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Rheumatoid Arthritis in Chad: Epidemiological, Clinical and Therapeutic Profile

Harine Abdel Aziz Garba[1], Adama Bah[2], Ramadhane Bouchrane[3], Djikoldinguem Marshall Mouandilmadji[4], Lienou Vanessa Tagne[5], Doun Fouda Anne Stéphanie Élodie[6], Abandazegoue-Andjembe Laetitia Cynthia[7], Zenal Abidine Adoum Hamad[8], Mahamat Issa Adoum[9], Sadou Yamoga Lam[10], Moustapha Niasse[11], Saïdou Diallo[1]

[1]CHURN, National University Referral Hospital, University of N'Djamena, N'Djamena, Chad
[2]Ignace Deen University Hospital, Gamal Abdel Nasser University of Conakry, Conakry, Guinea
[3]Pikine National Hospital, Cheikh Anta Diop University of Dakar, Dakar, Senegal
[4]Endocrinology and Diabetology Department, CHURN, National University Referral Hospital, N'Djamena, Chad
[5]Douala General Hospital, Douala, Cameroon
[6]Department of Internal Medicine and Specialties, Faculty of Medicine and Biomedical Sciences (FMSB), University of Yaoundé I (UY1), Yaoundé, Cameroon
[7]Omar Bongo Ondimba Military Teaching Hospital, Libreville, Gabon
[8]Neurology Unit of Renaissance University Hospital Center (CHUR), N'Djamena, Chad
[9]Pediatric Department of Albert Royer Hospital, Cheikh Anta Diop University of Dakar, Dakar, Senegal
[10]Dermatology Department of Dalal Jam National Hospital, Dakar, Senegal
[11]Coud Hospital, Cheikh Anta Diop University of Dakar, Dakar, Senegal
Email: garbaharine28@gmail.com

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Abstract

Objective: Rheumatoid arthritis (RA) is a chronic autoimmune inflammatory disease. Data from sub-Saharan Africa, particularly Central Africa, remain scarce and diagnosis is often delayed. This study aimed to describe the epidemiological, clinical, biological, radiological, therapeutic, and functional profile of RA in Chad and to situate these findings within the sub-Saharan and international literature. **Methods:** We conducted a retrospective descriptive study from January 2018 to December 2024 in the Rheumatology Department of the Hospital of the Refoundation of Chad. Patients fulfilling the 2010 ACR/EULAR classification criteria for RA and with complete medical records were included. Demographic, clinical, laboratory, radiographic, disease activity (DAS28), and quality-of-life data (SF-36, NHP) were collected, as well as treatments used and disease course. **Results:** Among 5000 rheumatology consultations, 211 patients had RA, representing 4.22% of visits. The mean age at diagnosis was 44.5 years (range 12 - 90), and women accounted for 86.3% of cases. The mean diagnostic delay was 72.4 months (≈6.5 years). At presentation, polyarthritis (93.8%), symmetrical involvement (90.3%), deformities

(61%) and ankylosis (52.2%) were frequent. Inflammatory markers were elevated in most patients, rheumatoid factor and anti-CCP antibodies were positive in 69% and 67.5% of tested cases, respectively. Radiographically, 55.2% of patients were classified as Steinbrocker stage 3 - 4, with joint space narrowing in 97.7% and erosions in 43.1%. Methotrexate was the cornerstone of therapy (81.5%), often combined with hydroxychloroquine or sulfasalazine. No biologic DMARDs were used because of cost and availability constraints, and treatment adherence was frequently irregular. Functional status and quality of life (SF-36, NHP) were markedly impaired, with only partial improvement under conventional DMARDs. **Conclusion:** This large Chadian series confirms that RA in sub-Saharan Africa is often diagnosed at an advanced, structurally destructive, and functionally disabling stage, with prolonged diagnostic delays and limited access to biologic therapies. Strengthening early detection in primary care, improving continuous access to conventional DMARDs, and progressively implementing national strategies for affordable biologic therapy are priorities to improve the prognosis of RA in Chad and similar African settings.

Subject Areas

Epidemiology

Keywords

Rheumatoid Arthritis, Epidemiology, Radiographic Damage, DMARD Therapy, Chad

1. Introduction

Rheumatoid arthritis (RA) is a chronic inflammatory autoimmune disease characterized by a peripheral, symmetrical, progressive, and potentially destructive joint involvement [1]-[5]. It is the most common inflammatory rheumatism worldwide, with a prevalence of approximately 0.5% - 1% in the general population [6]-[9]. In sub-Saharan Africa, available data remain limited, but several studies suggest an increasing recognition of the disease, related to improvements in diagnostic capacity and the gradual establishment of specialized rheumatology services. [10]-[12].

