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## Seasonal variation in vitamin D status in overweight and obese people of Iraqi and Caucasian descent

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It is well known that vitamin D plays an active role for calcium and phosphorus absorption but there is also growing evidence of an association between vitamin D insufficiency and various chronic diseases<sup>(1)</sup>. Middle Eastern populations are known to be at risk of vitamin D deficiency due to a diet low in vitamin D and low sunshine exposure<sup>(2)</sup>. Obesity is also a risk factor for low plasma levels of 25(OH)D since it is sequestered in body fat<sup>(3)</sup>. This study examined dietary intake of vitamin D and serum 25(OH) D in overweight and obese Iraqi people in the UK compared to a Caucasian group at two time points: end of summer (October) and winter (January).

Participants were recruited through Plymouth University via posters and electronic advertisements. Participants were included if they were aged 18 years or more, and had a high percentage of body fat (>20% males and >30% females). Exclusion criteria included those taking vitamin D containing supplements, pregnancy or lactation, low or normal percentage body fat or BMI<25. Participants completed a screening/ demographic questionnaire and were instructed on the completion of a 3-day diet diary. Body composition was measured using bioelectrical impedance (Tanita, Model TBF-300 M). Height, and weight were also measured at week 0 (October) and again at week 12 (January). Participants were asked not to lose weight during this time and to keep diet and exercise habits unchanged. Fasting blood samples were also taken at weeks 0 and 12 for determination of 25(OH)D using isotope-dilution liquid chromatography-tandem mass spectrometry<sup>(4)</sup>. A total of 36 participants completed the study (12 Iraqi and 24 Caucasian).

Serum 25(OH)D and Dietary intake of Vit D	Iraqi(n = 12)		Caucasian (n = 24)		Difference between Ethnic groups
	Mean	SD	Mean	SD	
25(OH)D nmol/l (Oct)	25.5	11.5	59.2	24.5	P<0.001
25 (OH)D nmol/l(Jan)	16.4	5.4	42.0	20.5	P<0.001
Intake of Vit D µg/d (Oct)	2.4	1.2	2.8	2.1	NS
Intake of Vit D µg/d (Jan)	1.6	1.0	2.8	2.2	0.037

Range of Serum 25(OH)D	Iraqi(n = 12)		Caucasian (n = 24)	
	n	%	n	%
25–50 nmol/l (Oct)	4	33	10	42
25–50 nmol/l (Jan)	1	8	12	50
<25nmol/l (Oct)	8	67	1	4
<25nmol/l (Jan)	11	92	5	21

In conclusion, Iraqi participants had significantly lower serum levels of 25(OH)D than Caucasians at both time points. Vitamin D intakes were lower in the Iraqi group than in the Caucasians in January and this, as well as limited sun exposure, will contribute to low serum levels in the Iraqi group. All Iraqi individuals had less than optimum serum 25(OH)D levels<sup>(5)</sup> at the end of summer which continued to decline during winter so that all but one had a serum level indicative of deficiency in January (<25 nmol/l). However, the majority of the Caucasians had low serum levels in January; over 20%<25 nmol/l, indicative of deficiency. It is likely that all Middle Eastern immigrants require vitamin D supplementation in the UK.

1. Holick (2004) *Am J Clin Nutr* **80**, 1678S–1688S.
2. Mithal *et al.* (2009) *Osteoporosis International* **20**, 1807–1820.
3. Wartsman *et al.* (2000) *The American Journal of Clinical Nutrition* **72**, 690–693.
4. Maunsell *et al.* (2005) *Clinical Chemistry* **51**, 1683–1690.
5. Malabanan *et al.* (1998) *Lancet* **351**, 805–806.