



Ward, K., Madanhire , T., Marenah , K., Micklesfield , L. K., & Gregson, C. L. (2024). Disparities in fragility fracture and osteoporosis care in Africa. *The Lancet Diabetes and Endocrinology*, 12(5), 294-296. [https://doi.org/10.1016/S2213-8587\(24\)00073-1](https://doi.org/10.1016/S2213-8587(24)00073-1)

Peer reviewed version

License (if available):
CC BY

Link to published version (if available):
[10.1016/S2213-8587\(24\)00073-1](https://doi.org/10.1016/S2213-8587(24)00073-1)

[Link to publication record in Explore Bristol Research](#)
PDF-document

This is the accepted author manuscript (AAM) of the article which has been made Open Access under the University of Bristol's Scholarly Works Policy. The final published version (Version of Record) can be found on the publisher's website. The copyright of any third-party content, such as images, remains with the copyright holder.

University of Bristol - Explore Bristol Research

General rights

This document is made available in accordance with publisher policies. Please cite only the published version using the reference above. Full terms of use are available:
<http://www.bristol.ac.uk/red/research-policy/pure/user-guides/ebr-terms/>

Disparities in fragility fracture and osteoporosis care in Africa

Kate A. Ward ^{1,2}, Tafadzwa Madanhire ^{3,4}, Kebba Marenah ⁵, Lisa K. Micklesfield ⁶, Celia L Gregson ^{3,7}

¹ MRC Lifecourse Epidemiology Centre, University of Southampton, Southampton, England, SO16 6YD, UK

²MRC Unit The Gambia, London School of Hygiene and Tropical Medicine, Banjul, The Gambia

³The Health Research Unit Zimbabwe, Biomedical Research and Training Institute, Harare, Harare Province, Zimbabwe

⁴ Department of Infectious Disease Epidemiology, Faculty of Epidemiology and Population Health, London School of Hygiene and Tropical Medicine, London, UK

⁵ Department of Orthopaedics & Trauma, Edward Francis Small Teaching Hospital, Banjul, The Gambia

⁶ SAMRC/Wits Developmental Pathways for Health Research Unit, School of Clinical Medicine, Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, South Africa

⁷ Musculoskeletal Research Unit, University of Bristol, Bristol, England, BS10 5NB, UK

Over coming decades, Africa is predicted to experience the greatest rise in **the number of** older people, who, in this region, spend longer living with disability and dependence than do those in high-income settings, impacting individuals, families, communities, and healthcare systems in some of the most resource-poor countries. As well as shifting demographics, rapid urbanisation, double and triple burdens of malnutrition, changing physical activity patterns, workplace environments, and climates change contribute to the growing prevalence of non-communicable diseases ¹. NCDs include cardiometabolic and musculoskeletal diseases, which often coexist as multimorbidity, along with communicable diseases such as HIV – an emerging chronic disease of ageing. Growing evidence shows HIV and its treatment are important risk factors for fracture².

In the Global Burden of Disease study, fragility fractures and osteoporosis (defined as low bone mineral density (BMD) and structural deterioration of bone) contribute to ‘other’ musculoskeletal disorders, yet their important contribution to the rising prevalence of injury- and fracture-related disability, morbidity and mortality is increasingly recognised ³. To date, lack of awareness and hence healthcare prioritisation in Africa, plus a high income country-led focus on specialist techniques to assess BMD (that are unavailable across much of Africa), has likely led to wide-spread under-reporting of morbidity (e.g., disability) and mortality associated with fragility fractures, inevitably creating inequity in fracture prevention and care provision ³.

Fractures of the proximal femur (hip) present a particular challenge to functional ability and survival. Hip fracture incidence is projected to double in South Africa between 2020-2050; a rise which will be seen across West, East and Southern African countries as populations continue to age and transition economically^{4 5}. In Black South African women and men, fracture outcomes are poorer, with much higher morbidity and mortality than is seen in other countries⁶. Harmonisation of cohorts across South Africa, The Gambia, and Zimbabwe, confirmed that osteoporosis and osteopenia are just as common in ageing Black African populations, as their similarly aged US counterparts¹. Healthcare systems, increasingly managing age-related multimorbidity, need to adapt to manage osteoporosis and prevent fragility fractures, for example HIV services managing post-menopausal women should be routinely assessing fracture risk. Without such changes, exacerbating health inequities will continue to grow for ageing populations in these settings.

Solutions lie in improving clinical awareness, primary care and specialist training, and expansion in access to potentially innovative diagnostic, treatment and rehabilitation services. Traditionally an osteoporosis diagnosis requires a dual energy X-ray absorptiometry (DXA) scan confirming a BMD T-Score ≤ -2.5 (using internationally defined thresholds for diagnosis^{1,7}). Furthermore, DXA scanners are expensive, require specialist support, reliable electricity supply, and are very few (just three in Zimbabwe; population 15.2 million). Where they are available, costs can prove prohibitive to public healthcare users⁸. Additionally, as most people who sustain a fragility fracture have a femoral neck BMD T-Score greater than -2.5 , i.e., not in the osteoporotic range consideration of the many clinical risk factors besides BMD, for fragility fracture risk, is key. Widespread DXA scanning provision is not practical in resource-constrained public healthcare settings; hence, validation of methods for non-specialist fracture risk assessment should be a priority; options including FRAX[®], Garvan and the vertebral fracture risk assessment calculator (VFRAC). Validation will necessitate collection of robust epidemiological data for fracture prevalence and incidence in different populations across Africa. Furthermore, evidence is lacking for the role of additional context-specific clinical risk factors such as HIV infection, which are likely to be important beyond age, BMD, prior fracture and alcohol intake (for

men) ⁹. There will be few data regarding parental fracture in many populations due to historically low life expectancy. Further, research is needed to validate these new fracture risk assessment tools in African populations.