In Chad, the management of rheumatic diseases has recently expanded with the opening of specialized services, including that of the Hôpital de la Refondation du Tchad in N'Djamena. However, RA is still often diagnosed at an advanced stage due to socioeconomic constraints, limited access to specialized care, and persistent lack of awareness of the disease in the general population. In this context, our study aims to describe the epidemiological, diagnostic, therapeutic, and evolutionary characteristics of RA at the Rheumatology Department.

2. Patient and Method

2.1. Study Setting

The study was conducted in the Rheumatology Department of the Hôpital de la

Refondation du Tchad (HRT), N'Djamena.

2.2. Study Design and Period

This was a retrospective descriptive study carried out from January 1, 2018, to December 31, 2024.

2.3. Study Population

Inclusion criteria:

- Diagnosis of RA according to the 2010 ACR/EULAR criteria;
- Complete and usable medical records.

Exclusion criteria:

- Incomplete medical records;
- Patients not meeting the 2010 ACR/EULAR criteria.

2.4. Data Collection

Data were collected using a standardized form including:

1) Epidemiological data:

- age, sex, ethnicity, residence, occupation, educational level

2) Clinical data:

- diagnostic delay;
- clinical form (early, recent, established, systemic, sequelae);
- number of tender and swollen joints;
- pain (VAS);
- morning stiffness, nocturnal awakenings;
- extra-articular manifestations;
- DAS28;
- RAID score.

3) Paraclinical data:

Biology:

- ESR, CRP, complete blood count, serum protein electrophoresis,
- blood glucose, uric acid, creatinine, calcium, transaminases.

Immunology (depending on availability):

RF, anti-CCP, ANA, ANCA, anti–double-stranded DNA, antiphospholipids.

In practice, immunological tests were performed according to their availability within the hospital laboratory. Routine testing mainly included rheumatoid factor (RF, latex agglutination) and anti-CCP antibodies (ELISA). Antinuclear antibodies (ANA) and other specific tests (ANCA, anti-double-stranded DNA, antiphospholipids) were requested selectively, in the presence of extra-articular manifestations or clinical suspicion of connective tissue disease.

Radiology:

- Standard radiographs of the hands, wrists, feet, and ankles;
- Steinbrocker, Larsen, and modified Sharp–van der Heijde classifications.

4) Functional assessment:

- HAQ, NHP, SF-36.

5) Therapeutic data:

- symptomatic treatments;
- conventional and innovative DMARDs;
- local injections;
- rehabilitation;
- surgery (if indicated).

2.5. Statistical Analysis

Data were analyzed using SPSS version 20. The chi-square test was used, with a significance threshold set at $p < 0.05$.

3. Results

3.1. Epidemiological Data

A total of 5000 rheumatology consultations were analyzed during the study period, allowing the identification of 211 cases of rheumatoid arthritis (RA), representing a prevalence of 4.22%. The disease predominantly affected women (86.3%, sex ratio = 0.15). The mean age at diagnosis was 44.45 years (range 12 - 90 years), with a predominance in the 41 - 50-year age group (23.7%).

3.2. Clinical Data

Medical history: spontaneous abortions (32.2%), hypertension (11.5%), tobacco use (6.7%), primary infertility (4.3%), diabetes (2.9%), sickle-cell disease (1.9%).

Diagnostic delay: 72.42 months (≈6.5 years).

Articular manifestations: polyarthritis (93.8%), symmetrical involvement (90.3%), deformities (61%), ankylosis (52.2%), mean TJC (10.31), mean SJC (2.53), morning stiffness (41.9 minutes).

Characteristic deformities: boutonnière deformity (36.3%), swan-neck deformity (15.2%), ulnar deviation (8.8%), Z-shaped thumb (7.8%), camel-back deformity (7.8%).

General signs: asthenia (23.6%), fever (5.3%), weight loss (1.9%). The detailed articular manifestations are summarized in Table 1.

3.3. Extra-Articular Manifestations

Alopecia (12%), myalgia (6.3%), cough (6.3%), erythema (3.8%), pulmonary fibrosis (3.4%), nodules (2.4%), myocarditis (1%), pharyngitis (1%), Raynaud's phenomenon (0.5%), neuropathies (0.5%). Extra-articular manifestations are summarized in Table 2.

