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Epidemiological, Clinical, Therapeutic, and Evolutionary Profile of Ankylosing Spondylitis in a Nigerian Hospital Setting: A Study of 372 Cases

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Abstract

Introduction: Ankylosing spondylitis (AS), the most common and severe form of spondyloarthritis, remains poorly documented in sub-Saharan Africa in terms of its clinical presentation and progression. This study aims to describe the epidemiological, clinical, therapeutic, and prognostic profiles of AS within the rheumatology unit of the National Hospital of Zinder (Niger). **Methods:** This was a longitudinal descriptive study with retrospective and prospective data collection, conducted over 54 months (July 2020 - February 2025) in the rheumatology unit of the Zinder National Hospital. All patients meeting the modified New York criteria for ankylosing spondylitis (AS) were included exhaustively. BASDAI and BASFI scores were assessed at baseline and at 3 months; their evolution was compared using the Wilcoxon signed-rank test for paired groups. **Results:** A total of 372 patients were included out of 5620 consultations, representing a hospital frequency of 6.62%. The mean age was 47.75 years ± 13.01 years (range: 17 - 85 years). There was a female predominance (72.58%; male-to-female ratio = 0.38). The median diagnostic delay was 52 months [Q25 - Q75: 25 - 125 months]. Pelvic pain was the main reason for consultation (66.40%). Peripheral involvement was present in 55.91% of patients, enthesitis in 27.69%, and uveitis in 5.65%. Radiological sacroiliitis was noted in all patients (Forrestier stage 2: 76.34%; stage 3: 22.04%; stage 4: 1.61%), and structural lesions of the lumbar spine in 88.71%. Therapeutically, NSAIDs were prescribed in 94.09% of patients, methotrexate in 36.29%, and sulfasalazine in

27.96%. At 3 months, the BASDAI score decreased significantly from 5.17 ± 2.69 to 3.09 ± 1.79 ($\Delta = -2.08$; $p < 0.001$), and the BASFI score decreased significantly from 5.30 ± 2.68 to 3.15 ± 1.91 ($\Delta = -2.15$; $p < 0.001$). **Conclusion:** Ankylosing spondylitis (AS) in Niger is characterized by a marked female predominance, frequent peripheral involvement, significant diagnostic delays, and advanced structural lesions at the time of diagnosis. However, a statistically significant and substantial improvement in disease activity and physical function was observed at 3 months with conventional management.

Keywords

Ankylosing Spondylitis, BASDAI, BASFI, Niger, Sub-Saharan Africa

1. Introduction

Ankylosing spondylitis (AS), the leading spondyloarthropathy, is a chronic inflammatory rheumatic disease characterized by predominant axial involvement, enthesitis, and extra-articular manifestations, which can progress to disabling spinal ankylosis [1]. Its global prevalence is estimated at 0.07% - 0.32%, with frequency linked to the distribution of the HLA-B27 antigen, and it classically affects young men in Western populations [2]-[4].

In sub-Saharan Africa, ankylosing spondylitis (AS) has long been considered rare due to the low frequency of HLA-B27 in Black African populations [5] [6]. However, recent hospital series have highlighted an epidemiological and clinical profile distinct from that of Caucasian populations, with a high frequency of female cases and significant diagnostic delays [5] [7]. In Niger, data on this disease remain almost non-existent, despite a real clinical burden, constituting a gap that limits the planning of specialized care [6].

The aim of this study was to describe the epidemiological, clinical, therapeutic, and evolutionary profile of AS in patients followed in the rheumatology unit of the National Hospital of Zinder (Niger).

2. Patients and Methods

2.1. Type of Study and Framework

This was a longitudinal descriptive study with mixed data collection (retrospective and prospective), conducted in the rheumatology unit of the National Hospital of Zinder (Niger).

2.2. Study Period

The study took place over a period of 54 months, from July 2020 to February 2025.

2.3. Study Population

All patients followed for ankylosing spondylitis (AS) in the rheumatology unit dur-

ing the study period were comprehensively recorded.

The rheumatology department and the internal medicine department are two separate entities within the hospital. The patients included were either seen directly in rheumatology consultations or referred by other departments, primarily internal medicine, where the diagnosis of spondyloarthritis was frequently considered before specialist referral. However, the source of referral was not systematically recorded.

