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Vitamin D status and bone turnover in post-menopausal South Asian and Caucasian women living in Blackburn, UK

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Vitamin D deficiency impairs Ca and P absorption, resulting in poor mineralization of the skeleton[(1)]. Evidence from recent studies indicates that a low serum level of 25-hydroxyvitamin D (cholecalciferol + ergocalciferol) is associated with low bone mineral density in older adults[(2)]. Suboptimal vitamin D status has been reported in UK Asian populations[(3)], which may lead to increased fracture risk post menopause. The purpose of the present study was to conduct a comparative investigation of vitamin D status, bone quality and bone turnover in post-menopausal South Asian (SA) and Caucasian (C) women living in Blackburn, Lancs., U.K.

Apparently-healthy post-menopausal C and SA women aged 50–65 years were identified from the health centre database at a general practice in an area of Blackburn, Lancashire, UK, serving a large SA population. Exclusion criteria included: use of steroid medication; Ca and/or vitamin-D supplementation; hormone-replacement therapy; renal diseases; diuretic use; gastrointestinal disorders. All women recruited were at least 1 year post menopause. Fasting blood was taken from sixty-six SA and forty-two C post-menopausal women. Plasma concentration of type-1 collagen β C-telopeptide (βCTX; a marker of bone resorption) and procollagen type-1 amino-terminal propeptide (P1NP; a marker of bone formation) were measured using electrochemiluminescence assays (Roche Diagnostics, Lewes, East Sussex, UK). Intact parathyroid hormone (PTH) levels were measured using sandwich immunoassay (PTH STAT; Roche Diagnostics) and bone-specific alkaline phosphatase activity (BAP) by immunoassay (Metra BAP EIA kit; Technoclone Ltd, Dorking, Surrey, UK). Serum 25-hydroxycholecalciferol ($25(OH)D_3$) was measured by HPLC–MS–MS. All assays were performed in the Department of Clinical Chemistry, Royal Liverpool Hospital, Liverpool, UK. Bone quality was assessed using broadband ultrasound attenuation (BUA) of the calcaneus (CUBA Clinical Ultrasonometer; McCue Plc, Winchester, Hants., UK).

Serum $25(OH)D_3$ was significantly lower in the SA women than the C women. This lower $25(OH)D_3$ was associated with a significantly elevated serum PTH concentration in the SA group. BAP was also significantly higher in the SA group, indicating elevated osteoblast activity. No significant differences were observed between the two groups for P1NP, βCTX or BUA scores.

	SA		C		
Biomarker	Mean	SD	Mean	SD	*P*
Serum $25(OH)D_3$ (ng/ml)	4.1	0.4	16.3	0.9	0.001
PTH (pmol/l)	8.2	0.7	5.0	0.3	0.01
BAP (U/l)	25.9	1.6	21.5	1.1	0.05

These results concur with previous reports of suboptimal vitamin D status and secondary hyperparathyroidism in SA populations in the UK. However, although BAP values are elevated, the levels of the other markers of bone turnover and of the BUA scores suggest that these SA women do not have a concurrent increase in bone turnover or impaired bone quality compared with C women. These data support previous research suggesting that SA individuals may have an altered vitamin D metabolism that protects their skeleton from excessive resorption despite low vitamin D status[(4)].

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