with SpA were enrolled using a non-probability consecutive sampling technique. The study commenced following approval of the research synopsis by the hospital's ethics review board (ethics review board no: FGPC.1/12/2024/E-Committee). Informed written consent was obtained from all participants.

Patients diagnosed with AS/SpA based on the ASAS classification criteria were included in this study. Eligible participants were those currently using NSAIDs, alone or in combination with corticosteroids and/or DMARDs, including both conventional and biologic agents. Patients were excluded from the study if they had a diagnosed rheumatologic condition other than SpA, such as rheumatoid arthritis, psoriatic arthritis, or systemic lupus erythematosus. Additionally, individuals who were using NSAIDs for reasons unrelated to AS were also excluded. The sample size was calculated using the World Health Organization sample size calculator, with a 95% confidence interval and a margin of error of 0.05, considering the prevalence of SpA to be 1%, as per the COPCORD study.

Summative NSAID consumption was assessed using the ASAS-NSAID score, calculated via an online tool in all 60 patients at baseline.<sup>8</sup> Among the study participants, 43 patients received bDMARDs or tsDMARDs during the study period. For these individuals, NSAID use was reassessed by recalculating the ASAS-NSAID score after six months of initiation of these therapies. Disease activity was evaluated concurrently using the BASDAI and ASDAS-CRP, both measured at the time of ASAS-NSAID score assessment.

Data analysis was conducted using SPSS version 23. Quantitative variables, including age, disease duration, CRP levels, number of days per week of NSAID use, duration of NSAID use, and ASAS-NSAID scores before and after initiation of biologic therapy, are presented as means with standard deviations. Qualitative variables, such as sex, HLA-B27 positivity, presence of sacroiliitis, types of NSAIDs used, type of treatment received, and the number of patients receiving b/tsDMARDs, are summarised as frequencies and percentages. Disease activity was assessed using BASDAI and ASDAS-CRP scores. Based on BASDAI, activity was categorised as active if the score was  $\geq 4$  and inactive if  $< 4$ . According to ASDAS-CRP, disease activity was further classified as inactive:  $< 1.3$ , low:  $\geq 1.3$  to  $< 2.1$ , high: 2.1-3.5, or very high:  $> 3.5$ .<sup>9</sup>

The Wilcoxon signed-rank test was utilised to assess the influence of b/tsDMARDs on NSAID usage by comparing ASAS-NSAID scores before and after the initiation of these therapies.<sup>10</sup> A mean rank analysis was also conducted to evaluate variations in ASAS-NSAID scores before and after treatment. The Kruskal-Wallis test was conducted to ascertain any significant correlation between the ASAS-NSAID score and the median of various independent groups, including sex, disease duration, NSAID dosage, prior treatment types before the introduction of b/ts DMARDs, and different categories of b/ts DMARDs implemented. The Mann-Whitney U test was employed to analyse the correlations between disease activity status and the dosage of different NSAIDs.<sup>11</sup>

## Results

Sixty patients were included in the study, with a male predominance (44 males, 73.3%) and a mean age of  $32.97 \pm 8.96$  years. Most participants (86.7%) had radiographic sacroiliitis, and nearly half (46.7%) were HLA-B27 positive. The mean disease duration was  $6.2 \pm 5.7$  years, and inflammatory markers (CRP) showed wide variability (mean  $20.8 \pm 23.1$  mg/dL). Based on the BASDAI, 56.7% of patients had active disease ( $\geq 4$ ). According to the ASDAS-CRP, 56.7% had high or very high disease activity. The demographics are summarised in Table 1.

**Table 1: Demographic, Clinical, and Treatment Characteristics of Patients with Spondyloarthritis (N=60)**

Variable	Mean $\pm$ SD/n (%)
Age (in years)	32.97 $\pm$ 8.96
Duration of disease in years	6.2 $\pm$ 5.7
CRP (quantitative) mg/dl	20.80 $\pm$ 23.12
Days/week of NSAIDs use	4.90 $\pm$ 2.16
Duration of NSAIDs use during the study	127.48 $\pm$ 55.93
Gender	
• Male	44(73.3)
• Female	16(26.7)
HLA-B27 positivity	28(46.7)
Sacroiliitis	52(86.7)
BASDAI $\geq 4$	34(56.7)
ASDAS-CRP $> 3.5$	18(30)

### Legend:

- **Quantitative Variables:** Age (years), duration of disease (years), C-reactive protein (CRP, milligrams per decilitre), days per week of non-steroidal anti-inflammatory drug (NSAID) use, and duration of NSAID use within the 6-month study period (days) are presented as mean  $\pm$  standard deviation.