2.3.1. Inclusion Criteria

Included were all patients meeting the modified New York criteria for AS [8] and whose medical records were usable.

2.3.2. Exclusion Criteria

Patients whose diagnoses did not meet the modified New York criteria and those whose medical records were incomplete or unusable for the variables of interest were not included.

2.3.3. Sampling

The recruitment was exhaustive, covering all patients meeting the inclusion criteria during the study period, *i.e.*, 372 patients.

2.4. Studied Variables

The variables collected included sociodemographic data (age at inclusion, sex, ethnicity, occupation, origin; the age of symptom onset was estimated by subtracting the diagnostic delay from the age at inclusion), personal and family history, clinical manifestations (mode of onset, axial, peripheral, and enthesitis involvement, extra-articular manifestations), biological data (erythrocyte sedimentation rate [ESR, considered elevated according to Muller's formula: >age/2 in men and >(age + 10)/2 in women [9]], C-reactive protein [CRP, normal threshold: ≤6 mg/L], complete blood count [anemia defined according to WHO criteria: Hb < 12 g/dL in women and <13 g/dL in men [10]]), and anteroposterior pelvic and spinal radiographs (anteroposterior and lateral views) were performed and interpreted at the institution. Sacroiliitis disease was graded according to the Forrestier classification: stage 2 (demineralization, joint widening, and incipient erosions), stage 3 (clear erosions with sclerosis and pseudo-widening), and stage 4 (ankylosis). In accordance with the modified New York criteria, all included patients presented with bilateral stage 2 - 4 or unilateral stage 3 - 4 sacroiliitis. Structural spinal involvement—lumbar, thoracic, and cervical—was defined by the presence of at least one of the following structural abnormalities on standard radiography: syndesmophytes, squaring of the vertebrae (Romanus sign), and ankylosis. These parameters of interest also concerned therapeutic modalities (NSAIDs, conventional disease-modifying antirheumatic drugs, analgesics, non-pharmacological measures), as well as disease activity scores (BASDAI) [11] and functional capacity scores (BASFI) [12], assessed at inclusion and at 3 months.

2.5. Data Collection

Data from patients diagnosed before the start of the study were collected retrospectively from medical records, while data from patients diagnosed and followed up during the study period were collected prospectively using a standardized data collection form. Sociodemographic, clinical, biological, and radiological variables were available in both components; BASDAI and BASFI scores at 3 months were collected prospectively or retrospectively for all included patients. These scores were collected by the same evaluator at baseline and then at the 3-month follow-up visit, which was systematically scheduled for all patients. Complete matched assessments were thus available for all 372 patients. In our setting, loss to follow-up occurred primarily during the extended follow-up period and not at the initial follow-up visits; attendance beyond the third month was not documented and was not within the scope of this study.

2.6. Statistical Analysis

Data were entered and analyzed using Epi Info software. Qualitative variables were expressed as counts and percentages, and quantitative variables as means ± standard deviations, with the minimum and maximum values and the median where relevant. The normality of distributions was verified using the Shapiro-Wilk test. Changes in BASDAI and BASFI scores between baseline and 3 months were compared using the Wilcoxon signed-rank test for paired samples. Effect size was estimated using the r coefficient ($r = Z/\sqrt{N}$). The proportion of patients who improved, remained stable, or worsened was reported. The Kruskal-Wallis test and Spearman's rank correlation coefficient were used to compare diagnostic delays according to Forrestier's stage. Comparisons of proportions were performed using the chi-square test. The age of onset could not be estimated for eight patients, as the recorded data did not allow for reliable documentation. These patients were excluded from this single analysis. The significance threshold was set at $p < 0.05$.

2.7. Ethical Considerations

Authorization was obtained from the authorities of the Faculty of Health Sciences at André Salifou University and those of the Zinder National Hospital. Informed consent was obtained from the patients for the prospective phase. Anonymity and data confidentiality were maintained throughout the study.

