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When Health Systems Fail: Advanced Rheumatoid Arthritis with Permanent Joint Deformities - A Two Case Reports from Tanzania

Mwambela A[1]*, Mwantake M[1], Shirima L[1], Mhere E[2] and Ngarawa K[2]

[1]Department of Internal Medicine, St. Francis University College of Health and Allied Sciences (SFUCHAS), Morogoro, Tanzania

[2]Department of Internal Medicine, Morogoro Regional Referral Hospital (MRRH), Morogoro, Tanzania

Corresponding author:** *Ally Mwambela, Department of Internal Medicine, St. Francis University College of Health and Allied Sciences (SFUCHAS), P.O.Box 75, Ifakara, Tanzania;* ***Tel: *+255 620 429 401;* ***Email:*** *allymwambela2000@gmail.com*

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Abstract

Rheumatoid Arthritis (RA) is a chronic inflammatory disease for which early diagnosis and prompt initiation of disease-modifying anti-rheumatic drugs (DMARDs) within a critical "window of opportunity" are essential to prevent irreversible joint damage. In low- and middle-income countries (LMICs), health system limitations often delay diagnosis and restrict access to effective therapy, resulting in preventable disability. We report two elderly female patients (62 and 68 years) from Tanzania who presented with advanced RA after diagnostic delays of five to six years. Both exhibited severe, permanent joint deformities, including metacarpophalangeal and swan-neck deformities, leading to functional immobility. Key diagnostic tests (e.g., anti-citrullinated protein antibodies) and first-line DMARDs were unavailable at initial points of care, restricting management to symptomatic relief with NSAIDs and PPIs. These cases highlight the consequences of systemic diagnostic and therapeutic gaps in resource-limited settings and underscore the intersection of clinical, social and structural barriers that perpetuate disability. They provide a compelling illustration of how delayed recognition and limited access to essential interventions transform a treatable disease into a disabling condition. Strengthening early arthritis recognition, decentralizing basic diagnostics and ensuring equitable access to affordable DMARDs at primary care levels are critical to mitigating irreversible disability and improving quality of life in LMIC populations.

Keywords: Rheumatoid Arthritis; Diagnostic Delay; Permanent Disability; Health Systems; Resource-Limited Settings; Joint Deformity

Introduction

Rheumatoid arthritis (RA) is a chronic, systemic autoimmune disease characterized by persistent synovial inflammation that progressively leads to cartilage destruction, bone erosion, functional disability, and increased mortality if inadequately treated [1]. Over the past two decades, advances in rheumatology have fundamentally transformed disease outcomes through early diagnosis and prompt initiation of disease-modifying anti-rheumatic drugs (DMARDs). Central to this paradigm is the concept of the "window of opportunity," a critical therapeutic period typically within the first three to six months following symptom onset during which early intervention can significantly halt disease progression and prevent irreversible joint damage [2].

Despite these therapeutic advances, the global burden of RA-related disability remains substantial and is disproportionately concentrated in Low- and Middle-Income Countries (LMICs). Health systems in many

LMICs face structural constraints that impede timely diagnosis and treatment of inflammatory arthritis. These constraints include a severe shortage of trained rheumatologists, limited availability of essential diagnostic investigations such as anti-citrullinated protein antibodies (ACPA/anti-CCP), inadequate imaging capacity and inconsistent access to affordable first-line DMARD therapy [3,4]. As a result, patients in resource-constrained environments frequently experience prolonged diagnostic delays and suboptimal disease management, ultimately leading to preventable disability and profound socioeconomic consequences.

Sub-Saharan Africa exemplifies this disparity, where rheumatology services remain scarce and health systems often lack the infrastructure necessary for early arthritis recognition and management. In Tanzania, published clinical evidence describing the downstream consequences of delayed rheumatoid arthritis diagnosis remains limited, despite increasing recognition of the disease burden in the region. This gap in the literature limits understanding of how systemic barriers within healthcare delivery pathways contribute to late-stage disease presentation and irreversible joint destruction [5].

Importantly, delayed diagnosis of RA in such settings is rarely attributable to patient factors alone but frequently reflects broader systemic deficiencies, including fragmented referral pathways, limited diagnostic capacity at primary care levels and restricted access to essential medications. These structural limitations collectively undermine the timely identification and management of inflammatory arthritis, transforming a treatable disease into a lifelong disabling condition.

