



## Differences in dietary intake in early postmenopausal women with different levels of areal and volumetric bone mineral density: a cross-sectional analysis of baseline data from an intervention study

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Osteoporosis is a degenerative disease of the bone. The rate of bone loss is accelerated during the first postmenopausal years in women which results in their disproportionate prevalence of osteoporosis<sup>(2)</sup>. Some of the factors contributing to the development and maintenance of bone mineral density (BMD) relate to diet, particularly the intake of protein, calcium and other micronutrients that play a crucial role in bone composition<sup>(3)</sup>. The most common method of measuring BMD is dual-energy X-ray absorptiometry (DXA) which generates a two-dimensional image of the scan site (typically spine, hip and/or forearm) to determine areal BMD (aBMD). However, new methods have recently emerged, including High Resolution peripheral Quantitative Computed Tomography (HRpQCT), that offer more accurate three-dimensional measurements of volumetric BMD (vBMD) and microstructure of distal tibia and radius<sup>(4)</sup>. The aim of this study was to examine the differences in the dietary intake of nutrients that represent organic or inorganic components of the bone, in early postmenopausal women with different spine aBMD and tibia and radius vBMD levels. One hundred and fourteen healthy early postmenopausal women with a lumbar spine or total hip BMD T score > -2.5 (measured by DXA) were recruited as part of a larger interventional study. Dietary intake was recorded using a 297-point self-reported validated food frequency questionnaire<sup>(5)</sup> for assessing the intake of energy, macro and micronutrients. Physical activity was self-reported using the validated Active Australia Questionnaire. Years since menopause were self-reported. DXA and HRpQCT scans measured L1-L4 spine, proximal femur aBMD, and distal tibia and radius vBMD respectively. Non-parametric statistical tests examined differences in dietary intake and physical activity levels between women at different levels of aBMD and vBMD. Data reported as median and interquartile ranges. There were no significant differences observed in the total sample between tertiles of aBMD and vBMD, regarding nutrient intake. However, for women with less than 3 years since menopause (i.e., the time-period of accelerated bone loss), lower dietary intakes of energy [8,658(3,324) vs 10,068(3,688) kJ/day;  $p = 0.047$ ], protein [94(29) vs 103(32) g/day; ( $p = 0.044$ )], sodium [1,927(992) vs 2,625(2,185) mg/d; ( $p = 0.044$ )], potassium [4,064(1,373) vs 5,121(2,377) mg/d; ( $p = 0.041$ )], calcium [969(325) vs 1,214(652) mg/d; ( $p = 0.028$ )] and zinc [10(3) vs 12(4) mg/d; ( $p = 0.005$ )] were observed for women with osteopenia ( $-1 < \text{L1-L4 aBMD T-score} < 2.5$ ) compared to those with normal L1-L4 aBMD (i.e., T-score > -1). No significant differences were observed for women with more than 3 years since menopause, with the only exception of alcohol intake ( $p = 0.033$ ), which was found to be lower in women with osteopenia compared to those with normal aBMD. These findings highlight the importance of targeting osteopenic women within the first 3 years following menopause as candidates for tailored dietary intervention programs for preventing osteoporosis.

**Keywords:** bone mineral density; dietary intake

### Ethics Declaration

Yes

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### References

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