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Nutrient intakes and bone mineral density of post-menopausal women residing in Northern Ireland

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Genetic factors explain about 80% of bone strength⁽¹⁾, however, bone mineral density (BMD) and bone metabolism are also affected by a number of environmental, hormonal and modifiable lifestyle factors, of which diet has been shown to play a prominent role⁽²⁾. Oestrogen depletion that occurs during the menopause has a negative effect on BMD, putting post-menopausal women at a greater risk of low BMD or osteoporosis⁽³⁾. The aim of this study was to compare intakes of macro- and micronutrients associated with bone health, between women with osteopenia and those with a normal BMD.

Post-menopausal women (*n* 300) (45–75 years) were recruited between October 2008 and June 2009. Nutrient intakes were estimated for 291 women from 4-d food diaries. BMD was measured in the first to fourth lumbar vertebrae (L1–L4) and left proximal femur by dual-energy X-ray absorptiometry.

Osteopenic women had significantly lower estimated dietary intakes of Ca, P and protein than those with normal BMD, with intakes of Ca below the UK reference nutrient intakes (RNI)⁽⁴⁾ (Table 1). Spearman’s rank analysis revealed a positive correlation between protein intake (g/d) and femoral BMD (*r* = 0.02, *P* = 0.041), albeit no relationship between dietary Ca or P and BMD was found. Both groups had median intakes of Mg and vitamin D below the RNI.

	Normal BMD (<i>n</i> 139)		Osteopenic BMD (<i>n</i> 152)		UK RNI*	<i>P</i> value
	Median	P5, P95	Median	P5, P95		
Ca (mg/d)	741.0	398.0, 1390.0	663.5	368.1, 1221.5	700	0.010†
Vitamin D (µg/d)	2.4	0.8, 5.9	2.0	0.5, 5.3	10‡	0.160
P (mg/d)	1176.0	772.0, 1799.0	1093.0	691.6, 1657.4	§	0.030†
Mg (mg/d)	241.0	149.0, 385.0	229.0	127.0, 365.6	270	0.205
Protein (g/d)	72.6	51.5, 99.8	69.0	46.7, 94.8	46.5	0.009†
Protein (%)	17.0	13.2, 24.3	16.9	13.5, 23.9		0.848
Protein (g/d/MJ)	10.2	7.8, 14.5	10.1	8.0, 14.3		0.874

*RNI PM♀ Source: Dietary Reference Values for food Energy and Nutrients for the UK 1991.

†Significant difference between groups with normal and osteopenic BMD values as determined by Mann–Whitney *U*-test (*P* < 0.05).

‡For the population aged 65 or more only and for those aged 4–65 years who are at risk for inadequate UVB sunshine exposure.

§1 mg P: 1 mg Ca.

Osteopenia is defined as a BMD between 1 and 2.5 sd below that of young adults (T-score –1 to –2.5).

Osteopenia was associated with lower intakes of bone related nutrients among post-menopausal women in Northern Ireland. Vitamin D intake was low in both groups; suboptimal vitamin D intakes have been reported before in post-menopausal women in Ireland⁽⁵⁾ and is an area for concern. Dietary advice to older women to optimise intakes of Ca, vitamin D and trace elements may have a beneficial effect on bone health.

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