

Review began 10/12/2026
Review ended 10/21/2026
Published 10/27/2026

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DOI: 10.7759/cureus.118659

Osteoporosis as a Silent Driver of Fragility Fractures: A Narrative Review of Risk Factors, Management, and Health System Gaps in Nigeria With Comparative Insights From the United Kingdom

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Abstract

Osteoporosis is a common yet underdiagnosed metabolic bone disease that silently reduces skeletal integrity until a fragility fracture occurs. This narrative review synthesizes evidence on risk factors, diagnostic practices, management, and health system gaps in Nigeria, with comparative insights from the United Kingdom (UK), drawing on targeted searches of PubMed, Google Scholar, and WHO IRIS (July 2026) and targeted checks during revision; cited publications span 1992 to 2026. Nigerian studies identify older age, female sex, and postmenopausal status as important factors, while evidence from the wider African and international literature suggests that vitamin D insufficiency, inadequate calcium intake, and diabetes may also contribute, although Nigeria-specific evidence is limited. Reported prevalence ranges from approximately 8.5% in a Lagos review of dual-energy X-ray absorptiometry (DXA) reports and 15% in a primary care DXA cohort to 57% in a hospital geriatric DXA cohort and 68% in a selected rural sample classified from self-reported indicators rather than densitometry. These estimates are not directly comparable, and the 68% figure is not DXA-confirmed prevalence. Community awareness appears low. DXA access is limited and unevenly distributed, and management appears largely reactive, with no documented coordinated fracture liaison services, whereas the UK has national frameworks for risk stratification, treatment, and postfracture follow-up, although implementation there is also uneven. Osteoporosis is likely to be a substantial, potentially preventable public health burden in Nigeria. Priority investments include public awareness, validated risk assessment tools, expanded diagnostic capacity, and structured postfracture care pathways, with contextually adapted elements of the UK model.

Categories: Health Policy, Orthopedics, Endocrinology/Diabetes/Metabolism

Keywords: fragility fracture, health systems, metabolic bone diseases, nigeria, osteoporosis, risk assessment

Introduction And Background

Osteoporosis is defined as a systemic skeletal disorder characterized by reduced bone mass and deterioration of bone microarchitecture, leading to increased fracture susceptibility. Bone mineral density (BMD) measures the amount of mineral in bone and is used to assess skeletal strength. Bone remodeling is the continuous process by which old bone is broken down and replaced. Osteoporosis is one of the most consequential noncommunicable diseases of aging, yet it remains largely invisible within the health policy architecture of sub-Saharan Africa [1]. The pathophysiological hallmark is a negative bone remodeling balance in which osteoclast-mediated resorption progressively outpaces osteoblast-driven formation, ultimately producing a skeleton rendered mechanically incompetent by low-energy forces that would cause no injury in a healthy individual.

Globally, Salari et al. (2021) estimated osteoporosis prevalence at 18.3%, with women disproportionately affected (23.1% vs. 11.7% in men), and reported the highest continental estimate in Africa at approximately 39.5% (95% CI 22.3–59.7), an imprecise figure that rests on few studies [2]. This figure exists alongside one of the most acute information voids in global bone health: population-representative BMD studies from sub-Saharan Africa remain scarce in the global literature [1]. This paradox of high estimated burden alongside minimal surveillance is the starting point for any serious engagement with osteoporosis in Nigeria.

Nigeria has a large population, with an estimated 11.3 million people aged 60 years and above in 2024 [3]. Urbanization and nutritional change may be reducing calcium intake and physical activity, although Nigeria-specific data are lacking. Type 2 diabetes mellitus is associated with higher hip and non-vertebral fracture risk [4], a risk that United Kingdom (UK) guidance describes as partly independent of BMD [5]. Against this backdrop, fragility fractures exact a substantial toll: a retrospective single-center study of 102 Nigerian older adults with fragility hip fractures reported a mortality of 22.5% at 12 months after hospital discharge, and 70.6% of patients had regained mobility by three months [6]. Because that mortality was

How to cite this article

Eboka O (October 27, 2026) Osteoporosis as a Silent Driver of Fragility Fractures: A Narrative Review of Risk Factors, Management, and Health System Gaps in Nigeria With Comparative Insights From the United Kingdom. Cureus 18(10): e118659. DOI 10.7759/cureus.118659

measured from discharge, it cannot be compared directly with registry mortality counted from admission. In the UK, the National Hip Fracture Database (NHFD) reports that 94% of 71,885 patients in 2024 survived beyond the first month after hip fracture [7]; the two figures are not directly comparable because the Nigerian estimate is a 12-month post-discharge figure [6]. UK hip fracture pathways are built around timely surgical fixation, orthogeriatric comanagement, and structured rehabilitation, delivered within a nationally audited system, although performance varies between units [7].

The UK operates under the National Osteoporosis Guideline Group (NOGG) guideline, most recently updated in 2024, alongside the National Institute for Health and Care Excellence (NICE) guidance on fracture risk assessment and a network of fracture liaison services (FLS) providing secondary fracture prevention [5,8]. Guidance and implementation are not the same: the NHFD reports that 56% of patients with hip fracture were receiving bone-strengthening medication at four months and that 69 hospitals (41%) appeared to have no FLS [7]. Nigeria has no equivalent system that the author could identify: dual-energy X-ray absorptiometry (DXA) capacity is limited and unevenly distributed, with access concentrated in selected tertiary centers [9,10]; no Nigerian FRAX model was listed on the FRAX online calculation tool [11]; and no national clinical guideline for osteoporosis screening or treatment has, to the author's knowledge, been published.