- **Qualitative Variables:** Sex, human leukocyte antigen B27 (HLA-B27) positivity, presence of sacroiliitis, Bath Ankylosing Spondylitis Disease Activity Index (BASDAI, score  $\geq 4$ , indicating active disease), and Ankylosing Spondylitis Disease Activity Score with C-reactive protein (ASDAS-CRP, score  $> 3.5$ , indicating very high disease activity) are presented as frequencies and percentages.

NSAID use was widespread and frequent. On average, patients used NSAIDs for  $4.9 \pm 2.2$  days per week, corresponding to 127  $\pm$  56 days during the six-month study period. Diclofenac sodium (75–100 mg) was the most frequently used NSAID, followed by celecoxib (100 mg) (**Figure 1**).

It presents the frequency of various non-steroidal anti-inflammatory drugs (NSAIDs) used by the 60 patients with spondyloarthritis in the study. It highlights diclofenac sodium (75–100 mg) as the most frequently used, followed by celecoxib (100 mg), reflecting baseline NSAID consumption patterns quantified by the ASAS-NSAID score prior to b/tsDMARD initiation.

Of the 60 patients, 15 (25%) were managed exclusively with NSAIDs, 39 (65%) received a combination of NSAIDs and sulfasalazine, and 3 (5%) were treated with NSAIDs and corticosteroids before the initiation of b/ts DMARDs. At the start of the study, two patients were already on tsDMARDs (tofacitinib), and one was on bDMARDs (etanercept).

Original Article

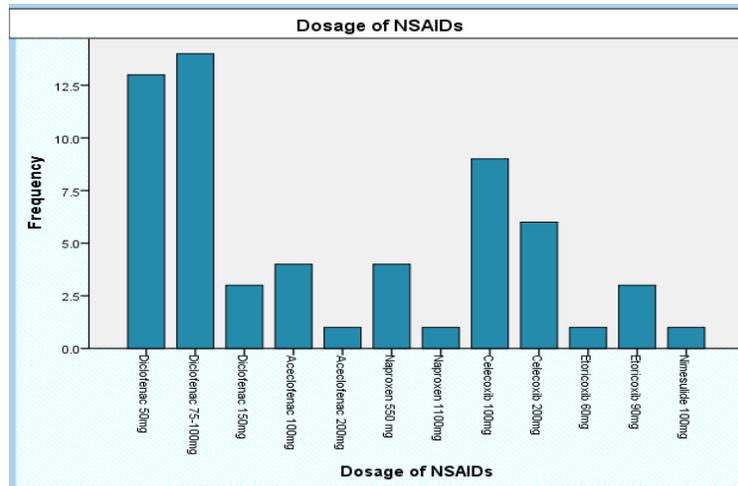


Figure 1: Frequency of different NSAIDs used by patients with spondyloarthritis (n= 60).

In total, b/tsDMARDs were introduced in 43 patients. Of these, 25 patients (58.1%) were initiated on tsDMARDs, including 14 on tofacitinib and 11 on upadacitinib. The remaining 18 patients (41.9%) received biologic DMARDs (TNF inhibitors or IL-17 inhibitors), with treatment distributed as follows: eight patients received etanercept, six received adalimumab, three received infliximab, and one received secukinumab. Two patients who were previously taking tsDMARDs (tofacitinib) were switched to TNF inhibitors due to a lack of response to the former. One patient was switched to a tsDMARD (upadacitinib) due to an inadequate response to a TNF inhibitor (etanercept).