3.4. Paraclinical Data

Biology: inflammatory syndrome (69.2%), anemia (28.8%), thrombocytosis (16.6%), leukopenia (7.8%).

ESR/CRP: elevated ESR (74.7%), elevated CRP (65.5%).

Table 1. Articular symptoms.

Characteristic	Number	Percentage/Mean
Polyarthritis	197/210	93.8%
Joint deformities	125/205	61%
Ankylosis	107/205	52.2%
Symmetrical involvement	186/206	90.3%
Cervical pain	42/205	20.5%
Mean number of tender joints (NTJ)	207/211	10.31
Mean number of swollen joints (NSJ)	207/211	2.53
Morning stiffness	205/211	41.9 min

Table 2. Extra-articular manifestations.

Manifestation	Number	Percentage
Nodules	5/208	2.4%
Erythema	8/208	3.8%
Alopecia	25/208	12%
Myalgias	13/208	6.3%
Pulmonary fibrosis	7/211	3.4%
Cough	13/208	6.3%
Raynaud's phenomenon	1/208	0.5%
Neuropathies	1/209	0.5%
Pharyngitis	2/208	1.0%

Serum protein electrophoresis: hypergammaglobulinemia (81.8%), hypoalbuminemia (78.3%).

Immunology: The rheumatoid factor was positive in 116 of 168 patients (69%), the latex agglutination test was positive with a mean of 94.64 (range 8 - 435.39), and the Waaler-Rose test was positive with a mean of 197.60 (range 30 - 1154). ACPA was positive in 112 of 166 patients (67.5%), with a mean of 170.78 (range 0.5 - 475).

3.5. Radiological Data

Steinbrocker staging:

- Stage 1: 15.2%;
- Stage 2: 24.1%;
- Stage 3: 55.2%;
- Stage 4: 5.5%. Radiological staging according to Steinbrocker is shown in Table 3.

Modified Sharp score: joint narrowing (53.93), erosion (5.77), total score (59.69).

Table 3. Radiological findings (Steinbrocker classification).

Stage	Number	Percentage
Stage 1	22	15.2%
Stage 2	35	24.1%
Stage 3	80	55.2%
Stage 4	8	5.5%

Radiographic lesions: joint space narrowing (97.7%), bone erosions (43.1%).

3.6. Therapeutic Data

Systemic corticosteroids were used in 204 patients (96.7% of cases) with mean doses of 7.19 mg (range 2.5 - 20 mg).

Methotrexate was used in 172 cases (81.5%) with mean doses of 14.10 mg and a maximum of 25 mg per week. The distribution of treatments used is presented in **Figure 1**. No biological DMARDs were used because of their unavailability and financial constraints, and irregular treatment adherence negatively influenced outcomes.

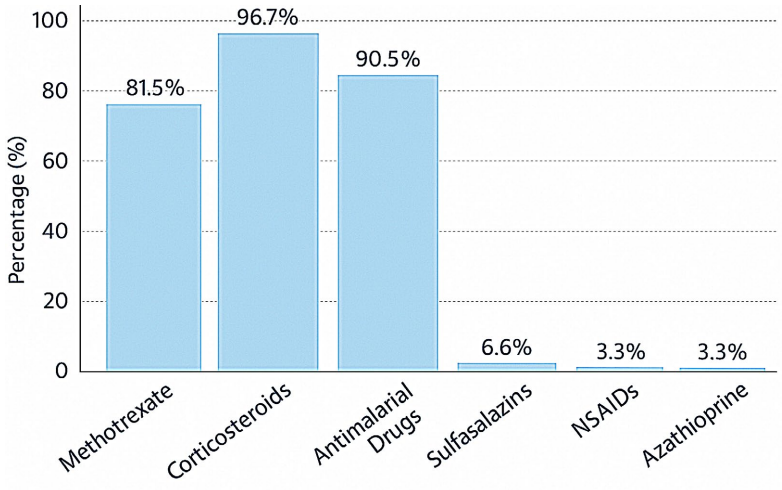

Figure 1. Treatments used in rheumatoid arthritis management, dominated by methotrexate followed by hydroxychloroquine, sulfasalazine, and corticosteroids.

