Low Bone Mineral Density in Men Living with HIV on Tenofovir Antiretroviral Therapy: A Cross-Sectional Exploratory Study from a Malaysian Tertiary Hospital

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Abstract

Background and objectives: Low bone mineral density (BMD) is a recognized complication in people living with HIV (PLHIV) that remains under-addressed, particularly in Malaysia. Known contributing factors for low BMD include advanced age, HIV infection itself, and prolonged use of anti-retroviral therapy (ART), particularly tenofovir-based regimens. There are limited data on the burden of low BMD in the HIV population in Malaysia. This study aimed to determine the prevalence of low BMD among men living with HIV on tenofovir disoproxil fumarate (TDF) and to identify the possible associated factors compared to a group of healthy individuals matched for age and ethnicity.

Methods: This is single-center cross-sectional study involved 112 men (56 HIV-positive individuals and 56 uninfected individuals matched for age and ethnicity) who underwent dual-energy X-ray absorptiometry (DXA) scans of the femoral neck and lumbar spine. Sociodemographic, clinical lifestyle, and laboratory data, including FRAX scores for those aged more than 40 years old, were collected. Results: The prevalence of low BMD at the femoral neck in HIV-infected men on tenofovir disoproxil fumarate was significantly higher compared to healthy individuals (32.1% vs. 16.1%; $p < 0.05$). Low BMD prevalence at the lumbar spine was higher in the HIV group (8.9% vs. 3.6%; $p = 0.463$) but was not statistically significant. Older age and low body mass index (BMI) were found to be significantly associated with reduced BMD in HIV patients. Chronic kidney disease stage 2 and 3a was linked with low femoral neck BMD. HIV-related factors (duration of illness, duration of ART exposure, and CD4+ counts) showed no significant associations to low BMD. The 10-year risk of major osteoporotic and hip fractures estimated by the FRAX tool was low in both groups, and no participant exceeded the recommended intervention threshold. Conclusions: Men with HIV on tenofovir disoproxil fumarate have a higher prevalence of low BMD, particularly at the femoral neck. Traditional risk factors were more closely associated with low BMD compared to HIV-related factors and specific markers, supporting the need for routine bone health screening and preventive strategies in this population.

Author keywords

anti-retroviral therapy; bone mineral density; DXA scan; HIV; tenofovir

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