3. Results

3.1. Epidemiological Data

During the study period, 372 cases of ankylosing spondylitis (AS) were collected from 5620 consultations, representing a hospital frequency of 6.62%. The mean age at inclusion was 47.75 years ± 13.01 years (range: 17 - 85 years), with 278 patients (74.73%) aged 40 years or older. The mean age of symptom onset, estimated in 364 patients, was 41.74 years ± 13.48 years (median 42.7 years [Q25 - Q75: 31.0 -

51.6]); 210 patients (57.7%) had experienced onset of their illness before age 45. The 41 - 60 age group was the most represented (53.23%).

A clear female predominance was observed, with 270 women (72.58%) and 102 men (27.42%), *i.e.*, a male/female sex ratio of 0.38. A family history of inflammatory rheumatism was found in 44 patients (11.83%) (Table 1).

Table 1. Sociodemographic characteristics of patients (n = 372).

Variable	Effective	Percentage (%)
Sex		
Female	270	72.58
Male	102	27.42
Age Range		
Age < 21 years	6	1.61
Age 21 - 40 years	110	29.57
Age 41 - 60 years	198	53.23
Age 61 - 80 years	57	15.32
Age ≥ 81 years	1	0.27
Education Level		
Schoolchildren	254	68.28
Not enrolled in school	118	31.72
Origin		
Urban	290	77.96
Rural	82	22.04

The comorbidities listed were mainly hypertension (11.02%), osteoarthritis (11.56%), diabetes (5.65%), and osteoporosis (4.30%). The toxic habits were smoking (6.72%) and alcohol consumption (1.08%) (Table 2).

Table 2. Comorbidities and toxic habits of patients (n = 372).

Comorbidities/Toxic Habits	Effective	Percentage (%)
Comorbidities		
High blood pressure	41	11.02
Osteoarthritis	43	11.56
Diabetes	21	5.65
Osteoporosis	16	4.30
Rheumatoid arthritis	3	0.81
Kidney failure	2	0.54
Gougerot-Sjögren syndrome	1	0.27

Continued

Toxic Habits		
Smoking	25	6.72
Alcoholism	4	1.08
Without Comorbidities/Toxic Habits	**307**	**82.53**

3.2. Clinical Data

The mode of onset was gradual in the majority of patients (73.66%), insidious in 22.85%, and sudden in 3.49%. The median diagnostic delay was 52 months (range 25 - 125 months; range 3 - 297 months). Axial involvement was present in 330 patients (88.71%). Axial pain manifestations were distributed as follows: pelvic pain in 247 patients (66.40%), low back pain in 141 patients (37.90%), pygalgia in 93 patients (25.00%), upper back pain in 62 patients (16.67%), neck pain in 45 patients (12.10%), and coccydynia in 14 patients (3.76%). Spinal stiffness was noted in 184 patients (49.46%), and pelvic-spinal syndrome in 149 patients (40.05%). Peripheral joint involvement was observed in 208 patients (55.91%), predominantly asymmetric oligoarthritis (23.12%) and symmetric polyarthritis (14.52%). Enthesitis was noted in 103 patients (27.69%), predominantly heel pain (70 patients; 18.82%), followed by pain in the anterior tibial tuberosity (8 patients; 2.15%) and greater trochanter (7 patients; 1.88%). Uveitis was reported in 21 patients (5.65%) (Table 3).

Table 3. Clinical characteristics of patients (n = 372).

Demonstration	Effective	Percentage (%)
Axial Involvement	330	88.71
Pelvic pain	247	66.40
Lower back pain	141	37.90
Pygalgia	93	25.00
Back pain	62	16.67
Neck pain	45	12.10
Coccydynia	14	3.76
Pelvic-spinal syndrome	149	40.05
Spinal stiffness	184	49.46
Peripheral Involvement	208	55.91
Asymmetric oligoarthritis	86	23.12
Symmetrical polyarthritis	54	14.52
Asymmetric polyarthritis	23	6.18
Monoarthritis	21	5.65

Continued

Enthesitis	103	27.69
Heel pain	70	18.82
anterior tibial tuberosity	8	2.15
Greater trochanter	7	1.88
Anterior chest wall injury (AWI)	72	19.35
Uveitis	21	5.65

3.3. Biological and Radiological Data

The erythrocyte sedimentation rate (ESR) was elevated in 205 patients (55.11%), and the C-reactive protein (CRP) level was elevated in 151 patients (40.59%). A complete blood count revealed anemia in 39 patients (10.48%).

