# Arthritis in East Africa: An Observational Study

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## Abstract

### Background

The burden of musculoskeletal (MSK) disease in East Africa remains largely unknown. Early evidence from Tanzania suggests that it may have a substantial adverse impact on health care outcomes, with both social and economic consequences. Limited data on prevalence and case mix of MSK disorders is presently available for East Africa. Data is urgently required to facilitate the planning, provision and funding of the services needed to meet population requirements here. The need is likely to be greatest among the poorer and most isolated members of the community. We describe the case mix of MSK disorders we encountered among people across five regions who had no previous access to clinical care in East Africa.

### Methods

Over a four-week period in 2022, we undertook a series of clinics in five separate locations across impoverished areas of Zambia and Kenya. These ranged from city slums to isolated rural communities. We recorded demographic features for every consultation, along with our diagnosis and intervention. We calculated the percentage of people consulting with MSK issues and describe the case mix of MSK disorders, along with interventions provided.

### Results

We completed a total of 1089 community consultations in Zambia and Kenya. Of these, a total of 271 people (24.9%) reported primary MSK issues. This population was mainly female (66%) and had a median (range) age of 58 (13-90) years. The percentage of patients who consulted with MSK issues were significantly influenced by geographic location, rising from 8% in urban areas to 52% in the most rural sites. The commonest MSK diagnoses we made at first consultation were osteoarthritis (49.8%), mechanical low back pain (27.7%) and soft tissue rheumatism (10.0%), with 3.0% having evidence of inflammatory joint disease (IJD). Therapeutic intervention was provided in 62.3% and procedures were performed in 11.4%.

### Conclusions

MSK disease appears to be a common reason for seeking medical intervention in East Africa, especially among older

females who have accumulated a significant mechanical burden from physical exertion and childbearing. Therapeutic intervention was frequently required, although smaller numbers had evidence of IJD. Increased awareness of the burden of MSK disease on poorer populations is necessary. Training programs in rheumatology are urgently required to ensure that care pathways are established with adequate funding and regular rapid access to ensure the provision of appropriate support and intervention.

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## Introduction

It appears that modern humans evolved about 300,000 years ago via merging of populations across South and East Africa, and that the rift valley was their ancestral home. Despite this, our knowledge of the burden of musculoskeletal (MSK) disease in Sub-Saharan Africa (SSA) remains extremely limited. There has been little evidence of inflammatory arthritis detected in human skeletal remains from SSA until relatively recently [1]. Clinicians have now confirmed the presence of MSK disease in SSA and highlighted the need for more data [2]. The World Health Organisation has identified that SSA has the lowest ratio of doctors to population in the world and that this shortage extends to all categories of health-care personnel [3].

The Community Oriented Program for Control Of Rheumatic Diseases (COPCORD) approach was proposed to improve data collection and standardisation in areas including SSA [4] and this approach has been adopted with success [5]. However, this suggested that most patients identified already exhibited advanced disease and deformity, and this was especially true of those living in rural or impoverished communities [5]. Although the opportunity to develop and improve rheumatological services was highlighted in 2017 [6][7], five years later there has been limited evidence of progress[8].

Some data on the case mix of MSK disorders has been made available from inpatient and outpatient hospital settings in SSA [9][10], but these are scanty and heavily influenced by accessibility and affordability. Hence, they can provide neither reliable estimates of disease prevalence, nor data on the distribution of rheumatological disease in the community.

However, a large systematic review and meta-analysis reviewing 27 studies over the forty years prior to 2015 did identify a range of MSK disorders across Africa [11]. Although twelve of the studies came from South Africa, the results revealed a significant prevalence of each of osteoarthritis (OA), rheumatoid arthritis (RA), and gout. Psoriatic arthritis (PsA) was identified in urban South Africa, while juvenile inflammatory arthritis (JIA) and ankylosing spondylitis (AS) appeared to be relatively rare throughout Africa [11].

Recent evidence from Tanzania suggests that MSK disease may have a substantial impact on health care outcomes, with both adverse social and economic consequences [12]. However, even now detailed information on the prevalence and case mix of these disorders is largely lacking in East Africa. From the limited data available, it seems likely that OA is the most prevalent MSK disorder across communities in SSA, with prevalence estimates ranging from 30% up to 83%. Rural location and increasing age appeared to be associated with the highest prevalence [11] but the threshold for diagnosis was low in several of the quoted studies. The knee appears to be the commonest site of OA with a prevalence of 33.1% reported among rural communities in South Africa. Equivalent data from other countries in SSA is scanty at present but an observational study in a hospital setting reinforced the impression that the knee is the commonest site with clinical evidence of this condition [13].

