Bone Health in Older Ugandans with HIV: Findings from the HASA Cohort

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BACKGROUND

Persons living with HIV (PLWH) are at increased risk of reduced bone mineral density (BMD) and subsequent fractures.

Limited data exist on bone health among older PLWH in sub-Saharan Africa (SSA).

Calcaneal ultrasound offers a portable, radiation-free method for estimating BMD, making it suitable for resource-limited settings such as Uganda, and has been locally validated.

Our objective was to assess the prevalence and predictors of low BMD and osteoporosis in older Ugandans with HIV.

METHODS

- We conducted a cross-sectional study among PLWH ≥60 years (in the HASA cohort, Kampala).
- Demographic, clinical, and HIV-related data were collected.
- All study participants underwent calcaneal QUS performed with the Sahara Hologic device. The machine measures broadband ultrasound attenuation (in decibels per megahertz) and speed of sound (meters per second) at a fixed region of interest in the midcalcaneus of the nondominant foot. The device subsequently combines the broadband ultrasound attenuation and speed of sound results to provide the QUS index (QUI) or stiffness index, using the formula QUI = 0.41 (speed of sound) + 0.41 (broadband ultrasound attenuation) − 571, and the estimated BMD (eBMD, in grams per centimeter squared), using the formula eBMD = 0.0025926 (broadband ultrasound attenuation + speed of sound) − 73.687.
- Estimated BMD (eBMD) measurements were analyzed to assess the prevalence of low BMD (T-scores ≤-1), and osteoporosis (T-scores ≤-2.5), and their associated factors in this population (using two separate logistic regression analyses).
- We also assessed the potential association of BMD with self-reported fractures and falls.

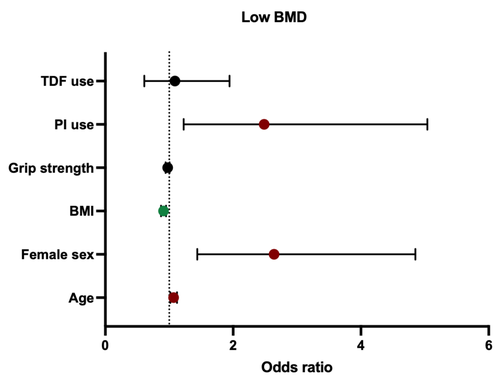
Among people with HIV aged ≥60 years in Uganda, reduced bone mineral density assessed by calcaneal ultrasound was highly prevalent (69.1%). Low BMI, reduced muscle strength, and protease inhibitor use emerged as potentially modifiable associated factors.

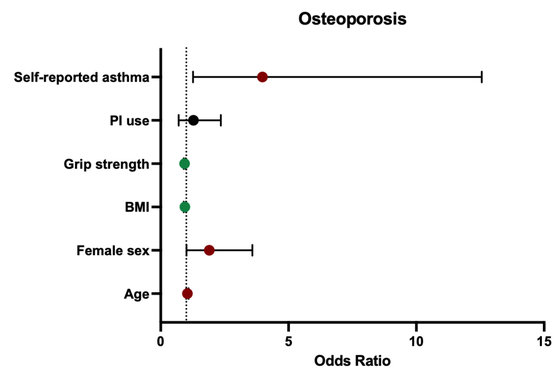
RESULTS

We enrolled 500 participants: mostly males (256, 51.2%), with an average age of 65 years (SD±4.9). All were on antiretroviral treatment (406, 81.2% on first-line TDF-containing regimens); CD4 cell count was 671 cells/mm3 (SD±284) and virological suppression was observed in 459 (91.8%). Average BMI was 25.1 Kg/m2 (±5.2).

Low BMD and osteoporosis were observed in 345 (69.1%) and 114 (22.8%). Fractures and falls were reported by 13 (6.3%) and 206 (41.2%) participants, and neither was associated with low BMD or osteoporosis.

- At logistic regression, independent predictors of low BMD were **female sex** (p=0.001, aOR 2.72, 95%CI 1.48-5.00), **older age** (p=0.007, aOR 1.07, 95%CI 1.02-1.12), **lower BMI** (p<0.001, aOR 0.91, 95%CI 0.87-0.95), and **protease inhibitor use** (p=0.010, aOR 2.43, 95%CI 1.24-4.77).
- Predictors of osteoporosis included **female sex** (p=0.047, aOR 1.90, 95%CI 1.01-3.56), **older age** (p=0.046; aOR 1.05, 95%CI 1.01-1.09), **lower BMI** (p=0.014, aOR 0.94, 95%CI 0.90-0.99), **self-reported asthma** (p=0.018, aOR 3.98, 95%CI 1.26-12.56) and **reduced grip strength** (p=0.001, aOR 0.93, 95%CI 0.90-0.97).
- We were not able to identify predictors of fractures





CONCLUSIONS AND DISCUSSION

A significant proportion of Ugandan older PLWH have an estimated low BMD.

Our findings highlight potentially modifiable factors, including nutrition (BMI) and physical function (muscle strength), as **key targets for prevention and management.**

Although no association was observed between TDF use and low BMD in this cohort, **protease inhibitor use** was independently associated with reduced BMD. Given that bone toxicity related to TDF has been mainly described in the context of co-administration with protease inhibitors, our findings support reconsidering the role of this drug class in older PWH.

The association between **self-reported asthma** and osteoporosis remains unexplained, as none of the participants were receiving inhaled corticosteroids.

In contrast, the robust association between **reduced muscle strength** and low BMD has relevant clinical implications. Grip strength assessment is simple, rapid, and low-cost, and may represent a pragmatic screening tool to integrate HIV care with non-communicable disease prevention strategies in low-income settings.

LIMITATIONS AND FURTHER ANALYSIS

- Several limitations need to be acknowledged including the cross sectional design, the lack of DXA scans and serum biomarkers and the lack of fracture characterization (low vs. high trauma)
- Future longitudinal studies are needed to assess fracture outcomes and guide interventions (diet, exercise, etc) tailored to aging PWH in SSA
- While PI use may not be avoided in people failing first line regimens, TDF sparing regimens should be explored; given the cost and non availability of TAF or abacavir, dual TDF sparing regimens should be explored and tested in this settings

Contacts

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