Radiologically, sacroiliitis was present in all 372 patients, classified according to the Forrestier classification, which found stage 2 in 284 patients (76.34%), stage 3 in 82 patients (22.04%), and stage 4 in 6 patients (1.61%). Structural lesions were observed in the lumbar spine in 330 patients (88.71%), the thoracic spine in 28 patients (7.53%), and the cervical spine in 23 patients (6.18%). The specific types of lesions were: syndesmophytes in 109 patients (29.30%), vertebral squaring in 37 patients (9.95%), and ankylosis in 11 patients (2.96%) (Table 4).

The diagnostic delay increased sharply with the radiographic stage: a median of 36 months [Q25 - Q75: 21 - 59] at stage 2, 126 months [85 - 195] at stage 3, and 261 months [256 - 268] at stage 4 (Kruskal-Wallis, $p < 0.001$; Spearman correlation between stage and delay: $\rho = 0.555$; $p < 0.001$).

Table 4. Characteristics, biological, and radiological data of patients (n = 372).

Setting	Number/Value	Percentage (%)
Biological Anomalies		
High VS	205	55.11
Median VS [Q25 - Q75]	35 [16.75 - 50.00] mm/h	-
high CRP	151	40.59
Median CRP [Q25 - Q75]	5.04 [3.43 - 14.00] mg/l	-
Anemia	39	10.48
Spinal Lesions		
Lumbar spine injuries	330	88.71
Thoracic spine injuries	28	7.53
Cervical spine injuries	23	6.18
Elementary Spinal Lesions		
Syndesmophytes	109	29.30
Squared (Romanus sign)	37	9.95

Continued

Ankylosis	11	2.96
Radiological Sacroiliitis		
Forestier—Stage 2	284	76.34
Forestier—Stage 3	82	22.04
Forestier—Stage 4	6	1.61

3.4. Therapeutic Data

Nonsteroidal anti-inflammatory drugs (NSAIDs) were prescribed to almost all patients (94.09%), in combination with analgesics in 93.01% of cases. Among conventional disease-modifying antirheumatic drugs (DMARDs), methotrexate was used in 135 patients (36.29%) and sulfasalazine in 104 patients (27.96%). Steroidal anti-inflammatory drugs (SAIDs) were prescribed to 4.57% of patients. The main therapeutic combinations were: NSAIDs alone in 128 patients (34.41%), NSAIDs and methotrexate in 120 (32.26%), NSAIDs and sulfasalazine in 96 (25.81%), and triple therapy with NSAIDs, methotrexate, and sulfasalazine in 6 (1.61%). In total, 233 patients (62.63%) were receiving at least one conventional disease-modifying therapy. No patient had received biologic therapy (anti-TNF or anti-IL-17).

The prescription of disease-modifying therapy was not more frequent in cases of peripheral involvement (57.21%) than in its absence (69.51%; $p = 0.02$). No therapeutic changes were recorded during the three-month follow-up.

Local procedures (corticosteroid injections, joint aspiration) were performed in 11.56% and 5.91% of patients, respectively. Physical therapy was prescribed for 9.68% of patients. No patient underwent surgery (Table 5).

Table 5. Therapeutic characteristics of patients (n = 372).

Treatment	Effective	Percentage (%)
NSAID	350	94.09
Painkillers	346	93.01
Methotrexate	135	36.29
Salazopyrine	104	27.96
IPP	102	27.42
Corticosteroid injection	43	11.56
Physiotherapy	36	9.68
Joint aspiration	22	5.91
AIS	17	4.57
Surgery	0	0
Biotherapy	0	0

3.5. Evolving Data

Matched assessments at 3 months were available for all 372 patients. At baseline,

the mean BASDAI score was 5.17 ± 2.69 (median: 5.22 [Q25 - Q75: 2.83 - 7.68]), indicating active disease (BASDAI ≥ 4) in 225 patients (60.48%). At 3 months, it was 3.09 ± 1.79 (median: 2.73 [1.92 - 3.75]), with disease becoming mildly active in 280 patients (75.27%). This change was statistically significant (Wilcoxon, $p < 0.001$; $r = 0.55$). The score improved in 148 patients (39.78%), remained completely unchanged in 222 (59.68%), and worsened in 2 (0.54%); the median change across the entire cohort was therefore zero. Patients whose score remained stable had a significantly lower baseline BASDAI score (mean 3.55, with 144 already below 4) than those who improved (7.64).