Although systemic inflammatory MSK disorders are now increasingly recognised across Africa[14], a decade ago there was very little data on the prevalence of RA in the continent [15]. Indeed, there is good evidence that RA has only been recognised in Africa within the last 65 years [1]. The community prevalence of RA ranges widely from 0.1% to 2.5% in urban populations, with lower rates in rural areas. These data were largely derived from North and South Africa [11], with a higher prevalence in urban areas and among smokers. Late presentation remains typical and the prevalence of seropositivity appears lower than in western countries [16]. A pattern of later presentation of RA, delayed diagnosis and limited management options for African patients has emerged when compared to those countries with a more developed health care system [17][18][19].

The prevalence of gout in SSA had been thought to be low until recently[20] but this disorder is now increasing within certain populations, as reported in Nigeria and Kenya, among others [21]. This is multi-factorial but associates with each of increasing obesity, urbanisation and alcohol consumption. It remains a marker for later vascular disease, especially among those with a polyarticular presentation which is not uncommon and affects the knees and ankles more often than the first metatarsophalangeal joint by contrast with the western experience [21].

There is evidence that systemic auto-inflammatory diseases are also on the rise in SSA. A recent systematic review and meta-analysis of a large hospital population calculated a prevalence of systemic lupus erythematosus (SLE) of 1.7%. Renal involvement was very high, affecting between one third and one half of patients [22]. This condition often presents late, frequently with disastrous results, often causing life-threatening end organ damage among young and middle-aged people and contributing to premature mortality. By comparison, inflammatory joint disorders in children appear rare. A recent survey of MSK disorders among those under 18 in Tanzania failed to reveal any cases, with most of the limited pathology relating to traumatic joint or bone disease with a subsequent high rate of local complications [23].

Given the limited data on prevalence and case mix of MSK disorders available within SSA, more data is urgently required

to facilitate the planning, provision and funding of the services needed to meet population requirements for clinical care. The need is likely to be greatest among the poorer and most isolated members of the community. We describe the case mix of MSK disorders we encountered among people across five impoverished regions of SSA, very few of whom had any previous access to clinical care.

## Methods

We undertook an observational study based on our clinical experience during a four-week period in 2022, when we undertook a series of clinics in five separate locations across impoverished areas of Zambia and Kenya. These ranged from city slums in Lusaka and Nakuru to isolated rural communities in both countries. Very few of the attenders at our clinics had any prior access to medical care and no medical notes were available for any patient. Two of us worked together (LB and CK), while another worked independently (CAK). CAK also assessed all other cases where diagnostic or management issues arose. Most clinics were held in school classrooms except at one very remote location centred near Siavonga in southern Zambia where there were no public buildings. Here clinics were held outdoors under the shade of two large baobab trees.

Clinical assessment was based on history and examination. As different languages were spoken at each site, a local health care worker was employed at each clinic, and served as translator, chaperone and clinical assistant. The clinicians had equipment to measure blood pressure, blood sugar, arterial oxygen saturation and to perform urinalysis. However, very limited access to any form of other investigation existed with blood tests (haemoglobin, creatinine, erythrocyte sedimentation rate [ESR] and rheumatoid factor) only available at one site. Likewise, only a single site had any facilities for radiological investigation, and even there this was confined to plain joint and spinal radiographs. No facilities for microscopy were available at any of the clinic sites.

Demographic features including age and gender were recorded for every consultation, along with the diagnosis and all therapeutic interventions. We calculated the age and gender mix, along with the percentage of people consulting with MSK issues. We defined the case mix of MSK disorders, along with all investigations and interventions provided. Patients often reported that their jpints were swollen and this was corroborated by physical examination which often showed large effusions in warm tender joints. Where clinicians judged it to be necessary, joint aspiration with or without injection of intra-articular steroids, was performed using a ‘no touch’ approach using gloves and a sterile field. Fluid obtained from joint aspiration could not be analysed locally and was sent to the nearest hospital laboratory only if sepsis was suspected. MSK diagnoses were based on validated tools, but the absence of certain investigations reduced diagnostic precision and inevitably led to a few cases where no diagnosis could be made.

