Determinants of serum 25-hydroxyvitamin D levels in healthy young adults living in the Western Cape, South Africa

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The prevalence of vitamin D deficiency is fast emerging as a global pandemic. In South Africa few studies have been conducted to determine the vitamin D status of the healthy population.

This cross-sectional phase of a larger study investigated vitamin D status of healthy, undergraduate students (20.41±2.29 years old) at Stellenbosch University, South Africa. Data was collected 6 weeks post winter solstice and included serum 25(OH)D, anthropometry, dietary vitamin D intake (food-frequency questionnaire), skin tone (Fitzpatrick Skin Type Classification), and skin reflectometry (to measure dermal melanin content) (Figure 1).

Summary statistics, analysis of variance and non-parametric methods were used. Serum 25(OH)D levels were interpreted using the Institute of Medicine guidelines (Table 1).

Results of the 242 students indicated a mean serum 25(OH)D of 63.80±41.35 ng/ml and a high prevalence of vitamin D sufficiency (88%). Males had significantly higher mean serum 25(OH)D levels than females (p<0.01) (Figure 2), with significantly more females experiencing suboptimal 25(OH)D levels than males (18 vs. 5%; p<0.01). Participants with lighter skin tones (II and III) had higher levels of 25(OH)D than those with darker skin tones (IV and V) (Chi²=24.02; p=0.02) (Figure 3). The Indian population had the lowest mean serum 25(OH)D levels (38.42 ± 22.51 ng/ml), and the highest level of deficiency (23%).

The majority of participants (61%) had normal BMIs, although the relationship between BMI and serum 25(OH)D was not significant (Spearman’s r=-0.11; p=0.09). A positive correlation was found between height and serum 25(OH)D, with taller participants having higher serum 25(OH)D levels (Figure 4).

Total mean vitamin D intake was 7.99±13.81 mcg, with 87% consuming inadequate intake (<15mcg). More vitamin D came from the diet than from supplemental sources (63% and 37% respectively). The most commonly consumed vitamin D rich food groups were Milk and Milk Products, and Fish and Seafood. The relationship between total vitamin D intake and serum 25(OH)D was significant (Spearman r=0.14; p=0.03).

Sun exposure & lifestyle factors did not have an effect on serum 25(OH)D levels in this study.

A low prevalence of vitamin D deficiency was found amongst healthy young adults, despite low dietary vitamin D intakes.

Significant relationships were found between serum 25(OH)D and gender, height, skin tone and vitamin D intake.

Further studies need to be conducted, especially in high-risk groups, before results are applied to the greater South African public.

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