Established risk factors include non-modifiable factors (older age, female sex, postmenopausal status, a previous fragility fracture, and a parental history of hip fracture), modifiable factors (smoking, alcohol intake of three or more units daily, nutritional deficiencies, including calcium and vitamin D, and medications such as glucocorticoids), and comorbidities (diabetes, rheumatoid arthritis, HIV, and other conditions affecting bone) [5]. Exercise is recommended for bone health [5], and low physical activity has been associated with osteoporosis in Nigerian studies discussed below. Ethnicity may also influence population-level risk, because BMD reference values and fracture-risk models are derived from particular populations [5,9], but it should not be read as a simple, independent biological explanation.

Public awareness compounds the diagnostic void: in a stratified random sample of 500 respondents at a polytechnic in Enugu, South-East Nigeria, only 37.4% had heard of osteoporosis, and only 6.8% could correctly describe its meaning [12]. In this context, a fracture may often be the first clinical encounter. This narrative review synthesizes existing evidence on risk factors, management practices, and health system gaps related to osteoporosis and fragility fractures in Nigeria, with comparative reference to the UK, in order to identify priority areas for reform.

Methods

Study Design

A narrative review methodology was selected in preference to a systematic review or meta-analysis. The available literature on osteoporosis in Nigeria is heterogeneous in design, population, and outcome measurement, with insufficient methodological homogeneity to support pooled quantitative synthesis. Narrative review affords the flexibility to integrate clinical studies, guidelines, health policy documents, and epidemiological analyses into a coherent thematic framework, a necessity given the comparative, cross-system scope of this work.

Search Strategy and Eligibility

Targeted searches were conducted on July 5, 2026 in PubMed/MEDLINE, Google Scholar, and WHO IRIS. The search terms recorded in the original manuscript were ("osteoporosis" OR "osteopenia" OR "bone mineral density") AND ("Nigeria" OR "West Africa" OR "sub-Saharan Africa") AND ("fragility fracture" OR "screening" OR "management" OR "health system"), supplemented by UK-specific terms, including "fracture liaison service", "NOGG", and "NICE osteoporosis". The exact strings entered in each database could not be reconstructed, and database-specific adaptations were not recorded. Sources were included if they reported data on osteoporosis prevalence, risk factors, diagnosis, management, or health system organization in Nigeria, sub-Saharan Africa, or the UK, and were available in English. Older foundational references were retained where their evidence remained methodologically definitive; the sources cited were published between 1992 and 2026, and no formal publication-date limit is claimed. Sources identified after the July 2026 searches, including recent Nigerian studies [13,14], were added during revision of the manuscript. During revision in October 2026, specific claims were also checked against current sources (current UK guidance and audit reports, United Nations population estimates, the FRAX country list, the International Osteoporosis Foundation list of national societies, and literature on diabetes and fracture risk).

The author alone screened records by title, abstract, and full text. The numbers of records identified and excluded were not recorded, including the number of Google Scholar results screened, and no PRISMA-style flow diagram can be provided; the review therefore does not claim the reproducibility of a systematic review, and the missing search and screening records limit reproducibility. Relevant information was extracted from the selected sources on study design, country and setting, population characteristics, sample size, diagnostic

methods, reported prevalence or effect estimates, management practices, and health system implications. Findings were organized thematically across five domains and compared across Nigerian, wider African, and UK evidence, with attention to differences in study populations, outcome definitions, and diagnostic methods. The final synthesis incorporated observational studies, systematic reviews and meta-analyses, clinical guidelines, policy documents, and economic evaluations relevant to osteoporosis and fragility-fracture prevention. Key Nigerian primary studies were appraised qualitatively; no risk-of-bias tool or scoring system was applied, and the Scale for the Assessment of Narrative Review Articles (SANRA) was not applied.

Review

Epidemiology and burden of osteoporosis in Nigeria

Establishing the precise epidemiological footprint of osteoporosis in Nigeria is constrained by limited population-representative data. Four Nigerian studies illustrate both the burden and the difficulty of interpreting it. Alonge et al. (2017) studied 2,401 consecutive patients aged 60 years and above at the Geriatric Centre, University College Hospital, Ibadan, and found osteoporosis in 56.9%, with prevalence higher in women (65.8%) than men (43.7%) [15]. Ugwu and Ene (2025), in a purposively recruited rural community sample of 587 postmenopausal women in Southeast Nigeria, reported that 68.0% were classified as having osteoporosis on self-reported indicators, alongside low knowledge (28.1% with accurate understanding) and poor preventive practices [16]. Ibrahim et al. (2023), studying 422 postmenopausal women (mean age 59.8 years) attending a family medicine clinic at Lagos State University Teaching Hospital with a portable DXA scanner, reported osteoporosis in 15.1% and osteopenia in 30.6% [17]. Azeez et al. (2025), in a retrospective review of DXA reports from Lagos between January 2018 and June 2023 (n = 212; mean age 62.0 years; 60.8% women), reported osteoporosis in 8.5% and osteopenia in 28.8%, with osteoporosis more frequent in women [13].

The divergence among these estimates is itself informative rather than a simple inconsistency to be resolved by more data. Alonge et al. measured BMD at the right wrist by DXA and applied the WHO T-score threshold to an older, hospital-attending geriatric population (mean age 70.8 years) that included men; the authors themselves note that prevalence varies widely with the instruments used and the skeletal sites measured [15]. Wrist DXA is a peripheral site, whereas UK guidance treats femoral neck DXA as the reference technology and accepts a forearm (one-third radius) measurement only when neither hip nor spine can be measured [5]. Ibrahim et al. used DXA in a younger, female-only, primary care-attending sample [17]. Azeez et al. analyzed reports from people who had undergone DXA, a selected group [13]. Ugwu and Ene did not use DXA at all: because scanning was not feasible in rural communities, osteoporosis was classified from self-reported indicators (low-impact fracture history, chronic musculoskeletal pain, reported height loss or stooping, and prior provider diagnosis) embedded in a knowledge, attitudes, and practices questionnaire, and eligibility required evidence or history of bone disease [16]. These studies therefore apply different constructs to different populations: a peripheral-site densitometric diagnosis in older hospital patients, densitometric diagnoses in younger postmenopausal women and in people referred for scanning, and a symptom-based proxy in a purposively selected rural sample. The 8.5–68.0% range should be read as an index of how much methodology and sampling shape the reported burden, not as a spread of comparable point estimates of one population parameter, and no pooled Nigerian prevalence can be defended on the current evidence. The 68.0% figure in particular is a self-reported, symptom-based proxy and should not be treated as DXA-confirmed prevalence.