At baseline, the mean ASAS-NSAID score for all patients was  $30.15 \pm 25.63$ , reflecting substantial NSAID dependence. Among the 43 patients who subsequently received b/tsDMARDs, the mean score significantly decreased to  $1.28 \pm 1.80$  after six months ( $p < 0.001$ , Wilcoxon Signed-Rank Test), confirming a pronounced NSAID-sparing effect of these agents. The comparison is shown in **Table 2**.

**Table 2: Comparison of ASAS-NSAID Scores Before and After Biological/Targeted Synthetic DMARDs in Patients with Spondyloarthritis (N=43)**

Variable	Median (Range)	Z-score	p-value
ASAS-NSAID Score Before b/tsDMARDs	24.50 (0.5-110)	-5.703	<0.001
ASAS-NSAID Score After b/tsDMARDs	0.66 (0-9.02)		

**Legend:**

- **ASAS-NSAID Score:** Assessment of SpondyloArthritis International Society Non-Steroidal Anti-Inflammatory Drug score, calculated based on the type, dosage, and duration of non-steroidal anti-inflammatory drug (NSAID) use.
- **b/tsDMARDs:** Biological Disease-Modifying Anti-Rheumatic Drugs or targeted synthetic Disease-Modifying Anti-Rheumatic Drugs.
- **Z-score and p-value:** Derived from the Wilcoxon signed-rank test comparing ASAS-NSAID scores before and after b/tsDMARD initiation, with a significance level of 0.05.

Patients with higher disease activity, as measured by  $BASDAI \geq 4$ , had significantly higher baseline ASAS-NSAID scores than those with inactive disease ( $p = 0.007$ ). No significant associations were observed between ASAS-NSAID scores and ASDAS-CRP, sex, or disease duration. The detailed results, including median ASAS-NSAID scores and mean ranks for each group, are presented in **Table 3**.

**Table 3. ASAS-NSAID Scores by BASDAI Categories (Mann-Whitney U Test)**

BASDAI Category	N (%)	Median ASAS-NSAID Score (Range)	Mean Rank	U Statistic	p-value
<4 (Inactive)	26 (43.3%)	20.00 (0.50 – 73.33)	24.12	229.000	<b>0.007</b>
$\geq 4$ (Active)	34 (56.7%)	41.00 (1.00 – 110.00)	34.68		

**Legend:**

- **BASDAI, Bath Ankylosing Spondylitis Disease Activity Index;** <4 indicates inactive disease,  $\geq 4$  indicates active disease.
- **ASAS-NSAID Score:** Assessment of SpondyloArthritis International Society Non-Steroidal Anti-Inflammatory Drug score.

The Mann-Whitney U test also revealed that patients who reported a reduction in NSAID usage following b/tsDMARDs initiation had significantly higher baseline ASAS-NSAID scores than those who did not ( $U = 120.5$ ,  $p < 0.001$ ).

Baseline ASAS-NSAID scores differed significantly among the NSAID dosage groups ( $p = 0.002$ , Kruskal-Wallis test), indicating that higher prescribed doses corresponded to greater cumulative NSAID intake. However, after the initiation of b/tsDMARD therapy, the differences between the dosage groups were no longer significant ( $p = 0.88$ ), reflecting an overall uniform reduction in NSAID use. There was no significant difference in NSAID scores among the various drug types ( $p = 0.107$ ).

## Discussion

The ASAS-NSAID score quantifies NSAID consumption in a standardised manner over a specific period. The ASAS NSAID score has been suggested in prior studies to be integrated into all clinical studies on spondyloarthritis, either to assess baseline characteristics or to evaluate the NSAID-sparing effect of therapeutic interventions.<sup>12</sup>

The hallmark features of SpA include inflammatory back pain, stiffness, and potential spinal ankylosis over time. NSAIDs are regarded as the cornerstone of conventional pharmacologic therapy for SpA, especially in early disease stages and in patients without significant extra-articular manifestations. These agents provide both anti-inflammatory and analgesic effects, leading to a significant reduction in pain and stiffness in approximately two-thirds of patients.<sup>13</sup>