Funding for the clinics and the medication was provided by the relevant charity. This was ‘Opportunities Zambia’ for the three sites in Zambia, while the Catholic Diocese of Nakuru funded clinics at the two Kenyan sites. The expenses of the three clinicians were met entirely by themselves and they were not paid for their work. Patients were given a starter pack of medication where this was required and instructed on how to renew this if necessary. They were neither charged nor

financially rewarded for attending clinics which were held on an open-ended basis without prebooked appointments. As such, clinics contained a wide range of patients in terms of both numbers and clinical case mix.

## Results

We completed a total of 1089 community consultations in Zambia and Kenya over a period of four weeks across five separate sites. Of these, a total of 271 (24.9%) people reported that their primary complaint was of musculoskeletal (MSK) origin. This group had the highest median (range) age of all categories of diagnosis at 58 (13-90) years, and 179 (66%) of these were female. The percentage of patients within each clinic area who consulted with MSK issues was significantly related to geographic location, rising from just 8% in a central urban area, to 52% in the most rural locations in both Zambia and Kenya (Table 1).

The commonest MSK diagnoses we made at first consultation are shown in Table 2. Osteoarthritis accounted for half of all cases, with the knee easily the commonest site. Generalised nodal osteoarthritis affecting the fingers and thumbs was also frequently observed, while by contrast we documented only a single case of osteoarthritis affecting the hip. Mechanical low back pain was commonly reported, accounting for a quarter of all MSK consultations, while mechanical neck pain was reported in under 3% of individuals. All these conditions were more often seen in females. Soft tissue rheumatism accounted for 10% of MSK consultations and chiefly comprised of shoulder capsulitis, carpal tunnel syndrome and tenosynovitis. Chronic widespread pain and tenderness, fulfilling ACR criteria for fibromyalgia [24], was recorded in 2.6% patients, most of whom were female. Only 8 (3%) patients met objective criteria for an inflammatory joint disease, with 6 having RA [25], and one each having Ps A [26] and AS [27]. Apart from a single patient reporting a prior diagnosis of RA, these were all new diagnoses made by us in clinic and were based on history, examination and a limited range of investigations. Two patients gave a classic history of a reactive arthritis following recent documented infection. Radiology was arranged in 5 patients, inflammatory markers were measured in 4 and serology was ordered in 2 patients. We used the results of all investigations to classify diagnosis for these patients.

Just 3 (1%) patients had clear clinical evidence of gout with tophi. This could well represent an underestimate as we were not able to access polarising light microscopy to examine synovial fluid for uric acid crystals. For similar reasons, the diagnosis of pyrophosphate arthropathy could not be made with any certainty. Given the large number of patients with sizeable knee joint effusions which we often aspirated, we might easily have misdiagnosed crystal arthropathy as inflammatory osteoarthritis in a significant number of cases. Soft tissue rheumatism was also diagnosed exclusively on clinical grounds. Carpal tunnel syndrome (CTS) was diagnosed on the basis of appropriate symptoms associated with thenar wasting, sensory discrimination and a positive circle test.

Two further patients had septic arthritis and required us to arrange urgent hospital admission for drainage and intravenous antibiotics. One other patient required oral antibiotics for an infected bursitis. One patient had classic giant cell arteritis with grossly elevated ESR. We were unable to make a confident diagnosis in a total of 11 (4%) patients.

Table 3 documents the therapeutic intervention offered to all patients presenting with features of MSK disorders. Non-

steroidal anti-inflammatory drugs (NSAIDs) were provided to around half of all patients, with simple analgesia given to a further 15%. In 31 (11%) patients with clinical evidence of a joint effusion, we aspirated synovial fluid for therapeutic purposes. The majority of these (25) were given an intra-articular steroid (IAS) injection for symptomatic relief. The knee was the commonest site requiring a procedure, with two patients needing IAS to the wrist and one each to the shoulder and ankle. For patients with IJD, oral steroids were often provided for a short period. Those with RA were offered hydroxychloroquine which was accepted by 4 patients. The single patient with GCA was given high dose steroids and an urgent review was requested at the nearest hospital.