Ward et al. (2024) highlighted that population-representative epidemiological data on osteoporosis remain scarce across sub-Saharan Africa, with the limited available studies showing wide variation in reported prevalence [1]. Ward et al. (2023), in a comparative review of sub-Saharan Africa (with African data drawn largely from South African cohorts), the UK, and the USA, noted that available African studies generally suggest higher prevalence than commonly assumed, with HIV infection, malnutrition, and inflammation proposed as contributors [18].

Adesina et al. (2025) reported a mortality of 22.5% at 12 months after hospital discharge in a retrospective single-center cohort of 102 older Nigerian adults with fragility hip fractures treated at a mission teaching hospital, a setting in which delayed presentation, surgical delay, and limited rehabilitation access were described [6]. This is a post-discharge figure and is not comparable with registry mortality counted from admission. Hospital-based fracture data may also underestimate true incidence, because qualitative work reports that traditional bone setters provide much primary fracture care [19,20]. Early projections estimated that the annual number of hip fractures worldwide would rise roughly 3.5- to 4-fold between 1990 and 2050 (from 1.26 to 4.5 million [21] or from 1.66 to 6.26 million [22]), driven largely by population aging and assuming unchanged age-specific incidence. In the UK, hip fracture numbers have so far risen more slowly than population aging alone would suggest [7]. No Nigeria-specific projection was identified in the sources examined.

Risk factors and determinants

Non-Modifiable Factors

In the Nigerian studies reviewed, age, female sex, and postmenopausal status emerge as the strongest predictors of low BMD. Alonge et al. (2017) identified older age (a 6.9% rise in the odds of osteoporosis per year of age) and female sex (OR about four) as the most significant independent risk factors and also listed absence of formal education, no occupational activity, and living with relatives or friends among associated factors [15]. Azeez et al. likewise reported more osteoporosis in women [13]. The menopausal transition represents a period of accelerated bone loss through estrogen withdrawal, which removes a critical inhibitory constraint on osteoclast activity. Ugwu and Ene (2025) found that older age, lower parity, and unmarried status were associated with osteoporosis in postmenopausal rural women, although these associations rest on the self-reported classification and selected sample described above [16]. Ibrahim et al. (2023) found oral steroid use associated with osteoporosis [17].

Vitamin D Deficiency and Calcium Insufficiency

A systematic review and meta-analysis of 129 studies from 23 African countries estimated, after correction, that about 17% of participants had serum 25-hydroxyvitamin D below 30 nmol/L, 34% below 50 nmol/L, and 59% below 75 nmol/L, with very high heterogeneity; values were lower in urban than in rural populations and in women than in men [23,24]. These are continent-wide estimates and may not describe Nigeria. Handa et al. (2008) similarly noted that vitamin D deficiency is common even in sunny countries [9]. UK guidance notes that vitamin D deficiency may contribute to fracture risk through osteomalacia rather than osteoporosis [5]. Meta-analytic evidence on calcium is more nuanced than often assumed: pooled cohort data show no association between total calcium intake and hip fracture risk, and pooled randomized trials of calcium supplementation alone show no reduction in hip fracture risk, with a possible increase (pooled RR 1.64, 95% CI 1.02-2.64), although that estimate is imprecise [25]. Meta-analyses of combined calcium and vitamin D supplements, by contrast, report reductions in hip and non-vertebral fractures, with supplementation best targeted to people whose dietary intake is inadequate; evidence that vitamin D alone reduces fractures is limited [5].

Comorbidities and Medication Use

Nigerian evidence on diabetes is limited to one study. A 2025 hospital-based study across 12 tertiary hospitals recruited 586 women aged 60 years and above with diabetes and a bone-related disorder and reported abnormal BMD in 75.6% of women with type 2 diabetes vs. 39.3% of women with other diabetes types [26]. This finding needs careful reading: the comparator was other diabetes types rather than women without diabetes, so the study cannot estimate the excess risk attributable to diabetes itself; only about two-thirds of participants (66.4%) reported having had a scan, and the reported OR and confidence interval are internally inconsistent [26].

International evidence supplies the context that the Nigerian data lack. A 2020 meta-analysis of observational studies (42 for hip fracture and 17 for non-vertebral fracture) reported higher fracture risk with diabetes than without: for type 2 diabetes, hip fracture RR 1.33 (95% CI 1.19-1.49) and non-vertebral fracture RR 1.19 (1.11-1.28); for type 1 diabetes, hip fracture RR 4.93 (3.06-7.95). Estimates were adjusted for age and sex, and the review did not examine bone density [4]. In a Manitoba, Canada registry cohort of 3,518 adults with diabetes and 36,085 without, aged 50 years or older and referred for DXA, diabetes predicted major osteoporotic fracture after adjustment for FRAX risk factors, including femoral neck BMD (HR 1.61, 95% CI 1.42-1.83); diabetes type could not be distinguished, although the authors expected most cases to be type 2 [27]. A review reached a similar conclusion and proposed accumulation of advanced glycation end-products in bone collagen and increased cortical porosity as possible mechanisms, although supporting data are limited [28], and UK guidance describes the risk as partly independent of BMD [5]. These data come from North America and Europe, and their applicability to Nigeria is uncertain.