The present case series describes two elderly female patients presenting to a referral center in Tanzania with advanced rheumatoid arthritis characterized by severe, irreversible joint deformities following prolonged diagnostic delays of five to six years. Beyond their clinical relevance, these cases illustrate a broader systemic breakdown in the diagnostic and therapeutic continuum of care in resource-limited settings. By highlighting the intersection between diagnostic delay, limited treatment availability and irreversible disability, this report underscores the urgent need to strengthen early arthritis recognition, improve access to essential diagnostics and DMARD therapy and reinforce referral systems within LMIC health systems.

Case Report

A. Patient 1: A 62-Year-Old Female with Five-Year Delay and Fixed Finger Deformity

A 62-year-old female presented with a five-month history of severe, painful hand joints and the inability to voluntarily flex the second digit of both hands. She reported having experienced waxing and waning joint pain and discomfort for approximately five years prior to presentation. During this time, she engaged in regular self-medication with over-the-counter analgesics, having sought care at multiple local health facilities without receiving a definitive diagnosis or sustained treatment. Her pain was notably worse in the early morning, accompanied by prolonged morning joint stiffness and significant functional limitation. The patient denied any family history of joint disease, alcoholism, or cigarette smoking.

On physical examination, the patient had marked, fixed joint deformities observed at the bilateral proximal and distal interphalangeal joints of the second digit, consistent with advanced joint fusion. Similar fixed changes were noted in the interphalangeal joints of the second toes bilaterally. The affected joints were immobile and non-tender on partial passive manipulation due to the severity of the damage (Figure 1).

Laboratory investigations showed mild lymphocytosis on a Full Blood Picture (FBP) and a significantly raised Erythrocyte Sedimentation Rate (ESR) 54 mm/hr (15-20mm/hr), indicative of chronic inflammation. Rheumatoid Factor (RF) was reactive. The critical diagnostic marker, ACPA (anti-CCP), was unavailable at the facility due to resource limitations. Based on the clinical presentation, duration of symptoms (5 years), joint involvement (small and large joints) and elevated acute phase reactants (ESR), the patient met the ACR/EULAR/2010 for RA with a score of 7/10, confirming the diagnosis.

Given the absence of Disease-Modifying Anti-Rheumatic Drugs (DMARDs) and specialized surgical or rheumatologic services, the patient was managed only symptomatically with Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) for pain relief, co-administered with a Proton Pump Inhibitor (PPI) for gastroprotection. The patient was thoroughly counseled on the advanced nature of her disease and referred to a tertiary care hospital for potential DMARD initiation and specialized management, which may now be limited to managing complications due to the fixed deformities.

B. Patient 2: A 68-Year-Old Female with Six-Year Delay

A 68-year-old woman presented with a seven-month history of progressive, debilitating joint pain, swelling and severe functional limitation affecting both hands. The patient reported that her joint symptoms began approximately six years ago, initially affecting the

Figure 1: Fixed Joint Deformities in Patient 1.
(a) Clinical presentation of the hand demonstrating marked, fixed joint deformities, consistent with advanced joint fusion, observed at the second digit's distal interphalangeal joints. Red arrows indicate the site of the fixed deformity and functional limitation. (b) and (c) Fixed changes noted in the interphalangeal joint of the second toe, characterized by immobility and non-tender passive manipulation. The red arrow highlights the location of the fused joint.

small joints of the hands before progressing to the knees. The pain was described as persistent and dull, accompanied by morning stiffness lasting more than one hour. Like the first case, she had been self-medicating with over-the-counter analgesics and herbal remedies for years without sustained relief and had received non-specific treatment from various facilities. The patient denied any family history of autoimmune disease, smoking, or alcohol use.

The patient was in mild distress. Examination revealed classic, advanced features of late-stage RA, including visible deformities of both hands characterized by swan-neck deformities of the second and third digits bilaterally (Figure 2X). A single, firm, non-tender rheumatoid nodule was palpable over the left big toe (Figure 2Y).

Laboratory investigations demonstrated an elevated ESR 45mm/hr and a positive Rheumatoid Factor result. A mild normocytic anemia was noted on FBP. Uric acid testing was also performed and the result was within the normal range. CRP and all radiographic investigations were unavailable at the facility due to significant resource limitations. Despite these limitations, the clinical presentation, this evidence, the patient met the ACR/EULAR 2010 classification criteria for Rheumatoid Arthritis with a total score of 8/10, derived by allocating 3 points for the polyarthritis involving multiple small and medium joints (hands and knees), 3 points for the positive serology (RF), 1 point for the evidence of systemic inflammation (elevated ESR)and 1 point for the disease duration exceeding six weeks, The diagnosis was confirmed with advanced deformities resulting in permanent functional disability.