A further inequality stems from differences in provision within public and private health care services where access to medicines, used commonly in high income countries for primary and secondary fracture prevention, is most often only possible in private healthcare systems. This largely reflects lack of prioritisation of osteoporosis medicines, as being 'essential', by the WHO. Where private healthcare plans exist in South Africa, osteoporosis is not considered a primary medical benefit, hence there is no incentive to assess and treat fracture risk, though those with more comprehensive medical insurance are reimbursed in the case of severe osteopenia, osteoporosis and fracture⁸. Medical pluralism is also common, particularly in West Africa where traditional bone setters are usually the first point-of-contact on a complex care pathway, which can result in treatment delays. Equitable access to affordable osteoporosis and fracture treatment should be a priority for health care providers and policy makers.

The ultimate clinical manifestation of osteoporosis is a fragility fracture. Much of the available literature in Africa has been under powered to estimate fracture prevalence or incidence. Except for South Africa, there remains a paucity of robust epidemiological data to evidence the rise in fragility fractures and to determine context-specific clinical risk factors. Notably, of 131 fracture liaison services surveyed globally in 2020, only one was operational (in South Africa) across Western, Eastern and Southern Africa ¹⁰.

In conclusion, ageing populations in Africa do not have equitable access to diagnostic and treatment options to reduce future fragility fracture risk and subsequent disability. Given the predicted exponential rise in demand placed by osteoporosis and fragility fractures on already stretched healthcare systems, this must be given attention. Awareness is certainly increasing, with recognition of the importance of appropriate diagnostic and management pathways. It will be important to ensure that communities and stakeholders are fully consulted, as pathways are co-developed, to ensure

practical context-specific solutions are implemented. Focusing on equitable access to diagnostic services, creation of implementable tools for diagnosis and treatment monitoring, and building capacity in the provision of healthcare and specific expertise in osteoporosis care, should be key goals for healthcare services, policymakers and governments.

Declaration of Interests

[A: please declare any competing interests. Note that declarations should match exactly those on the individual ICMJE forms. Please have each author complete an ICMJE form and additional have all authors sign a completed Author Statement form.]

References:

1. Ward KA, Pearse CM, Madanhire T, et al. Disparities in the Prevalence of Osteoporosis and Osteopenia in Men and Women Living in Sub-Saharan Africa, the UK, and the USA. *Current Osteoporosis Reports* 2023.
2. Hamill MM, Pettifor JM, Ward KA, Norris SA, Prentice A. Changes in Bone Mineral Density, Body Composition, Vitamin D Status, and Mineral Metabolism in Urban HIV-Positive South African Women Over 12 Months. *J Bone Miner Res* 2017; **32**(8): 1615-24.
3. Gill TK, Mittinty MM, March LM, et al. Global, regional, and national burden of other musculoskeletal disorders, 1990–2020, and projections to 2050: a systematic analysis of the Global Burden of Disease Study 2021. *The Lancet Rheumatology* 2023; **5**(11): e670-e82.
4. Oden A, McCloskey EV, Kanis JA, Harvey NC, Johansson H. Burden of high fracture probability worldwide: secular increases 2010-2040. *Osteoporos Int* 2015; **26**(9): 2243-8.
5. Hawley S, Dela S, Burton A, Paruk F, Cassim B, Gregson CL. Incidence and number of fragility fractures of the hip in South Africa: estimated projections from 2020 to 2050. *Osteoporos Int* 2022; **33**(12): 2575-83.
6. Paruk F, Matthews G, Gregson CL, Cassim B. Hip fractures in South Africa: mortality outcomes over 12 months post-fracture. *Arch Osteoporos* 2020; **15**(1): 76.
7. Kanis JA, McCloskey EV, Johansson H, et al. European guidance for the diagnosis and management of osteoporosis in postmenopausal women. *Osteoporos Int* 2013; **24**(1): 23-57.
8. The International Osteoporosis Foundation. The Middle East and Africa Audit: Epidemiology, costs and burden of osteoporosis in 2011, 2011.
9. Gregson CL, Cassim B, Micklesfield LK, et al. Fragility fractures in sub-Saharan Africa: time to break the myth. *Lancet Global Health* 2019; **7**(1): E26-E7.
10. Clynnes MA, Westbury LD, Dennison EM, et al. Bone densitometry worldwide: a global survey by the ISCD and IOF. *Osteoporos Int* 2020; **31**(9): 1779-86.

Figure 1: Challenges and solutions to improving fragility fracture and osteoporosis care in Africa

Population level challenges	Health system challenges	Solutions
<ul style="list-style-type: none">• Rapidly growing ageing population in resource poor settings• Increase in NCDs often leading to multimorbidity• HIV as a chronic disease of ageing• Rapid urbanization• Double and triple burdens of malnutrition• Changing physical activity patterns & workplace environments• Climate change	<ul style="list-style-type: none">• Low levels of public and stakeholder awareness about bone health• Historic focus on, and funding for, infectious diseases• Historically siloed models of health care• Multiple competing healthcare priorities• Lack of access to specialist training and too few specialists in bone health• Lack of validated fracture risk assessment tools• Lack of access to DXA scanning services• Medical pluralism	<ul style="list-style-type: none">• Co-design of public information resources to raise awareness• Co-design of context-specific clinical guidelines• Training and capacity strengthening• Emerging fracture epidemiology & understanding of context specific risk factors• Validation of low-cost scalable fracture risk assessment tools• Consideration of osteoporosis treatments as essential medicines• Integration of bone health in established pathways of healthcare (e.g., HIV care)