Ward et al. (2023) reported higher osteoporosis prevalence in African populations, with HIV infection among the proposed contributors [18]. In a South African cohort of premenopausal women with HIV, bone density fell within the first 12 months of antiretroviral therapy and did not continue to fall afterward [29]. These are not Nigerian data.

Lifestyle Factors

Nigerian evidence on tobacco and alcohol is inconsistent rather than absent. Ugwu and Ene (2025) reported significant associations of both with osteoporosis, but the outcome was self-report-defined in a selected sample, and the reported test statistics do not correspond to the reported p-values, so these findings should be interpreted cautiously [16]. Alonge et al. (2017), using DXA, found no independent association, but only 20 of 2,401 participants used alcohol and five used tobacco, so the study could not test the question [15]; the 2025 multicenter study likewise found no association with tobacco or alcohol [26]. Physical inactivity has some support in Nigerian studies: low activity was associated with poor bone outcomes in the multicenter study [26], and nonparticipation in sport at school age was independently associated with osteoporosis in Alonge et al. [15].

A 2026 multicenter cross-sectional study at 18 physiotherapy clinics enrolled 447 women aged 50 years and

above with clinically confirmed osteoporosis. Age was the only independent predictor of high-intensity weight-bearing exercise, which was self-reported, and the authors reported that higher intensity was associated with greater satisfaction with physiotherapy [14]. Because the outcome is patient satisfaction rather than bone or fracture outcomes, this does not demonstrate treatment response, although it is consistent with the international exercise evidence discussed under Clinical management.

For diet-related bone health, evidence from South Africa illustrates a plausible parallel: a cross-sectional study of 1,261 rural and urban Black South African women identified low dietary calcium and raised bone-turnover markers as concerns in urban postmenopausal women [30]. This pattern may be relevant to Nigerian cities, but Nigeria-specific data confirming it are unavailable and should be a priority for future research rather than assumed from cohorts elsewhere.

Diagnostic practices and tools

The diagnostic landscape for osteoporosis in Nigeria is characterized by limited capacity rather than suboptimal practice. The WHO diagnostic standard requires BMD measurement by DXA, with T-scores of -2.5 SD or below defining osteoporosis [31]. Handa et al. (2008) described DXA facilities in sub-Saharan Africa as virtually nonexistent at the time of writing, and Harvey et al. (2025), in their International Osteoporosis Foundation Position Paper, reported poor availability of densitometry across low- and middle-income countries [9,10]. Nigerian research shows that scanning capacity exists in selected centers: the 2025 diabetes study reported DXA-based assessment across 12 tertiary hospitals, although only 66.4% of participants reported having had a scan [26]; the Lagos studies used a portable scanner in a family medicine clinic and reviewed hospital DXA reports [13,17]. This demonstrates presence, not access; no national inventory of scanners or data on waiting times, costs, or population coverage were identified, and the practical reach of this capacity for most Nigerians remains unquantified.

Whether quantitative ultrasound (QUS) can meaningfully substitute for DXA where scanning is unavailable remains unresolved. QUS is portable, inexpensive, and free of ionizing radiation and has precedent in West African clinical research: a study of HIV-infected adults on antiretroviral therapy in Dakar, Senegal, used calcaneal QUS as a feasible alternative to DXA in a resource-limited setting, finding reduced bone density in the HIV-infected group relative to matched controls (difference -0.36 SD, 95% CI -0.59 to -0.12), in part related to lower body mass index [32]. A Nigerian study of 327 antenatal attendees in Abakaliki, who were young (mean age 29 years) and pregnant, applied T-score thresholds to calcaneal QUS and classified 36.4% as osteoporotic [33]; this is a young, pregnant sample with thresholds applied to ultrasound and is not a prevalence estimate. The 2024 NOGG guideline strongly recommends against QUS, IBEX, and radiofrequency echographic multispectrometry for the diagnosis of osteoporosis [5], and the International Society for Clinical Densitometry does not endorse applying WHO T-score criteria to QUS [34]. QUS is therefore better understood as a plausible prescreening or research tool to identify patients warranting further assessment, rather than as a validated diagnostic substitute.

The FRAX tool, developed at the WHO Collaborating Centre for Metabolic Bone Diseases in Sheffield, provides 10-year fracture probability estimates from clinical risk factors with or without BMD measurement [11,35]. FRAX without BMD performs about as well as BMD without FRAX, which makes it attractive where scanning is unavailable [5]. However, FRAX models are calibrated to local fracture incidence, and no Nigerian model was listed on the FRAX online calculation tool [11]. NOGG notes that the UK FRAX model is calibrated to a predominantly white population and advises using the model for a person's country of birth where one exists [5]. Saber et al. (2021) examined the problem in Egypt, testing FRAX calculators from nine other countries and regions in the absence of a validated Egyptian model; treatment decisions were broadly similar with and without BMD, but the authors concluded that Egypt needed its own population hip fracture data to build a national FRAX model [36]. A similar validation exercise for Nigeria remains needed.

In the UK, the NOGG guideline recommends FRAX assessment in postmenopausal women and men aged 50 years and above with a clinical risk factor, with BMD measurement targeted to people at intermediate risk rather than offered to everyone [5]. NOGG defines very high fracture risk as a FRAX-based probability exceeding the intervention threshold by 60% and advises considering specialist referral for such patients; teriparatide, abaloparatide, or romosozumab can be considered as first-line treatment in postmenopausal women at very high risk, particularly those with vertebral fractures (conditional recommendations) [5]. These are guideline recommendations, and actual service availability differs [7]. Nigerian clinicians, by contrast, may lack the tools to initiate a standardized pathway at all outside selected tertiary centers.