3.7. Evolutionary Data

DAS28: initially high or moderate disease activity; progressive improvement under regular methotrexate; persistent activity among non-adherent patients. Remission was noted in 5 patients (6.3%). Disease activity was low in 11 patients (13.9%). Disease activity was moderate in 45 patients (57%). Disease activity was high in 18 patients (22.8%). Disease activity according to the DAS28 score is illustrated in **Figure 2**. SF-36: significant impairment in physical and psychological domains; moderate improvement with treatment; persistently low scores in cases with structural damage. NHP: impairment in pain, fatigue, sleep, and mobility;

partial improvement with treatment; high scores in severe cases.

Structural progression: joint space narrowing (97.7%), erosions (43.1%), deformities and ankylosis causing lasting disability.

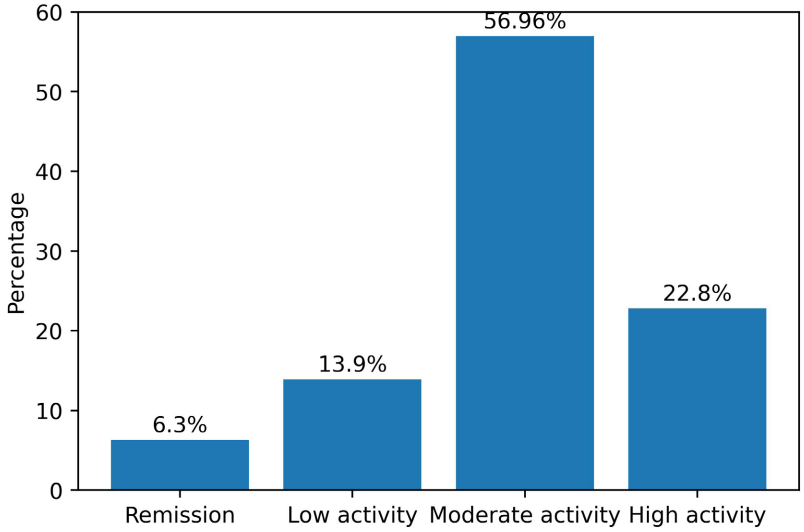

Figure 2. Distribution of rheumatoid arthritis disease activity based on DAS28 categories (High, Moderate, Low). The majority of patients present with high inflammatory activity at diagnosis, reflecting delayed consultation and limited access to early DMARD initiation.

4. Discussion

Our series of 211 cases of rheumatoid arthritis (RA) represents one of the most substantial datasets reported in Central Africa. Its prevalence of 4.22% among 5000 rheumatology consultations is at the upper limit of African estimates, which generally range from 1.5% to 4% in specialized hospital studies [13]-[16]. This variability may reflect recruitment differences in specialized centres or a genuinely high RA burden in the Chadian population.

1) Epidemiological profile and diagnostic delay

The marked female predominance (86.3%) aligns with findings from Senegal, Benin, Congo, and North Africa, where women represent 75% to 90% of cases. [17] [18]. The mean age at diagnosis (44.45 years) is similar to reports from Senegal (43 - 45 years), Congo (45 years), and Morocco (46 years) [19] [20].

A major diagnostic delay—72 months—is one of the key features of our study. This delay is substantially longer than those reported in Morocco (36 - 48 months), Benin (36 - 48 months), and remains higher than Senegalese data (54 - 72 months) [21] [22]. Such prolonged delays, typical of sub-Saharan Africa, may be explained by self-medication, limited specialist availability, restricted access to immunological testing, and lack of structured care pathways. As a consequence, advanced forms are common at diagnosis: deformities (61%), ankylosis (52.2%), and polyarticular involvement (93.8%). Similar findings have been reported in Senegal and Benin [23] [24]. Comparative data from sub-Saharan African studies are presented in **Table 4**.

Table 4. Comparison of epidemiological data on rheumatoid arthritis in sub-Saharan Africa.