Similarly, the mean BASFI score decreased from 5.30 ± 2.68 (median: 5.07 [2.65 - 8.01]) to 3.15 ± 1.91 (median: 2.54 [1.90 - 4.03]) at 3 months (Wilcoxon, $p < 0.001$; $r = 0.53$), with preserved functional capacity (BASFI < 4) in 268 patients (72.04%) compared to 140 (37.63%) at baseline. The score improved in 139 patients (37.37%) and remained unchanged in 233 (62.63%), with no worsening (Table 6 and Table 7).

Table 6. Distribution of patients according to activity level/function (n = 372).

Setting	Inclusion n (%)	3 Months n (%)
BASDAI ≥ 4 (Active Disease)	225 (60.48)	92 (24.73)
BASDAI < 4 (Low Disease Activity)	147 (39.52)	280 (75.27)
BASFI > 4 (High Disability)	232 (62.37)	104 (27.96)
BASFI < 4 (Low Capacity)	140 (37.63)	268 (72.04)

Table 7. Evolution of BASDAI and BASFI scores between inclusion and 3 months (n = 372).

Score	Inclusion (Mean ± SD)	3 Months (Average ± DS)	Δ	p (Wilcoxon)
BASDAI	5.17 ± 2.69	3.09 ± 1.79	−2.08	<0.001
BASFI	5.30 ± 2.68	3.15 ± 1.91	−2.15	<0.001

4. Discussion

4.1. Epidemiological Aspects

This study collected 372 patients followed for AS at the rheumatology unit of the National Hospital of Zinder over a period of 54 months, constituting one of the largest hospital series reported in sub-Saharan Africa for this pathology.

The hospital incidence of ankylosing spondylitis (AS) in our series was 6.62% (372 cases out of 5620 consultations). This figure is comparable to that found in Senegal (6.99%; 647 cases out of 9262 consultations) [5] and significantly higher than those of Burkina Faso (0.9% [13]) and Togo (0.1% [14]). However, this high incidence should be interpreted with caution: the Zinder National Hospital is a regional referral center, which concentrates the recruitment of diagnosed cases,

and the denominator used corresponds solely to rheumatology consultations, a population already selected based on an osteoarticular pattern. These differences in denominator, recruitment method, and diagnostic criteria limit direct comparability between series.

The mean age of our patients at inclusion (47.75 years ± 13.01 years) is very close to that reported in Senegal at the time of diagnosis (47.28 years ± 15.49 years) [5], confirming the tendency of African studies to identify ankylosing spondylitis (AS) in middle-aged individuals. However, the comparison with Moroccan and Western data should focus on the age of symptom onset: estimated at 41.74 years ± 13.48 years in our series, it remains significantly higher than the 25.5 years reported in Morocco [15] and the usual age of onset in Western populations, before 30 years [1]. This discrepancy reflects both a later onset of the disease and the longer delay before diagnosis.

The female predominance observed in our series (72.58%; male-to-female ratio = 0.38) is particularly marked and contrasts sharply with data reported in other West African series. In Senegal, the predominance remained female but was more moderate (64% women; female-to-male ratio of 1.77 women per man) [5]. Conversely, a recent Togolese series found a clear male predominance, with a male-to-female ratio of 4.3 men per woman [14], illustrating significant heterogeneity in the sex profile across West African contexts, possibly linked to recruitment biases, access to care, or real population variations that remain poorly understood. This trend toward female predominance in African series contrasts with classic data from Western countries, where ankylosing spondylitis (AS) is historically described as predominantly male [4].