The success of NSAIDs in symptom control is tempered by their potential for significant adverse effects. Prolonged use has been associated with a high-risk profile, including cardiovascular events, gastrointestinal complications (e.g., ulcers and bleeding), as well as renal and hepatic dysfunction. Moreover, while NSAIDs effectively alleviate pain and stiffness in most patients, they do not alter the underlying disease progression or structural damage in spondyloarthritis, particularly in cases with advanced radiographic changes.<sup>14</sup>

Our study included 60 patients, comprising 44 men and 16 women, with a mean age of 33 years. This demographic distribution reflects the well-documented predominance of spondyloarthritis among young men, consistent with existing epidemiological data.<sup>15</sup> HLA-B27 was positive in 28 patients, while sacroiliitis was present in 52 patients, whereas only eight patients exhibited features of peripheral spondyloarthritis. CRP levels demonstrated substantial variability, with a mean value of 20.80 mg/dL. Based on disease activity indices, 34 patients were classified as having active disease according to the BASDAI. Similarly, 56.7% of the patients had either high or very high disease activity as assessed by the ASDAS-CRP, with 30% of the total cohort falling within the very high disease activity category. NSAID usage was prevalent at baseline before the introduction of biological DMARDs. Participants reported using NSAIDs an average of  $4.90 \pm 2.16$  days per week, with a median of five days per week. Over six months, NSAIDs were used for a mean of  $127.48 \pm 55.93$  days, with a median of 146 days.

The ASAS NSAID score was calculated to quantify cumulative NSAID usage. At baseline, the mean NSAID score was notably high ( $30.15 \pm 25.63$ ), reflecting substantial reliance on NSAID therapy. However, following the introduction of biologic agents, the mean score markedly decreased to ( $1.28 \pm 1.80$ ), indicating a significant reduction in NSAID consumption. This finding highlights the potential of early biological intervention to enhance clinical outcomes and mitigate NSAID-related adverse effects by significantly decreasing the necessity for prolonged usage. The ASAS NSAID score was significantly correlated with disease activity indices, especially the BASDAI. The NSAID score also corresponded with the dosages of different NSAIDs administered and the types of bDMARDs/tsDMARDs used. These correlations underscore the efficacy of the ASAS NSAID index as a proxy indicator of disease burden and treatment intensity.<sup>16</sup>

Non-parametric statistical analysis revealed a significant correlation between the ASAS-NSAID score and patient-reported disease activity (BASDAI), demonstrating its sensitivity to clinical status<sup>17</sup>. Furthermore, NSAID consumption fluctuated based on the specific type and dosage of NSAIDs administered, as well as the classification of b/ts DMARDs prescribed<sup>11</sup>. No substantial correlations were identified with objective disease markers (ASDAS-CRP), disease duration, sex, or previous treatments.

Our study findings clearly showed that using different biologic agents that are currently available and prescribed in Pakistan for the treatment of spondyloarthritis has an NSAID-sparing effect.<sup>18</sup> These findings align with the 2022 ASAS-EULAR recommendations for the treatment of axSpA, which support the early initiation of biologic therapy in patients with persistently high disease activity despite NSAID treatment.<sup>19</sup> The observed NSAID-sparing effect in our cohort is consistent with outcomes reported in well-established studies, including the SPARSE study and the DESIR cohort, further validating the effectiveness of biologics in reducing NSAID dependency and potentially lowering associated adverse events.<sup>17,20</sup>

Our study had several limitations. The most notable was the small sample size, which restricted the generalisability of the findings to a broader population. Additionally, the short follow-up duration of six months limited our ability to assess the long-term sustainability of the observed reduction in NSAID usage. Consequently, we were unable to determine whether the NSAID-sparing effect persisted consistently over time with continued biologic therapy.

Despite its limitations, our study has several strengths. Firstly, to our knowledge, it is the first study conducted in Pakistan to specifically address the ASAS NSAID score in patients with spondyloarthritis, providing valuable local data on NSAID usage patterns. Secondly, the study highlights the impact of introducing biologic DMARDs in clinical practice, reinforcing their role in the management of SpA by demonstrating a significant NSAID-sparing effect. These findings support the implementation of evidence-based treatment strategies in accordance with the ASAS-EULAR 2022 recommendations and emphasise the importance of broader access to biologic agents in the region.

