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Ethnic differences in vitamin D and Interleukin-6 levels in healthy South Asian and Caucasian women revealed by the D2-D3 study

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Vitamin D is most commonly known for its importance to bone health, but growing evidence suggests that it also has a role in regulating immune function and the inflammatory response. Vitamin D supplementation has recently been shown to reduce the risk of acute respiratory tract infection[1] and greater levels of circulating vitamin D are associated with a lower risk of chronic disease such as multiple sclerosis[2]. Interleukin-6 (IL-6) is an immune function marker, released in the inflammatory response and has been shown to be inhibited by vitamin D[3]. The present study aimed to determine any ethnic differences in IL-6 and serum 25-hydroxyvitamin D (25OHD) at baseline between South Asian and Caucasian women.

A total of 54 subjects (South Asian n = 22, Caucasian n = 32) were selected from the D2-D3 study[4] based on the greatest 25OHD changes across the 12 week intervention period. Plasma samples were analysed from Visit 1 (baseline). IL-6 was quantified using high-sensitivity enzyme-linked immunosorbent assay (R&D Systems, Minneapolis, MN, USA) and all standards and samples were plated in duplicate. Serum 25OHD levels had previously been determined and were therefore available for use in this study. The D2-D3 study had ethical approval from both the South-East Coast (Surrey) NHS Research Ethics Committee (NHS REC No. 11/LO/0708) and the University of Surrey Ethics Committee (Fast-Track EC/2011/97/FHMS).

At baseline, IL-6 concentration was significantly higher in the South Asian women (1·83pg/mL IQR 0·85) compared to the Caucasian women (1·24pg/mL IQR 0·75) (P = 0·023) and serum 25OHD was significantly lower in the South Asian women (28·09 ± 15·8 nmol/L) compared to the Caucasian women (55·98 ± 24·8 nmol/L) (P < 0·001). No correlations (negative or positive) were found between serum 25OHD and IL-6 in either the South Asian (r −0·186, p = 0·407) or Caucasian (r −0·090, p = 0·625) women.

	South Asian (n = 22)				Caucasian (n = 32)				
	Mean	SD	Median	IQR	Mean	SD	Median	IQR	*P* value
25OHD (nmol/L)	28·09	15·77	22·20	24·67	55·98	24·76	48·75	41·90	<0·001*
IL-6 (pg/mL)	1·99	1·03	1·83	0·85	1·48	0·64	1·24	0·75	0·023†

* P < 0·05 Independent Samples T-test, †P < 0·05 Mann Whitney U test, IQR, Interquartile Range.

The present study shows a significant ethnic difference in both IL-6 and serum 25OHD concentrations at baseline with South Asian women having greater IL-6 and lower 25OHD levels than Caucasian women. Very few studies have looked at IL-6 and vitamin D in a UK-based South Asian population, although a cross-sectional study carried out in West London found that IL-6 was significantly higher in South Asian women compared to European women[5]. An ethnic difference in serum 25OHD levels between South Asian and Caucasian women has previously been identified, with South Asian women being identified as vitamin D deficient[6]. The present study supports both of these previous findings. Further work is underway to investigate the effect of vitamin D supplementation, compared to placebo, on Interleukin-6 and serum 25OHD after 6 and 12 weeks intervention in the selected participants.

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