From an immunogenetic standpoint, the frequency of the HLA-B27 antigen is classically very low in Black African populations, which has long been suggested to explain the rarity of ankylosing spondylitis (AS) on the continent [6] [7]. However, its frequency in affected patients varies widely between populations: it exceeds 90% in Caucasian patients [2], while a recent Turkish series of 488 patients from the Thrace region reports only 59.43% positivity, which is also associated with an earlier onset, a male predominance, and more severe sacroiliitis [16]. This finding underscores that the strength of the association observed in Western cohorts cannot be directly extrapolated to sub-Saharan populations, in whom the diagnostic value of HLA-B27 remains poorly established. This point could not be addressed in our series: no patient underwent HLA-B27 testing, as this test was not available locally and its cost remained prohibitive for our patients. This is the main limitation of this study. Multicenter studies incorporating systematic HLA-B27 testing would be necessary to characterize the immunogenetic profile of ankylosing spondylitis (AS) in the Nigerian context.

4.2. Clinical Aspects

The diagnostic delay observed in our series (mean 81.38 months ± 74.89 months, median 52 months [Q25 - Q75: 25 - 125 months], *i.e.*, more than 4 years) is one

of the most concerning findings of this study. A review on the early diagnosis of ankylosing spondylitis in Africa and the Middle East reports a typical diagnostic delay of 8 to 10 years in this region [17]. Three factors are suggested: poor recognition of symptoms by patients themselves, who downplay chronic low back pain and seek medical help late; insufficient awareness among primary care physicians of inflammatory low back pain; and the fact that the diagnosis relies on radiographic evidence of sacroiliitis, which only appears after several years of progression, in a context where access to MRI remains limited. Our median delay, although significant, remains lower than the regional average. This finding should be interpreted with caution, as the hospital- and single-center nature of our recruitment may have selected patients already referred to a specialized structure.

The clinical presentation was primarily axial, dominated by pelvic (66.40%) and lumbar (37.90%) pain, with pygalgia (25.00%), dorsalgia (16.67%), and cervicalgia (12.10%) being less frequently prominent. This decreasing distribution from the pelvic to the cervical level corresponds to the ascending pattern of spread classically described in ankylosing spondylitis and aligns with the profile reported in other African and North African series [6] [15]. Peripheral involvement, relatively frequent in our series (55.91%), particularly asymmetric oligoarthritis, is classically more pronounced in African forms of spondyloarthritis than in Caucasian forms with purely axial predominance [6] [18].

Regardless of the joint profile, uveitis warrants particular attention: it is found in only 5.65% of our patients and is significantly less frequent than the combined global prevalence of 25.8% reported in a landmark meta-analysis of over 44,000 patients [19]. This discrepancy likely reflects underdiagnosis of uveitis in our setting, due to a lack of systematic access to ophthalmological consultations, rather than a genuinely lower frequency of this manifestation.

Enthesitis, present in 27.69% of our patients, was largely dominated by heel pain (18.82%), with other locations—the anterior tibial tuberosity (2.15%) and the greater trochanter (1.88%)—remaining marginal. This calcaneal predominance is classic in ankylosing spondylitis, with the Achilles enthesis and plantar fascia being the most frequently affected sites, followed by the patellar and anterior tibial entheses [20]. The overall frequency reported here is, however, probably underestimated: the evaluation was based exclusively on clinical examination, the sensitivity and specificity of which are low for diagnosing enthesitis, with ultrasound and MRI as the only imaging modalities capable of detecting subclinical involvement [20].

This clinical profile sheds light on the role of the internist in the diagnostic process. In countries with a low density of rheumatologists (0.03 per 100,000 inhabitants in French-speaking sub-Saharan Africa [21]), the internist is frequently the first point of contact for chronic back pain, peripheral arthritis, or isolated extra-articular manifestations—presentations whose wide range largely overlaps with their scope of practice. In our series, a significant proportion of patients were initially evaluated in internal medicine before being referred to rheumatology. The

observed diagnostic delay underscores the importance of targeted training for these practitioners to recognize inflammatory low back pain, a prerequisite for earlier referral and, consequently, management before structural damage develops.

4.3. Paraclinical Aspects

From a biological standpoint, an inflammatory syndrome (elevated ESR and/or CRP) was present in a significant proportion of our patients (elevated ESR: 55.11%; elevated CRP: 40.59%). These data are consistent with classic observations in AS, where the biological inflammatory syndrome is typically mild, absent in a significant proportion of patients, and does not accurately reflect the true disease activity [1].