In the management of SpA, NSAIDs have a pivotal role in the symptomatic relief. However, tracking cumulative NSAID intake using the ASAS NSAID score should be emphasised as an important component of outpatient and follow-up assessments. This standardised approach allows clinicians to monitor symptom control, assess treatment response, and detect potential over-reliance on NSAIDs, which may predispose patients to adverse effects. Our findings reinforce that the early initiation of biologic DMARDs can lead to a substantial reduction in NSAID use, highlighting their role not only in disease control but also in minimising long-term NSAID-related risks.

## Conclusions

Following b/tsDMARDs, the ASAS-NSAID score significantly decreased (from  $30.15 \pm 25.63$  to  $1.28 \pm 1.80$ ,  $p < 0.001$ ), demonstrating the NSAID-sparing effect and potential to lower related risks. The score did not correlate with ASDAS-CRP ( $p = 0.242$ ) but correlated with BASDAI ( $p = 0.007$ ). This study supports early b/tsDMARDs and routine use of ASAS-NSAID scores in accordance with the 2022 ASAS-EULAR recommendations to optimise AS management, despite limitations such as the small sample size.

## Author Information

1,4. Fellow, Federal Government Polyclinic Hospital, Islamabad. 2. 2 HOD & Associate Professor, Federal Government Polyclinic Hospital. 3. 3 Senior Registrar, Federal Government Polyclinic Hospital, Islamabad. 5. Postgraduate Trainee, Benazir Bhutto Hospital, Rawalpindi.