Clinical management

Nonpharmacological Management

The foundations of osteoporosis management, including adequate calcium and vitamin D intake, regular weight-bearing exercise, smoking cessation, and fall prevention, are theoretically applicable in Nigeria without specialist infrastructure. A 2023 evidence-based position statement from the Korean Society for Bone and Mineral Research and the Korean Society of Exercise Physiology, synthesizing 50 randomized controlled trials, concluded that resistance and impact training improved bone strength, muscle strength,

and balance and reduced falls [37]. The challenge in Nigeria is not the evidence base but the delivery infrastructure: no community fall prevention programs, physiotherapy-led bone health clinics, or systematic exercise prescription pathways integrated into primary care were identified in this review.

Pharmacological Management

Bisphosphonates, particularly oral alendronate or risedronate and intravenous zoledronate, are the most cost-effective first-line options in UK guidance [5]. The landmark Fracture Intervention Trial demonstrated that alendronate reduces the risk of new vertebral fractures by around half (relative risk 0.53, 95% CI 0.41–0.68) and hip fractures by around half (relative hazard 0.49, 95% CI 0.23–0.99) compared with placebo in postmenopausal women with existing vertebral fractures and low bone mass [38]. Alonge et al. reported treating women and men with osteoporosis using alendronate or ibandronate plus calcium at their center [15], showing that treatment is feasible in a tertiary setting. Systematic Nigerian data on the supply and affordability of bisphosphonates are lacking, so access beyond such centers is uncertain. Anabolic agents are much more expensive than antiresorptive drugs [5], and whether they are accessible in Nigeria has not been studied.

An important further consideration for Nigeria is the trade-off between drug efficacy, adherence, and delivery infrastructure. The HORIZON Pivotal Fracture Trial demonstrated that a single annual intravenous infusion of zoledronic acid reduced vertebral fracture risk by approximately 70% and hip fracture risk by 41% (hazard ratio 0.59, 95% CI 0.42–0.83) over three years, with the once-yearly regimen intended to overcome the adherence problems of daily and weekly oral regimens; serious atrial fibrillation events were more frequent with zoledronic acid (50 vs. 20 events) [39]. NOGG strongly recommends offering intravenous zoledronate as a first-line option after hip fracture and reports an increase in symptomatic atrial fibrillation in the main phase III trial [5]. In principle, this adherence advantage could be valuable where a reliable oral medicine supply chain is uncertain. In practice, annual infusion still requires infusion-capable clinical infrastructure that is likely concentrated in the same urban tertiary centers already identified as bottlenecks; it is therefore a potential option with specific infrastructure requirements, not a straightforward solution to oral medication access, unless delivered through existing infrastructure, such as antiretroviral or diabetes clinics, rather than as a standalone service. A South African example is instructive: the fracture liaison service at Helen Joseph Hospital in Johannesburg, listed on the IOF Capture the Fracture map, evaluates fracture patients through a geriatrics and endocrinology team and treats them acutely with intravenous bisphosphonate, suggesting that infusion-based secondary prevention can be delivered within an African public hospital [40].

Fracture Management and Workforce

Nigerian patients with fragility hip fractures face delayed presentation and surgical fixation and limited rehabilitation capacity [6]. Nwachuku et al. (2025), in a narrative review informed by interviews with 23 surgeons at one Lagos hospital, reported that Nigeria has fewer than 500 orthopedic surgeons for more than 200 million people, which corresponds to roughly one surgeon per 400,000 people, compared with approximately one per 10,000 in high-income countries [19]. The same review describes traditional bone setters as the first point of care for up to 85% of fracture patients in the literature it cites, with unregulated practice associated with malunion, infection, and gangrene [19]. Poverty, out-of-pocket payment, and cultural beliefs, as well as workforce shortage, shape this pattern, so the causal pathway cannot be reduced to surgeon numbers alone. In the UK, hip fracture care is audited nationally through the NHFD [7].

Health system organization, policy gaps, and structural barriers

To the author's knowledge, Nigeria has no national guideline for osteoporosis screening, diagnosis, or management. There is no equivalent of the NOGG framework, and the IOF lists one Nigerian national society, the Foundation for the Awareness of Osteoporosis, based in Enugu [41]; no Nigerian body with an identifiable guideline-development or adoption mandate was identified in the sources examined. Nigerian noncommunicable disease policy was not examined directly in this review: the absence of osteoporosis from the literature identified is consistent with, but does not demonstrate, low policy priority.

Three separate questions should be distinguished. First, credible guidance exists regionally: in 2021, the African Society of Bone Health and Metabolic Bone Diseases published a Delphi-derived, evidence-based treat-to-target guideline for osteoporosis diagnosis and management across Africa, developed by a multinational panel of African experts [42]. Second, whether a Nigerian organization has formally adopted or adapted it was not established in the sources examined. Third, whether the health system has the resources, workforce, and funding to implement any guideline is a separate matter. The existence of an African guideline means that the absence of a credible, Africa-appropriate technical framework cannot be assumed, but it does not by itself explain why Nigeria has not adopted one. One hypothesis is that institutional adoption and implementation, rather than the absence of technically credible guidance alone, represent an important barrier; this review did not examine national policy processes directly, and the interpretation remains a hypothesis.