Radiologically, sacroiliitis was present in all our patients, an expected consequence of the modified New York criteria used for inclusion. Its severity, however, was marked: nearly a quarter of them (23.66%) already presented with Forrestier stage 3 or 4 at the time of diagnosis. In addition, structural lesions of the lumbar spine were present in 88.71% of patients; when the type of lesion was specified, syndesmophytes predominated (29.30%), followed by vertebral squaring (9.95%) and ankylosis (2.96%), three lesions that mark the evolutionary spectrum of the disease, from the early inflammatory stage to vertebral fusion. The extent of these structural lesions, already established and irreversible at the time of diagnosis, testifies to the late stage of management—a recurring characteristic in African and North African series, directly linked to the previously highlighted diagnostic delay [6] [7] [15] [17]. Indeed, in our context, diagnosis relies almost exclusively on standard radiography, as access to MRI remains very limited in the subregion [21], even though MRI detects active inflammatory lesions in both the sacroiliac and spinal regions before any structural changes occur.

Analysis of our data supports this link: the diagnostic delay increased markedly with the radiographic stage, rising from a median of 36 months in stage 2 to 126 months in stage 3 and 261 months in stage 4 ($\rho = 0.555$; $p < 0.001$). This gradient, consistent with the natural history of the disease, does not allow us to establish a causal link due to the cross-sectional nature of this comparison, but it underscores the importance of early diagnosis. Conversely, the six patients in stage 4 had the lowest initial BASDAI score (median 1.78), a classic profile of ankylosed and minimally inflammatory disease.

4.4. Therapeutic Aspects

The management of our patients relied primarily on conventional treatments: NSAIDs (94.09%), analgesics (93.01%), methotrexate (36.29%), and sulfasalazine (27.96%). The predominant role of NSAIDs is consistent with ASAS-EULAR recommendations, which position them as first-line treatment for all symptomatic patients, with continuous treatment recommended in cases of persistent active disease [22]. This rate significantly exceeds the 60% reported in the Senegalese series [5]. This near-systematic prescription reflects the central role of this thera-

peutic class in our context, where it often constitutes the only truly accessible option.

The frequent use of conventional disease-modifying antirheumatic drugs (DMARDs) in our series deserves to be placed in context. International guidelines reserve methotrexate and sulfasalazine for forms with peripheral joint involvement and do not recommend them for purely axial forms [22]. Two Cochrane reviews support this position: the review on methotrexate concludes that there is insufficient evidence regarding its efficacy on overall disease activity [23], and the review on sulfasalazine finds no demonstrated benefit on pain, disease activity, radiographic progression, physical function, or spinal mobility, with a favorable effect suggested only on peripheral joint manifestations [24]. In our population, peripheral involvement affected 55.91% of patients, a high proportion that constitutes a valid indication for a substantial number of them: 119 of the 233 patients receiving DMARD therapy (51.07%) actually presented with such involvement. However, the prescription did not appear to be targeted at this phenotype, as it was no more frequent in patients with peripheral involvement (57.21%) than in others (69.51%; $p = 0.02$). This practice thus reflects both the actual frequency of peripheral forms in our population and a default strategy imposed by the unavailability of biotherapies [17] [21]. Better dissemination of international recommendations would allow these molecules to be better reserved for situations where their benefit is established.

None of the patients in our series had access to biologic therapy (anti-TNF or anti-IL-17), which is nevertheless recommended in cases of persistent inflammation despite well-conducted conventional treatment [22]. This lack of access is widespread across the continent: the review by Rachid *et al.* highlights that the cost and limited accessibility of biologic therapies remain one of the main obstacles to optimal management of ankylosing spondylitis in Africa, forcing the majority of practitioners to rely exclusively on conventional treatment [17]. A 2015 survey on the state of rheumatology in French-speaking sub-Saharan Africa confirmed this reality, with the monthly cost of anti-TNFs exceeding €1700 in some countries of the sub-region, effectively making them inaccessible to the vast majority of patients [21]. Furthermore, physiotherapy was prescribed for only 9.68% of our patients, whereas a meta-analysis of randomized controlled trials demonstrated the effectiveness of supervised exercise programs on disease activity and physical function in ankylosing spondylitis (AS), with a weighted mean difference of −0.90 for the BASDAI and −0.72 for the BASFI in favor of exercise [25]. This inexpensive, non-pharmacological rehabilitation component appears to be underutilized in our setting, although the study does not allow us to distinguish underprescription from limited access, service unavailability, or financial constraints.