Corresponding author: Dr. Abdur Rehman  dr.malik.ar123@gmail.com

## References

1. Navarro-Compán V, Sepriano A, El-Zorkany B, van der Heijde D. Axial spondyloarthritis. *Ann Rheum Dis.* 2021;80(12):1511–21. <https://doi.org/10.1136/annrheumdis-2021-221035>
2. Bittar M, Deodhar A. Axial spondyloarthritis: a review. *JAMA.* 2025;333(5):408–20. <https://doi.org/10.1001/jama.2024.20917>
3. Hwang MC, Ridley L, Reveille JD. Ankylosing spondylitis risk factors: a systematic literature review. *Clin Rheumatol.* 2021;40:3079–93. <https://doi.org/10.1007/s10067-021-05679-7>
4. Saeed MA, Ahmed H, Faiq M, Aslam Z, Khan SEA, Batool S, et al. Prevalence of inflammatory back pain and radiographic axial spondyloarthritis in a semi-urban community of Lahore, Pakistan. *Int J Rheum Dis.* 2021;24(2):207–15. <https://doi.org/10.1111/1756-185X.14030>
5. Chen YH, Huang WN, Chen YM, Lai KL, Hsieh TY, Hung WT, et al. The BASDAI cut-off for disease activity corresponding to the ASDAS scores in a Taiwanese cohort of ankylosing spondylitis. *Front Med (Lausanne).* 2022;9:856654. <https://doi.org/10.3389/fmed.2022.856654>
6. Ramiro S, Nikiphorou E, Sepriano A, Ortolan A, Webers C, Baraliakos X, et al. ASAS-EULAR recommendations for the management of axial spondyloarthritis: 2022 update. *Ann Rheum Dis.* 2023;82(1):19–34. <https://doi.org/10.1136/ard-2022-223296>
7. da Cruz Lage R, Marques CDL, Oliveira TL, Resende GG, Kohem CL, Saad CG, et al. Brazilian recommendations for the use of nonsteroidal anti-inflammatory drugs in patients with axial spondyloarthritis. *Adv Rheumatol.* 2021;61(1):4. <https://doi.org/10.1186/s42358-020-00160-6>
8. NSAID Calculator – ASAS [Internet]. Assessment of SpondyloArthritis International Society; 2023 [cited 2025 Jul 14]. Available from: <https://www.asas-group.org/nsaid-calculator/>
9. Baraliakos X, Gladman DD, Chakravarty SD, Gong C, Shawi M, Rampakakis E, et al. BASDAI versus ASDAS in evaluating axial involvement in patients with psoriatic arthritis: a pooled analysis of two phase 3 studies. *Rheumatol Adv Pract.* 2024;8(2):rkae058. <https://doi.org/10.1093/rap/rkae058>
10. Durak Ediboğlu E, Solmaz D, Kabadayı G, Gücenmez S, Cinakli H, Otman Akat E, et al. Non-steroidal anti-inflammatory drug use is determined by disease activity in axSpA and decreased by biologicals: a longitudinal analysis. *ARP Rheumatol.* 2023;4(4):322–9. <https://doi.org/10.1136/annrheumdis-2021-221035>
11. Lorincz M, Østergaard M, Wetterslev J, Sørensen IJ, Madsen OR, Christiansen SN, et al. Construct validity and responsiveness of ASAS Health Index assessed in two longitudinal studies of TNF- $\alpha$  inhibitor initiation and dose reduction in patients with axial spondyloarthritis. *RMD Open.* 2024;10(4):e004948. <https://doi.org/10.1136/rmdopen-2024-004948>
12. Meade-Aguilar JA, Liew J, Stovall R, Ramiro S, Gensler LS. Nonsteroidal anti-inflammatory drug use and incident hypertension among patients with axial spondyloarthritis: insights from the DESIR cohort. *Ann Rheum Dis.* 2025;84(Suppl 1):524–5. <https://doi.org/10.1002/acr.24070>
13. Bindu S, Mazumder S, Bandyopadhyay U. Non-steroidal anti-inflammatory drugs (NSAIDs) and organ damage: a current perspective. *Biochem Pharmacol.* 2020;180:114147. <https://doi.org/10.1016/j.bcp.2020.114147>
14. Durak Ediboğlu E, Solmaz D, Kabadayı G, Gücenmez S, Cinakli H, Otman Akat E, et al. Non-steroidal anti-inflammatory drug use is determined by disease activity in axial spondyloarthritis and decreased by biologicals: a longitudinal analysis. *Adv Rheumatol.* 2023;63(1):4. <https://doi.org/10.1186/s42358-022-00296-9>
15. Crossfield SSR, Marzo-Ortega H, Kingsbury SR, Pujades-Rodriguez M, Conaghan PG. Changes in ankylosing spondylitis incidence, prevalence, and time to diagnosis over two decades. *RMD Open.* 2021;7(3):e001888. <https://doi.org/10.1136/rmdopen-2021-001888>
16. Wang R, Bathon JM, Ward MM. Nonsteroidal anti-inflammatory drugs as potential disease-modifying medications in axial spondyloarthritis. *Arthritis Rheumatol.* 2020;72(4):518–28. <https://doi.org/10.1002/art.41164>
17. Dougados M, Kiltz U, Kivitz A, Pavelka K, Rohrer S, McCreddin S, et al. Nonsteroidal anti-inflammatory drug-sparing effect of secukinumab in patients with radiographic axial spondyloarthritis: four-year results from the MEASURE 2, 3, and 4 phase III trials. *Rheumatol Int.* 2021;42(2):205–13. <https://doi.org/10.1007/s00296-021-05044-6>
18. Rashid MU, Khurshid A, Shaikat H, Ashraf FF, Lodhi MH, Naveed A, et al. Disease patterns of ankylosing spondylitis-associated treatment patterns and drug utilisation among affected patients. *Pak J Health Sci.* 2024;5(6):13–8. <https://doi.org/10.54393/pjhs.v5i06.1376>
19. Ramiro S, Nikiphorou E, Sepriano A, Ortolan A, Webers C, Baraliakos X, et al. ASAS-EULAR recommendations for the management of axial spondyloarthritis: 2022 update. *Ann Rheum Dis.* 2023;82(1):19–34. <https://doi.org/10.1136/ard-2022-223296>
20. Portier E, Chevret S, Walter-Petrich A, Ruyssen-Witrand A, Dougados M, Moltó A. Factors associated with treatment pathways in early axial spondyloarthritis: a multistate analysis of the 10-year follow-up of the DESIR cohort. *J Rheumatol.* 2024;51(4):368–77. <https://doi.org/10.3899/jrheum.2023-0933>