## Discussion

Our study shows that MSK disease accounted for a quarter of all community consultations among those residing in poverty in East Africa. By comparison with those who consulted for other indications, people with MSK concerns were more likely to be older, female and to live in a rural location with little access to any medical care. Females are often responsible for much of the manual work in rural Africa, frequently expected to plant and harvest food crops, as well as prepare the food for their family. This is in addition to their role as mothers which they often conduct in tandem with manual labour, carrying their younger children on their backs. It is no surprise that they often accumulate a significant mechanical burden from the combination of physical exertion and childbearing. Such demands often commence at a young age and remain common practice in rural East Africa where motorised vehicles and mechanical aids are a rarity.

Osteoarthritis of the knees was the commonest presentation of articular disease and was associated with considerable impairment of function. Although we did not formally quantify this, many people described being unable to work, or even to walk, as the result of pain and associated swelling. In the absence of investigations such as X ray and polarising light microscopy, the presence of a secondary crystal arthropathy could not be excluded or confirmed. However, affected joints frequently yielded 50 millilitres of viscous synovial fluid when aspirated and patients reported dramatic benefit from the introduction of an intra-articular steroid preparation, as evidenced by later feedback to the local study coordinators. People who had no knee effusions were treated with NSAIDs. Previous work has confirmed that those of African heritage are more prone to degenerative disease in the knees [28][29][30] and suggested that this might be influenced by genetic factors. By contrast, we saw only one case of osteoarthritis of the hips. The reasons for this observed difference are not entirely understood, but the structure and function of the hip joint in Africans may differ from Caucasians which could offer some protection from later degenerative disease. However, one study has suggested that African Americans are more prone to radiological evidence of cartilage loss in the superior hip [31] although this may not correlate with clinical signs, symptoms or disability.

The lumbar spine was another common source of symptoms among those who consulted us. Degenerative disc disease was frequently associated with reduced movement and with features of nerve root irritation. Again, the absence of investigations made detailed assessment difficult but there was a striking difference between the number of cases of mechanical lumbar and cervical origin. Indeed, there were few complaints of neck pain among women despite the tendency to carry heavy objects on their heads from an early age. We theorise that the neck muscles compensated and

added to the capacity for loading bearing in the cervical area, preserving good posture in the upper spine. By comparison, an exaggerated lumbar lordosis was usually observed in women with low back pain and may be an adaptation to carrying a succession of babies over a prolonged period. Radiological evidence again supports the finding of increased degenerative disease in the lumbar spine among African women [32].

The number of people in whom we were able to make a confident diagnosis of inflammatory joint disease was relatively low, although six people did meet criteria for RA. There is evidence that this condition is less common in rural Africa and is concentrated in urban areas [14][15][16]. In the absence of confirmatory investigations, this may be an under-estimate of the number of cases among those who consulted us, and our data cannot be used to assess the prevalence of any of the conditions we encountered. There are clearly many present challenges to the provision of modern rheumatological care in rural East Africa. These include access to adequate training for local health care providers, limited access to and affordability of investigations and very limited therapeutic options. Few African countries have a registry of the use of biologic agents in RA (South Africa, Egypt, Algeria and Morocco) and some still have no access to any biologic treatments.

We worked alongside several local doctors and other health care workers in clinics to train them in the process of diagnosing and managing MSK disease and they were all enthusiastic and rapid learners. However, the management of IJD's and systemic connective tissue disorders like SLE require considerable experience and access to prescribing and monitoring services which are not always easily provided or afforded in the areas where we were working. Our experience suggests that some patients with SLE do not present as early as they do in other countries. Expanding training and education for health care staff must be made a high priority in SSA. Many people with RA present with advanced articular or systemic disease and patients with SLE often present with end organ damage or renal failure. The opportunity to intervene more effectively at an earlier stage would be enhanced by greater population awareness. A screening program to look for proteinuria and systolic hypertension among young women may yield dividends but requires a significant investment in public health.

Soft tissue MSK complaints accounted for 10% of all rheumatological consultations. Conditions like shoulder capsulitis and CTS usually respond well to low-cost interventions, but again require a degree of expertise and investment to provide this. Less amenable to a one-off intervention is chronic pain, and we did encounter a few cases, usually in the context of fibromyalgia. The complex interaction between physical and psychological factors involved is more difficult to address in rural East Africa than in the UK.