The fracture liaison service model, in which trained coordinators systematically identify patients presenting with fragility fractures, ensure diagnostic workup, initiate treatment, and arrange follow-up, has become a central secondary fracture prevention strategy in the UK and internationally. NOGG recommends multidisciplinary, coordinator-based FLS and notes that models that assess and initiate treatment, or recommend it to primary care, are more effective than those that only identify patients or provide education [5]. The evidence base has developed in stages. A UK modelling study using eight years of service data suggested that the model could be cost-effective, with fractures avoided and reduced hospital bed occupancy [43], and a systematic review of the economic literature (23 studies) reached a broadly similar conclusion [44]. More recently, a 2024 systematic review and meta-analysis of 37 studies (22 pooled) found a lower risk of secondary fragility fracture with FLS care than without: a relative risk of 0.26 (95% CI 0.13-0.52) at one year (low certainty) and 0.68 (95% CI 0.55-0.83) at two years or longer (moderate certainty) [45]. The evidence has limits that bear on transferability to Nigeria: almost all included studies were cohort studies (only two were randomized trials), FLS models varied considerably in intensity, from coordinator-led services that assess and initiate treatment to services that only notify primary care, and European data cited in the review indicate that many patients with an osteoporotic fracture are still not identified or treated even where FLS programs exist [45]. A summary of the key included studies is presented in Table 1.

Author (year)	Study type	Country/setting	Nigeria?	Population	Key finding
Ward et al. (2024) [1]	Commentary	Sub-Saharan Africa	No	General	Population-representative BMD/fracture data remain scarce across SSA
Salari et al. (2021) [2]	Systematic review	Global	No	General population	Global osteoporosis prevalence 18.3%; women 23.1% vs. men 11.7%; highest by continent in Africa (39.5%, 95% CI 22.3-59.7)
Vilaca et al. (2020) [4]	Systematic review/meta-analysis	International	No	Adults with and without diabetes	T2D: hip fracture RR 1.33 (1.19-1.49), non-vertebral RR 1.19 (1.11-1.28); BMD not examined
Gregson et al. (2025) [5]	Clinical guideline	UK	No	Postmenopausal women and men aged 50 or older	2024 NOGG update: FRAX-based stratification; very high risk when probability exceeds the intervention threshold by 60%; strong recommendation against QUS, IBEX, and REMS for diagnosis
Adesina et al. (2025) [6]	Retrospective cohort	Nigeria (single mission teaching hospital)	Yes	102 older adults with fragility hip fracture	Mortality 22.5% at 12 months after discharge in a setting characterized by treatment delays; not comparable with admission-based registry mortality
Harvey et al. (2025) [10]	Position paper	LMICs/global	No	Health systems	Barriers to osteoporosis care in resource-limited settings
Njeze Ngozi et al. (2017) [12]	Cross-sectional	SE Nigeria (polytechnic)	Yes	500 respondents, stratified random sample	37.4% had heard of osteoporosis; 6.8% described it correctly
Azeez et al. (2025) [13]	Retrospective cross-sectional	Lagos, Nigeria	Yes	212 people with DXA reports, 2018-2023	Osteoporosis 8.5%, osteopenia 28.8%; osteoporosis more frequent in women
Alonge et al. (2017) [15]	Cross-sectional	Ibadan, Nigeria	Yes	2,401 patients aged 60 or older at a geriatric center	Wrist DXA: osteoporosis 56.9% (men 43.7%, women 65.8%); age and female sex strongest predictors
Ugwu and Ene (2025) [16]	Cross-sectional	SE Nigeria (rural)	Yes	587 postmenopausal women	68.0% osteoporosis by self-reported indicators (no DXA; eligibility required evidence or history of bone disease); knowledge low
Ibrahim et al. (2023) [17]	Cross-sectional	Lagos, Nigeria	Yes	422 postmenopausal women, family medicine clinic	Portable DXA: osteoporosis 15.1%, osteopenia 30.6%; oral steroid use associated with osteoporosis
Ward et					

al. (2023) [18]	Comparative review	SSA/UK/USA	No	Men and women	BMD differences by region and sex; HIV, malnutrition, and inflammaging proposed as drivers
Mogire et al. (2020) [23,24]	Systematic review/meta-analysis	Africa (continent-wide)	No	129 studies, 23 countries	After correction, about 17%, 34%, and 59% below 30, 50, and 75 nmol/L; very high heterogeneity
Ugwu et al. (2025) [26]	Cross-sectional	12 tertiary hospitals, Nigeria	Yes	586 women aged 60 or older with diabetes and bone-related conditions	T2DM associated with abnormal BMD vs. other diabetes types (75.6% vs. 39.3%); no nondiabetic comparator; reported OR and CI inconsistent
McLellan et al. (2011) [43]	Modelling study	UK	No	FLS program data	Model suggests FLS can be cost-effective, with fractures avoided and reduced bed occupancy
Danazumi et al. (2024) [45]	Systematic review/meta-analysis	International	No	Adults aged 50 or older with fragility fracture	FLS care: RR 0.26 (0.13-0.52) at one year (low certainty); 0.68 (0.55-0.83) at two years or longer (moderate certainty); mostly cohort studies

TABLE 1: Summary of key included studies.

