

# VITAMIN D STATUS OF ADULTS WITH GROWTH HORMONE DEFICIENCY

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Vitamin D and growth hormone/insulin-like growth factor-1 (GH/IGF-1) axis are reported to interplay at both endocrine and paracrine levels, with a positive correlation between IGF-1 and 25-hydroxyvitamin D (25(OH)D) in healthy subjects. Hyposomatotropism is among the conditions predisposing to lower vitamin D status due to several direct and indirect mechanisms.

## Aim of the research

The aim of the study was to evaluate vitamin D status in a representative sample of adults with GH deficiency (GHD) and to investigate the association between serum 25(OH)D and age, gender and onset of hyposomatotropism.

## Patients and methods

This cross-sectional study included **129 adult patients** (70 males, aged 42.1 ± 16.6 years) diagnosed with GHD [childhood-onset GHD (COGHD): n=54] in the Clinical Centre of Endocrinology in Sofia, Bulgaria (latitude 41°-44° N). **Total serum 25(OH)D** was the vitamin D metabolite used to assess vitamin D status and was measured by **electro-chemiluminescence binding assay** (COBAS, Roche Diagnostics International Ltd.; analytical sensitivity - 4.01 ng/ml; within-run and intermediate precisions - ≤ 6.5% and ≤ 11.5%, respectively) which employs vitamin D binding protein to capture both 25-hydroxyvitamin D<sub>3</sub> and D<sub>2</sub>. **Vitamin D status and GHD** were defined according to the **Endocrine Society Clinical Practice Guideline recommendations**. Statistical analysis was performed using **SPSS for Windows, version 23.0**.

## Results

Serum 25(OH)D levels were evaluated in 70 men and 59 women with hyposomatotropism, with **men being 8 years younger** in their mean age (p = 0.006). The two study subgroups divided in accordance with the onset of the GHD also differed significantly in their mean age – the 54 subjects with **COGHD were almost twice younger than AOGHD patients** (p < 0.0001). (Table 1)

	All	Men	Women	COGHD	AOGHD
Number (%)	129 (100%)	70 (54.3%)	59 (45.7%)	54 (41.9%)	75 (58.1%)
Age min – max (years)	18 – 82	18 – 77	18 – 82	18 – 58	20 – 82
Mean age ± SD (years)	42.1 ± 16.6	38.5 ± 16.4*	46.5 ± 16.1*	29.4 ± 12.1**	51.3 ± 12.9**

**Table 1. Descriptive characteristics of the study population**

\*p < 0.05 mean age of men vs. women

\*\*p < 0.05 mean age of COGHD patients vs. AOGHD patients

## Conclusion

Data from our study demonstrated considerably high prevalence of hypovitaminosis D in GHD adults, with lower 25(OH)D concentrations among the subgroup with AOGHD. Therefore, 25(OH)D testing is highly recommended in patients with hyposomatotropism. Normalization of vitamin D status might have beneficial effects in GHD subjects, especially considering the additive effects of vitamin D and GH replacement.

## References:

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Only **6.2%** (n=8) of our study participants had adequate vitamin D status with serum 25(OH)D concentrations of 30 ng/ml or higher. The predominant part of the study cohort was diagnosed with **vitamin D deficiency** - 102 subjects (**79.1%**); the remaining **14.7%** (n=19) of the patients were with **vitamin D insufficiency** (serum 25(OH)D between 20 and 29.9 ng/ml). (Table 2)

25(OH)D (ng/ml)	All	Men	Women	COGHD	AOGHD
Min – Max	3.9 – 49.9	6.8 – 35.6	3.9 – 49.9	5.4 – 35.6	3.9 – 49.9
Mean ± SD	15.1 ± 7.6	15.7 ± 7.2	14.5 ± 8.1	16.8±8.0*	14.0±7.2*
≥ 30.0 (%)	6.2%	8.6%	3.4%	11.1%	2.6%
20.0 - 29.9 (%)	14.7%	14.3%	15.3%	14.8%	14.7%
< 20.0 (%)	79.1%	77.1%	81.3%	74.1%	82.7%

**Table 2. Serum 25(OH)D levels of the study population**

p < 0.05 mean 25(OH)D levels of COGHD patients vs. AOGHD patients

We also analyzed the distribution of the participants in the 3 categories of vitamin D status (adequate, insufficient and deficient) but found no significant difference comparing men vs. women (p=0.115) and COGHD vs. AOGHD subjects (p=0.239).

**Mean 25(OH)D levels (15.1 ± 7.6 ng/ml)** corresponded to the high prevalence of impaired vitamin D status in our cohort of GHD patients. 25(OH)D concentrations **did not differ between men and women** (p = 0.387) (Table 2) and were **negatively and weakly correlated with age** (r = -0.256; p = 0.003) (Data not shown). In the younger group of **COGHD subjects**, however, mean serum **25(OH)D was significantly higher** compared with AOGHD participants (p = 0.039) (Table 2).