Gout is becoming commoner and more readily recognised in SSA as risk factors for this increase. Again, this is less of a feature in poorer rural areas where obesity and alcohol excess are less common. Increased awareness of this eminently treatable disorder amongst both the population and health care staff is warranted. By contrast, both psoriatic arthritis and ankylosing spondylitis were rare among the population attending our clinics, and this observation is supported by the published evidence from elsewhere in Africa [11]. Infection still plays a part in the morbidity associated with MSK disease, but we were surprised at the relative lack of serious infective complications affecting bones and joints among the population we saw. Direct articular infection was rare, while reactive arthritis was associated, as expected, with prior

suspected streptococcal or sexually acquired infection. Again, awareness of these complications is important, especially among a population where HIV infection, brucellosis and tuberculosis are all still quite prevalent in the community. There are several obvious limitations of our study, including the difficulty in accessing investigations to clarify and confirm clinical diagnoses. No conclusions about prevalence can be made from the observational data we collected. Several types of autoimmune disease could not be diagnosed with any confidence, under such circumstances. Thus, conclusions relating to SLE and other connective tissue disorders could not be drawn from our data. Africa faces several medical challenges including underfunded public health and medical management, inefficient utilisation of resources, shortage of health care staff, and the lack of support for rural populations [33][34]. The gaps in care for NCDs are becoming increasingly well recognised [35].

Given that we have documented significant numbers of people with life limiting MSK disorders in East Africa, more investment in training and education is indicated for health care workers in this region. Whilst rheumatological services are now developed in Kenya and Tanzania, they remain almost exclusively city centric. Many rural dwellers are unaware of the need to seek help from medical staff and still opt to see the local witch doctor or try herbal remedies. This adds to the complications that accompany delayed diagnoses. As therapeutic intervention is frequently indicated, and usually effective, a significant expansion of services for MSK disease is indicated in East Africa and this must include improved access to investigations and to drug treatment. Such an approach should include recruitment and training of nurses, physiotherapists, and pharmacists into a wider multi-disciplinary team to provide more cohesive care for a population who may not be aware of the need or opportunity to seek medical help. Hence, management of these issues should also target patient populations at the systemic level as opposed to individualized treatment.

## Conclusions

MSK disease appears to be a common reason for seeking medical intervention in East Africa, especially among older females who have accumulated a significant mechanical burden from physical exertion and childbearing. Therapeutic intervention is frequently required, and although we detected small numbers with IJD, the true prevalence of inflammatory and auto-immune disorders requires a more detailed approach. Increased awareness of the burden of MSK disease on poorer populations in Africa is necessary. Training programs in rheumatology are urgently required to ensure that care pathways are established with adequate funding and regular rapid access to ensure the provision of appropriate support and intervention.

## Tables

**Table 1. The number (percentage) of patients presenting with musculoskeletal symptoms compared to their geographic location**

| | |
|---|---|
| ZAMBIA | |
| Kabanana (city slum) | 45 (8%) |
| Chomwe (sub-urban) | 53 (18%) |
| Siavonga region (very isolated and accessible only by boat) | 114 (52%) |
| KENYA | |
| St Anthony's clinic near Nakuru (sub-urban) | 29 (26%) |
| Momoi farm at Mbogoini (very isolated and rural) | 30 (50%) |

**Table 2. The number (percentage) of musculoskeletal conditions (MSK) diagnosed in 271 patients presenting with MSK symptoms. Percentages of patients identifying as female are shown in square brackets [%].**

| | |
|---|---|
| Degenerative spinal disease | 75 (27.7%) [**82%**] |
| Generalised OA | 73 (26.9%) [**72%**] |
| OA knees | 62 (22.9%) [**71%**] |
| Soft tissue problems (Capsulitis, CTS, tenosynovitis) | 27 (10.0%) [**52%**] |
| Inflammatory joint disease | 8 (3.0%) [**88%**] |
| Fibromyalgia | 7 (2.6%) [**86%**] |
| Gout | 3 (1.1%) [**0**] |
| Reactive arthritis | 2 (0.7 %) [**0**] |
| Infection | 2 (0.7 %) [**0**] |
| Giant cell arteritis | 1 (0.4%) [**100%**] |
| No diagnosis made | 11 (4.1%) |

**Table 3.** A List of Treatments Administered to 211 / 271 Patients

| | |
|---|---|
| Non-steroidal anti-inflammatory drugs | 125 (46.1%) |
| Joint aspiration with steroid injection | 25 (9.2%) |
| Joint aspiration without steroid injection | 6 (2.2%) |
| Oral steroids | 6 (2.2%) |
| Hydroxychloroquine | 4 (1.5%) |
| Antibiotics | 3 (1.1%) |
| Analgesia | 42 (15.6%) |

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