BMD, bone mineral density; DXA, dual-energy X-ray absorptiometry; FLS, fracture liaison service; FRAX, Fracture Risk Assessment Tool; IBEX, impact-based bone assessment; LMICs, low- and middle-income countries; NICE, National Institute for Health and Care Excellence; NOGG, National Osteoporosis Guideline Group; QUS, quantitative ultrasound; REMS, radiofrequency echographic multispectrometry; RR, risk ratio; SE, southeastern; SSA, sub-Saharan Africa; T2D, type 2 diabetes; T2DM, type 2 diabetes mellitus

Several diagnostic and treatment gaps are relevant. BMD-based diagnosis may be difficult where DXA is unavailable, and conceptual overdependence on BMD has been identified as a barrier in low- and middle-income countries [10]; clinical fracture-risk assessment can complement rather than simply replace densitometry [5]. A fracture may result in surgical treatment without coordinated assessment of the underlying bone disease; Nigerian data on postfracture assessment were not identified, and even in the UK only 56% of patients with hip fracture were receiving bone-strengthening medication at four months, and 41% of hospitals appeared to have no FLS [7]. Understanding of osteoporosis, concerns about medication, access to treatment, and adherence can influence whether secondary prevention occurs, and UK guidance notes that no single intervention has been shown to improve adherence, whereas multicomponent approaches with active patient engagement appear most helpful [5]; Nigerian data do not establish that patient misunderstanding or nonadherence is a documented cause of poor outcomes. Njeze et al. (2017) documented that only 37.4% of educated adults in a polytechnic in Enugu State had ever heard of osteoporosis, and awareness was not significantly associated with educational level, gender, or marital status [12]; such awareness deficits are consistent with limited investment in bone health literacy at the community level. The extent to which other barriers apply in Nigeria has not been systematically studied.

Discussion

Principal Findings

The reviewed evidence suggests a consistent pattern. Osteoporosis in Nigeria appears to be underrecognized, inadequately diagnosed, and poorly managed, although the size of the burden cannot be stated precisely because reported prevalence varies from about 8.5% to 68.0%, depending on population and method. Biological vulnerabilities (age, menopause, possibly vitamin D insufficiency, and diabetes) appear to operate within a health system that lacks several structural prerequisites (accessible diagnostic tools, reliable treatment supply chains, specialist workforce, and coordinated care pathways). The 12-month post-discharge hip fracture mortality of approximately 23% in a single-center cohort [6] should be interpreted cautiously: it cannot be compared directly with admission-based registry figures, and the study was not designed to quantify the contribution of health system factors.

Strengths and Weaknesses of the Study

The principal strength of this review is its structured comparative framework. By juxtaposing the Nigerian evidence base against the UK’s NOGG model, the review moves beyond a descriptive account of deficits to identify specific, potentially transferable policy mechanisms. It integrates clinical, epidemiological, and health system evidence, includes recent 2023–2026 Nigerian primary studies, and explicitly compares how diagnostic method and sampling shape reported prevalence rather than averaging incompatible estimates. Its weaknesses are that it is a narrative rather than systematic review, with incomplete search and screening

records, a single screener, and only a qualitative appraisal of key Nigerian studies; that Nigerian evidence is dominated by hospital-based and nonrepresentative community samples with heterogeneous diagnostic methods; and that no population-representative Nigerian BMD or fracture incidence data exist to anchor the comparison. Three of the Nigerian sources [14,16,26] come from the same research group, and some contain reporting inconsistencies, for example, a reported confidence interval that does not contain its own OR [26] and test statistics that do not match reported p-values [16]; these considerations temper confidence in individual findings.

Comparison With Existing Literature

The Nigeria-UK comparison exposes not merely a quantitative gap in resources but a gap in systems thinking about fracture prevention. The NOGG framework illustrates that FRAX-based stratification, with BMD targeted to intermediate-risk patients, can identify and treat high-risk individuals without scanning everyone [5].

The fracture liaison service comparison is equally instructive. Evidence from the UK and elsewhere supports cost-effectiveness and reduced refracture [43,45], but coordinator-led services vary widely in design, and the UK comparator should not be idealized: implementation and coverage are not uniform [7]. Within Africa, the Helen Joseph Hospital service in Johannesburg shows that a structured, multidisciplinary FLS using intravenous bisphosphonate can operate in a South African public hospital [40]. Nigeria has not yet produced a comparable documented pilot.

Interpretation

Several possible explanations beyond simple resource scarcity may account for the persistent gap; none was directly tested in the studies reviewed. One possible explanation is that osteoporosis receives limited policy attention because its effects are often clinically apparent only after a fracture; this interpretation requires further investigation in the Nigerian policy context. A second is that fractures are managed as surgical emergencies, so that hip fracture patients may be discharged without investigation or treatment of the underlying bone disease; Nigerian data are lacking, although the UK data cited above show that postfracture treatment gaps occur even in a system with established pathways [7]. A third is that guideline development and public health education may lack an institutional home in Nigeria: the IOF lists a Nigerian national society [41], but no body with an identifiable guideline-development or adoption mandate was identified in the sources examined.

Type 2 diabetes, HIV, aging, and nutritional change may together give a Nigerian risk profile that differs from that of the UK, but this was not demonstrated. North American registry data suggest that diabetes-related fracture risk is not explained by BMD alone [27,28], whereas the Nigerian multicenter study reported abnormal BMD more often in women with type 2 diabetes than in women with other diabetes types [26]. Because that comparator was other diabetes types and no nondiabetic group was studied, the two findings cannot be reconciled directly, and which pattern applies in Nigeria is unknown. BMD-based and clinical risk-factor approaches are best seen as complementary rather than alternatives, and clinical risk-factor-based assessment may be useful wherever scanning is unavailable [5].

Implications for Practice, Policy, and Health Systems

Several implications follow from this synthesis, subject to the limits of the evidence. Clinically, fracture risk assessment could become a component of perimenopause consultations, diabetic review appointments, and geriatric assessments at tertiary and secondary care levels in Nigeria. In the absence of a Nigerian FRAX model, clinicians could consider clinical risk-factor-based assessment, noting that FRAX models calibrated elsewhere have not been validated for Nigerian populations and that any use of a borrowed model should acknowledge this limitation [5,36]. Priority risk factors include postmenopausal status, fracture history, glucocorticoid use [5,17], and diabetes; tobacco and alcohol use should be recorded, but their independent contribution in Nigeria remains uncertain.