Authors/Year	Country/Center	Hospital frequency (%)	Average diagnostic delay (months)	ACPA positive (%)	Access to biotherapies
Ndongo et al., 2025	Senegal—Thiès Regional Hospital 3.1	3.1	36–40	44–48	Unavailable
Garba Mahaman Salissou et al., 2019	Niger—Maradi University Hospital	3.7	~72	42.9	Unavailable
Bamba et al., 2025	Ivory Coast—Cocody University Hospital, Abidjan	2.14	~63	52.9	Not reported
Ouédraogo et al., 2024	Burkina Faso—Bogodogo University Hospital	2.84	40.5±62.6	84.47	Not used
Nonguierma et al., 2021	Guinea—Cameroon	0.090.04	~50	52.9	Not reported
Ntsiba et al., 2014	Congo—Brazzaville	2.3–3.5	~48	~60	Rare access/Unavailable
Garba Harine Abdel Aziz et al., 2024	Chad—Refoundation Hospital	4.22	72.42	67.5	Unavailable

2) Extra-articular manifestations and immunological features

Extra-articular manifestations such as alopecia (12%), pulmonary involvement (3.4%), and myalgia (6.3%) fall within the African range 2% - 15% [25] [26]. Immunological markers (RF 69%, ACPA 67.5%) are consistent with Senegalese and Moroccan data. These high positivity rates correlate with greater structural severity, as confirmed by our radiological findings [27] [28].

3) Structural severity and radiographic outcomes

A predominance of Steinbrocker stage 3 (55.2%) and a high frequency of joint space narrowing (97.7%) and erosions (43.1%) illustrate a structurally severe disease. Similar levels of radiographic damage have been reported in Congo, Benin, and Morocco [29] [30].

4) Evolutionary data: DAS28, SF-36, and NHP

a) Inflammatory activity (DAS28): Initial DAS28 scores were mostly high or moderate, reflecting substantial inflammatory activity. Similar profiles were observed in Senegal. Clinical improvement under methotrexate parallels findings from Benin and Morocco.

b) Quality of life (SF-36): Significant impairment was noted in physical functioning, pain, and activity limitation, consistent with Tunisian and Moroccan studies.

c) Functional impairment (NHP): Major impairments in pain, sleep, fatigue, and mobility were observed, similar to results in Senegal and Tunisia [31] [32].

5) Therapeutic management: African context

Therapeutic strategies relied mainly on methotrexate (81.5%), hydroxychloroquine, sulfasalazine, low-dose corticosteroids, and NSAIDs, consistent with African practice. The absence of biologics remains a major limitation due to high cost, lack of health insurance, unavailability, and absence of national RA care programs

[33]-[36].

5. Limitations of the Study

This study has several limitations. Its monocentric and retrospective design exposes it to selection bias, particularly towards moderate-to-severe cases referred to a specialized rheumatology department. The availability of immunological tests was variable, which may have influenced the observed seropositivity rates. In addition, disease activity indices and functional scores were not systematically available for all patients because of socioeconomic constraints. Nevertheless, these limitations reflect real-life conditions in sub-Saharan Africa and underline the relevance of our data for routine clinical practice in the region.

RA in Chad is diagnosed late, clinically active, radiologically destructive, and functionally disabling. Early detection, continuous access to DMARDs, and progressive introduction of biologic therapies are necessary to improve patient outcomes.

6. Conclusion

This study, involving 211 cases of rheumatoid arthritis, represents one of the largest series reported in Chad. It reveals a disease that is often diagnosed at a late stage, with an average diagnostic delay of more than six years and a high frequency of severe, deforming, and disabling forms. Biological and immunological data confirm high disease activity, while radiological findings demonstrate advanced joint destruction. Management remains dominated by methotrexate, hydroxychloroquine, and low-dose corticosteroids, in a context marked by the total absence of biologic therapies and irregular treatment adherence. These findings highlight the urgent need to strengthen early detection through training of primary-care physicians to recognize early inflammatory arthritis and to refer patients promptly to rheumatology services. In parallel, patient education programs focusing on treatment adherence and early recognition of warning symptoms could help reduce diagnostic delays and prevent irreversible disability. Finally, expanding access to conventional DMARDs and progressively implementing national strategies for the introduction of biologic therapies should be considered a priority for improving the prognosis of rheumatoid arthritis in Chad.

Authors' Contributions

All authors contributed significantly:

-Study conception and methodology: Garba Harine Abdel Aziz.

-Data analysis: All authors.

-Manuscript writing: Garba Harine Abdel Aziz.

-Critical revision: All authors.

All authors approved the final manuscript.

Data Availability

Data are available upon reasonable request from the corresponding author.

Ethical Approval

The study protocol was conducted with due regard for patient anonymity and confidentiality. Authorization to collect and use data was obtained from the management of the Refoundation Hospital of Chad and the research director of the Faculty of Human Health Sciences at the University of N'Djamena. Informed oral consent was obtained during consultations.

Conflicts of Interest

The authors declare no conflicts of interest.

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