S-25OHD is Associated with Hand Grip Strength and Myopathy at Five Years in Girls: An Odense Child Cohort Study

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Conclusion

Five-year s-25OHD was independently associated with HGS and myopathy in girls, but not in boys. No associations with pregnancy or cord s-25OHD were seen.

Muscle strength may be dependent on actual vitamin D status even in the higher range in preschool girls.

Introduction

Hypovitaminosis D (s-25OHD <50 nmol/L) is prevalent worldwide in all age groups. Severe vitamin D deficiency may lead to myopathy in adults. Little is known about vitamin D and muscle strength in children.

Objectives

To determine explanatory variables for 5-year hand grip strength (HGS) including serum 25-hydroxyvitamin D (s-25OHD) during pregnancy, at birth and at 5 years.

Methods

Data collected from the prospective, observational Odense Child Cohort (OCC): Questionnaires and blood samples in early and late pregnancy, at birth and at five years. Anthropometrics, body fat percentage by skin fold measurements and HGS at 5 years

Inclusion: Children in the OCC, now 5 years old.

Exclusion: Multiple birth, preterm birth (gestational age <259 days), chronic disease, no available HGS measurements.

Statistics: Multiple regression analyses on associations between:

- S-25OHD → hand grip
- S-25OHD → myopathy (HGS <10th percentile)

Adjusting for Height, weight, and body fat percentage. Stratified by sex.

Results

N= 499 with 5-year s-25OHD and HGS

HGS mean (SD) ♂ 8.76 (1.76) kg vs. ♀ 8.1 (1.64) kg, p<0.001.

5-year s-25OHD mean (SD) 70.7 (24.5) nmol/L.

In adjusted analyses, HGS was independently associated with

- height, weight (direct) ♀
- body fat percentage (inverse) ♀, ♂
- 5-y s-25OHD (direct) ♀
- 5-y s-25OHD ≥75 vs. <50 nmol/L, ♀

(Table 1).

Odds of myopathy

- reduced by 69% for s-25OHD ≥50 vs. <50 nmol/L ♀

S-25OHD in pregnancy/cord: No associations with HGS

Table 1. Adjusted associations to hand grip strength in 5-y- old children.

Multiple regression	Girls		Boys	
n=493	β coefficient [95% CI]	p-value	β coefficient [95% CI]	p-value
HGS, continuous				
Height (cm)	0.117 [0.043;0.192]	0.002	0.026 [-0.054;0.105]	0.529
Weight (kg)	0.179 [0.025;0.333]	0.023	0.448 [0.275;0.620]	<0.001
Body fat %	-0.129 [-0.209;-0.048]	0.002	-0.156 [-0.247;-0.066]	0.001
5-y s-25OHD , cont.	0.011 [0.004;0.019]	0.003	0.006 [-0.001;0.013]	0.103
75 vs. <50 nmol/L	0.783 [0.325;1.241]	0.001	0.382 [-0.108;0.872]	0.126
HGS, myopathy				
≤10p vs. >10p	aOR [95% CI]	p-value	aOR [95% CI]	p-value
Height (cm)	0.773 [0.637;0.937]	0.009	0.993 [0.823;1.198]	0.940
Weight (kg)	1.016 [0.688;1.501]	0.935	0.563 [0.349;0.907]	0.018
Body fat (%)	1.216 [0.986;1.499]	0.068	1.079 [0.860;1.354]	0.509
5-y s-25OHD	0.310 [0.126;0.762]	0.011	0.530 [0.203;1.387]	0.196
≥50 vs. <50 nmol/L				

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