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Associations between vitamin D deficiency, leg muscle strength and grip strength in an immigrant population

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Background & Aim: A majority of immigrants from the Middle East and Africa who live in northern Sweden were found to have vitamin D deficiency or insufficiency. Our aim was to examine the impact of vitamin D status on muscular strength in this population.

Methods: The cross-sectional population-based Vitamin D Deficiency in Immigrants (VIDI1) study was conducted from September 2009 till June 2010. All immigrants, ages 25-65 years originating from nine African or Middle East countries living in three districts in Umeå were invited. 216 immigrants participated; 111 men and 106 women. The participation rate was 16,5%. 73 % of the immigrants had 25(OH)D3 <50 nmol/L and 12 % had vitamin D deficiency (25(OH)D3 <25 nmol/L). Mean 25(OH)D3 was 41,0 nmol/L with no significant difference between men and women. Participants were examined with the Standardised Muscle strength test of lower extremities and a JAMAR hand dynamometer. S-25(OH) D3 was measured with HPLC. Anthropometry, medical history, socioeconomic and lifestyle data were registered.

Results: Immigrants with vitamin D deficiency had significantly weaker leg muscle strength ($p=0,004$) and grip strength ($p=0,029$) compared to other immigrants. 25(OH)D3 levels were significantly lower in immigrants with weakness in leg muscle strength ($p=0,005$).

Other variables significantly associated with leg muscle weakness were obesity, low education level, occurrence of sick leaves and high age. Weakened grip strength was also significantly associated with being female, high age, occurrence of sick leaves and low education level. After adjustment for these variables leg muscle weakness and grip strength remained significantly associated with vitamin D deficiency ($p=0,049$ and $p=0,022$) in multiple regression analyses.

Conclusions: Our results support that vitamin D deficiency is significantly associated with weakened leg and grip strength. Doctors should be aware that vitamin D deficiency is not uncommon and might have negative health impact in immigrants from Africa and the Middle East.