4.5. Evolutionary Aspects

Under conventional treatment, the mean BASDAI score decreased from 5.17 ± 2.69 to 3.09 ± 1.79, and the BASFI score decreased from 5.30 ± 2.68 to 3.15 ± 1.91

at 3 months ($p < 0.001$; $r = 0.55$ and 0.53). However, this change should be interpreted with caution: it was based on a marked improvement in approximately 40% of patients, those with the most active disease at baseline, while the score remained virtually unchanged in nearly 60% of patients, whose disease activity was already low at baseline. These values are close to those reported in the Senegalese series by Abba *et al.*, where the mean initial BASDAI and BASFI scores were 5.0 and 5.03, respectively, decreasing to 2.61 and 2.35 after 3 months of treatment [5].

This favorable evolution, observed in a context where access to biotherapies remains exceptional across the continent [17] [21], cannot be interpreted as proof of therapeutic efficacy. The study included neither a control group nor standardized treatment allocation, and the heterogeneity of the regimens used precludes attributing the observed improvement to a particular strategy; regression to the mean and spontaneous evolution cannot be ruled out. It is therefore an association between conventional management and short-term improvement, and not a causal relationship. However, functional prognosis is not limited to the initial symptomatic response: a recent systematic review showed that a significant diagnostic delay in axial spondyloarthritis is associated with a poorer long-term health-related quality of life [26]. In our patients, diagnosed after a median of 52 months of disease progression, the symptomatic benefit observed at 3 months does not therefore necessarily prevent subsequent disability.

4.6. Strengths and Limitations of the Study

This study has several strengths: a large sample size for a single-center African series, exhaustive recruitment over a long period, standardized diagnostic criteria, and an objective longitudinal evaluation with an appropriate statistical test.

However, this study has several limitations. The main one is the complete absence of HLA-B27 status determination: no patient underwent this test, which was unavailable locally, meaning that no immunogenetic characterization of the cohort was possible, even though HLA-B27 is a central element in the pathophysiology of ankylosing spondylitis (AS). The mixed data collection approach, retrospective followed by prospective, exposes the patient to information and selection biases, as well as heterogeneity in data quality: the type of elementary spinal lesion was specified in only some of the records, and the age of onset could not be documented in eight patients, who were excluded from this single analysis. The use of the modified New York criteria, which require radiographic evidence of sacroiliitis, inherently excludes non-radiographic axial forms (nr-axSpA) and mechanically contributes to the high frequency of structural abnormalities observed. The radiographic readings were not subjected to independent double interpretation, exposing the patient to inter-observer variability. Finally, the descriptive and single-center nature of the study, the absence of a control group, the non-standardized allocation of treatments, and a follow-up limited to 3 months preclude assessing medium- and long-term outcomes, attributing the observed improvement to a specific therapeutic strategy, or generalizing these results to the entire Nige-

rian population.

5. Conclusion

Ankylosing spondylitis in Niger is characterized by a marked female predominance, significant diagnostic delays, and advanced structural lesions at diagnosis, with frequent peripheral involvement. In the absence of access to biotherapies, a statistically significant improvement in disease activity and functional capacity was observed at 3 months with conventional management. Multicenter studies with systematic HLA-B27 testing and long-term follow-up are needed to better characterize and optimize the management of this disease in resource-limited settings.

Author Contributions

Conceptualization: Garba Abdoul Aziz and Alkassan Yacouba; Methodology: Garba Abdoul Aziz; Software: Alkassan Yacouba; Validation: Brah Souleymane, Adehossi Eric and Daou Mamane; Formal Analysis: Garba Abdoul Aziz; Survey: Brahim Alhadji Djibrillah and Ben Salah Mohamed; Resources: Garba Abdoul Aziz; Data Curation: Brahim Alhadji Djibrillah and Ben Salah Mohamed; Original Preparation: Garba Abdoul Aziz; Editing: Brah Souleymane and Adehossi Eric; Visualization: Abdoul Kader Mamadou. All authors have read and accepted the published version of the manuscript.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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