Given the absence of DMARDs and specialized rheumatologic follow-up, management was limited to symptomatic treatment: NSAIDs for pain control and PPI for gastroprotection. The patient received counseling on joint care and was advised on gentle physiotherapy before being referred to a higher-capacity tertiary hospital for definitive rheumatologic and potential surgical consultation (Table 1).

Discussion

This case series highlights a profound and often under-recognized health system disparity in the management of rheumatoid arthritis (RA) in

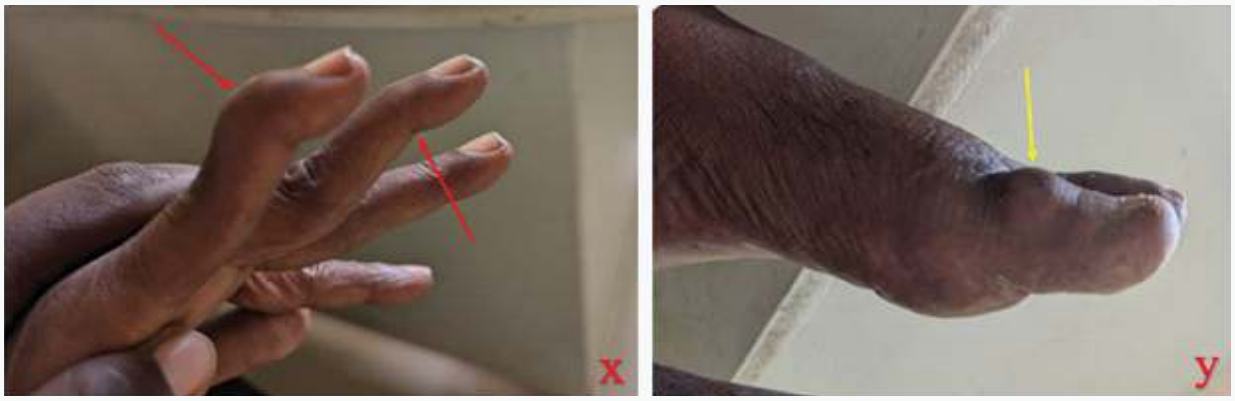

Figure 2: Advanced Joint Deformities in Patient 2.
(2X) Clinical photograph of the hand demonstrating characteristic advanced features of Rheumatoid Arthritis, specifically visible swan-neck deformities of the second and third digits. Red arrows indicate the site of the chronic fixed deformities. (2Y) Close-up view of the foot showing a rheumatoid nodule (indicated by the yellow arrow) located over the first metatarsophalangeal (MTP) joint.

Table 1: Summary of Diagnostic Investigations and Results for the Two RA Patients.

Investigation	Patient 1 (62 years)	Patient 2 (68 years)	Availability / Limitation
Full Blood Picture (FBP)	Mild lymphocytosis	Mild normocytic anemia	Available
Erythrocyte Sedimentation Rate (ESR)	54 mm/hr (↑; normal 15–20 mm/hr)	45 mm/hr (↑; normal 15–20 mm/hr)	Available
Rheumatoid Factor (RF)	Positive	Positive	Available
Anti-Citrullinated Protein Antibody (Anti-CCP / ACPA)	Not done	Not done	Unavailable due to resource limitation
C-Reactive Protein (CRP)	Not done	Not done	Unavailable due to resource limitation
Uric Acid	Not done	Normal	Partially available
Plain Radiographs (X-ray)	Not done	Not done	Unavailable due to resource limitation
ACR/EULAR 2010 Classification Score	07-Oct	08-Oct	Based on clinical and limited labs

resource-constrained environments. Both patients experienced diagnostic delays of five to six years—far exceeding the critical therapeutic "window of opportunity" during which early initiation of disease-modifying anti-rheumatic drugs (DMARDs) can prevent irreversible joint damage. Such prolonged delays inevitably resulted in advanced joint destruction and permanent functional disability, severely compromising the patients' quality of life and future therapeutic prospects [1,2]. These cases therefore illustrate how systemic constraints within healthcare delivery pathways can transform a treatable inflammatory disease into a disabling lifelong condition.

