

The association between circulating 25-hydroxyvitamin D concentration and Grip Strength and Timed-Up and Go test in 70+ year old adults: Baseline findings from the Vitamin D Supplementation in Older People (VDOP) study

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Vitamin D has important regulatory effects in muscle tissue⁽¹⁾. Cross sectional studies demonstrate that circulating 25-hydroxyvitamin D (25OHD) [the indicator of vitamin D status] is associated with better muscle function but the optimal 25OHD concentration for muscle function is not universally agreed. The objective of this study was to identify the association between serum 25OHD concentration and Grip Strength (GS) and Timed-Up and Go test (TUG) using 25OHD thresholds used in North America (≥ 50 nmol/l)⁽²⁾ and the UK (≥ 25 nmol/L)⁽³⁾ used to define nutritional adequacy for vitamin D.

A total of 377 male and female adults aged >70 years living in the North-East of England were recruited. GS (in kg) was measured by a hand grip dynamometer and TUG was measured as the time (in seconds (s)) to walk 2 m distance. Serum 25OHD concentration was measured by LC-MS. Weight, height and body composition were also measured. In separate analyses, individuals were grouped according to the circulating 25OHD concentration < or ≥ 25 nmol/L and < or ≥ 50 nmol/L. Male and female older adults were grouped into two separately, based on the gender specific median values of GS and TUG test values. The odds ratios to have high GS and low TUG test values were identified using logistic regression analysis after adjusting for age, weight, height and body composition.

Classification	n	Males			Females			
		OR*	CI	p	OR*	CI	p	
GS								
SACN	25OHD < 25 nmol/L	102	0.371	0.163–0.841	0.018	0.652	0.334–1.272	0.209
	25OHD ≥ 25 nmol/L	275	Reference			Reference		
IOM	25OHD < 50 nmol/L	271	1.202	0.61–2.341	0.588	0.739	0.355–1.538	0.419
	25OHD ≥ 50 nmol/L	106	Reference			Reference		
TUG test								
SACN	25OHD < 25 nmol/L	102	1.274	0.59–2.741	0.536	0.695	0.358–1.350	0.283
	25OHD ≥ 25 nmol/L	275	Reference			Reference		
IOM	25OHD < 50 nmol/L	271	0.910	0.474–1.74	0.777	0.537	0.257–1.120	0.098
	25OHD ≥ 50 nmol/L	106	Reference			Reference		

Mean serum 25OHD concentration of older adults was 39.8 (± 19.9) nmol/L. About 21.0 % of males and 33.7 % of females had serum 25OHD concentration less than 25 nmol/L. Similarly, 67.9 % of males and 76.2 % of females had serum 25OHD concentration less than 50 nmol/L. Only for male, those with serum 25OHD concentration lower than 25 nmol/L were significantly more likely to have lower GS compared to the individuals who had serum 25OHD concentration higher than 25 nmol/L. However, there was no significant relationship between 25OHD status and TUG for either gender. In conclusion, in male older adults, serum 25OHD concentration lower than 25 nmol/L is associated with lower GS but there was no evidence of musculoskeletal benefit from having serum 25OHD concentrations higher than 50 nmol/L for either gender. Therefore, based on this cross sectional analysis, the optimum serum 25OHD concentration to maximize the muscle strength for older males is likely to be between 25–50 nmol/L.

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