Regarding pharmacological access, essential medicine lists could be reviewed for generic bisphosphonates, the most cost-effective first-line option in UK guidance [5], and for vitamin D preparations, subject to Nigerian availability and price data, which were not identified. Calcium supplementation should be targeted to patients whose dietary intake is inadequate, given that trials of calcium alone have not shown a reduction in hip fracture risk [5,25]. Strengthening supply chains for these agents would be a necessary condition for any scale-up. At the health systems level, a pilot fracture liaison service adapted to Nigerian resource realities and potentially nurse-coordinated could be established at one or two high-volume teaching hospitals. Such a service would identify eligible fracture patients, coordinate bone health assessment, facilitate treatment, and arrange follow-up. A pilot is preferable to immediate nationwide implementation because feasibility, staffing, referral processes, treatment affordability, and follow-up need to be assessed locally. A pilot could measure identification rates, completion of assessment, treatment initiation, follow-up, adherence, and, where design and follow-up allow, recurrent fractures. The UK model should be adapted to Nigerian service capacity rather than copied wholesale, and the African example at Helen Joseph Hospital

[40] offers a regional reference. Integration of bone health screening into existing noncommunicable disease programs, particularly HIV and diabetes services, may offer a resource-efficient route to reaching high-risk populations without building parallel infrastructure.

Future Research Priorities

The research gaps identified in this review are specific. A national, community-based epidemiological study of BMD and fragility fracture incidence across Nigeria's geopolitical zones, using a consistent densitometric method, would provide the data needed to calibrate a Nigeria-specific FRAX tool and to resolve the divergence among current prevalence estimates. Longitudinal cohort studies examining bone loss trajectories in Nigerian postmenopausal women and older men are needed, with attention to the interaction of diabetes, HIV, glucocorticoid use, and vitamin D status, and studies of diabetes and bone should include participants without diabetes as comparators. A pilot feasibility study of a nurse-led fracture liaison service in a high-volume Nigerian teaching hospital would generate the local evidence needed to justify scale-up. Economic analyses estimating the cost of fragility fractures in Nigeria and the cost-effectiveness of specific preventive interventions would inform health financing decisions.

Further work could also advance the assessment of bone quality and microarchitecture, which DXA does not capture; in type 2 diabetes, for example, increased cortical porosity has been proposed as a contributor to fracture risk [28]. UK guidance describes a trabecular bone score adjustment to FRAX [5]; whether such tools are feasible and cost-effective in Nigeria is unknown. The interactions of kidney and endocrine disease with bone health in Nigerian populations, and the sequencing of anabolic and antiresorptive therapies, for which UK guidance notes there is no evidence to support a specific sequence [5], are further research questions, as are precision approaches tied to local evidence gaps. Finite element analysis and AI approaches to imaging are longer-term directions, but they should not displace the more immediate gaps in Nigerian epidemiological and health system evidence.

Limitations of the Review

This review carries the inherent limitations of the narrative review methodology. The search date is documented, but database-specific search histories, screening counts, and the number of Google Scholar results screened were not recorded, which limits reproducibility; the author was the sole screener, and the SANRA was not applied. Only a qualitative appraisal of key Nigerian studies was undertaken, without a formal risk-of-bias tool, and the absence of meta-analytic pooling limits the precision of prevalence estimates; publication bias toward hospital-based Nigerian cohorts may misrepresent community-level burden. Some sources were assessed from abstracts or summaries rather than full text. The Nigerian evidence base is predominantly hospital-based and tertiary-center-derived, limiting generalizability to community and rural populations. Most cross-sectional studies used convenience or purposive rather than random sampling, and several were conducted in single centers. One community study classified osteoporosis without densitometry, and one multicenter study recruited only women with diabetes and bone-related conditions. Language restriction to English may have excluded relevant grey literature.

The comparative UK evidence base draws substantially on guideline documents, audit reports, and reviews rather than primary effectiveness data, which may overstate the uniformity of UK service provision. Finally, direct Nigeria-specific evidence was not available for every determinant discussed; where this was the case, the review draws explicitly on evidence from other sub-Saharan African settings and elsewhere and flags the resulting uncertainty rather than presenting extrapolated findings as Nigeria-specific data.

Conclusions

Osteoporosis in Nigeria appears less likely to be rare than underrecognized. Available evidence suggests it may affect a large proportion of at-risk older women and a substantial proportion of older men, although reported prevalence varies from about 8.5% to 68.0% depending on population and method. It appears to go unseen partly because health system structures for detecting and treating it remain limited; the consequences may include fracture-related disability and mortality, although this review did not measure preventable outcomes. The path forward requires four targeted investments achievable within Nigerian resource realities: a national epidemiological study to calibrate fracture risk tools to the local context; integration of bone health screening into existing noncommunicable disease platforms; essential medicine access for generic bisphosphonates and, where dietary intake is inadequate, calcium with vitamin D; and a pilot fracture liaison service program at high-volume centers. Their absence, in the face of available evidence, represents an important and potentially modifiable gap in osteoporosis and fracture-prevention care. This review contributes a structured Nigeria-UK comparison and shows how diagnostic methods and sampling shape reported Nigerian prevalence; it also highlights diabetes and HIV as comorbidities that warrant attention in risk assessment, although Nigerian evidence on both is limited.

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

Concept and design: Olisemeka Eboka

Acquisition, analysis, or interpretation of data: Olisemeka Eboka

Drafting of the manuscript: Olisemeka Eboka

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Disclosures

Conflicts of interest: In compliance with the ICMJE uniform disclosure form, all authors declare the following: **Payment/services info:** All authors have declared that no financial support was received from any organization for the submitted work. **Financial relationships:** All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. **Other relationships:** All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

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