Several interconnected structural barriers contributed to this outcome. First, diagnostic scarcity remains a major limitation in many low-resource settings. Although both patients were rheumatoid factor (RF) positive, the unavailability of anti-citrullinated protein antibody (ACPA/anti-CCP) testing significantly constrained diagnostic certainty and risk stratification. ACPA is not only highly specific for RA but also serves as a prognostic marker associated with aggressive and erosive disease, often

guiding the early initiation of intensive therapy [5]. Similarly, the absence of key inflammatory markers such as C-reactive protein (CRP) and the limited availability of radiographic imaging at initial points of care hinder objective assessment of disease activity and structural damage, further delaying appropriate clinical decision-making.

Second, these cases demonstrate a clear pattern of therapeutic inertia driven by structural resource limitations. Even after clinical features strongly suggested rheumatoid arthritis, the absence of essential DMARDs particularly methotrexate, the globally recommended first-line therapy restricted management to symptomatic treatment with non-steroidal anti-inflammatory drugs (NSAIDs). This reflects a fundamental gap in treatment capacity within parts of the healthcare system, where clinicians may recognize the disease but lack access to the medications required to modify its course [6]. Consequently, patients remain exposed to ongoing inflammatory activity, progressive joint destruction, and escalating disability.

The clinical consequences of these systemic failures are evident in the advanced deformities observed in both patients. Fixed metacarpophalangeal joint destruction and classic swan-neck deformities indicate longstanding uncontrolled disease. At such advanced stages, the therapeutic objective shifts from preventing joint damage to managing irreversible complications and maintaining residual function. Although surgical reconstruction, joint replacement, and comprehensive rehabilitation may offer partial functional improvement, their feasibility in resource-limited settings is often constrained by cost, technical complexity, and limited specialist availability [7,8].

An additional dimension highlighted by these cases is the intersection of gender, age, and social vulnerability in the context of chronic disease management. Rheumatoid arthritis disproportionately affects women, and in many low-resource environments elderly women may face compounded barriers to timely healthcare access, including economic dependency, limited decision-making autonomy, and reduced access to specialized medical services. These social determinants may further contribute to delayed diagnosis and inadequate disease management, reinforcing existing health inequities [9].

Collectively, these observations suggest that the burden of RA-related disability in low- and middle-income countries is not solely a clinical issue but a manifestation of broader structural weaknesses within health systems. Limited diagnostic infrastructure, inconsistent medication availability, and fragmented referral pathways create conditions in which treatable inflammatory diseases are detected only after irreversible damage has occurred. Addressing these systemic gaps is therefore essential for reducing preventable disability associated with rheumatoid arthritis.

Conclusion

These cases demonstrate the direct consequences of health system limitations on rheumatoid arthritis outcomes in resource-limited settings. Prolonged diagnostic delays, restricted access to essential investigations, and the absence of disease-modifying therapy contributed to irreversible joint destruction and permanent functional disability. Addressing this preventable burden requires strengthening early arthritis recognition at the primary care level and enabling clinicians to initiate treatment or referral based on clinical features supported by basic tests such as rheumatoid factor and erythrocyte sedimentation rate. Expanding access to affordable first-line DMARDs, particularly methotrexate, and decentralizing basic diagnostic services are essential steps. Improving early diagnostic pathways and treatment access is critical to reducing avoidable disability and advancing health equity for patients with rheumatoid arthritis in resource-constrained health systems.

Ethical Consideration

Institutional and international research regulations were observed during interacting with the patients and the preparations of the manuscript both verbal and written informed consent was obtained from the patients for the publication of this case report and the accompanying images.

Patient Perspective

Patient 2 Stated: "I wish I had known what was wrong earlier. Now I cannot even prepare food for myself or hold my grandchildren's hands properly. I hope telling my story helps others get treatment faster."

Conflict of Interest

No potential conflicts interest in relations to this study.

Authors Contributions

All Authors equally contributed to this study regarding the conception and design of the study, literature review and analysis, drafting, critical revision, editing and final approval of the final version.

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Artificial Intelligence (AI) Statement

The authors confirm that no artificial intelligence (AI) or AI-assisted tools were utilized in the conception, design, analysis, interpretation, writing, editing or revision of this manuscript. All intellectual content, data interpretation and manuscript preparation were solely conducted by the authors, who take full responsibility for the accuracy, integrity and originality of the work and its scientific contributions.

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