Risk Factors for Hypovitaminosis D in Gerontopsychiatric Patients

To the Editor: In the elderly, the prevalence of hypovitaminosis D is high.[1] Normative data for vitamin D deficiency are a matter of debate; most authors diagnose vitamin D deficiency in patients with 25-hydroxyvitamin D levels of < 10 μg/L and vitamin D insufficiency at levels of 10–30 μg/L.[2] The clinical significance of hypovitaminosis D for skeletal health is well established. However, theoretical considerations, in vitro studies, and several clinical investigations suggest a potential role for vitamin D in neuropsychiatric disorders.[3] Vitamin D binds to an intracellular steroid receptor that is detected in a number of brain areas, including the cortex, cerebellum, amygdala, and hippocampus.[4] The aim of this study was to investigate the prevalence and risk factors for vitamin D deficiency in gerontopsychiatric patients.

Method. Within the framework of this retrospective cohort study, and as part of the inpatient clinical routine, we analyzed serum concentrations of 25-hydroxyvitamin D of all patients ≥ 65 years old who were admitted to the gerontopsychiatric wards of the Central Institute of Mental Health in Mannheim, Germany, which is located at a latitude of 49.5°N. According to the diagnosis leading to their admission, the patients were divided in 2 groups: those with dementia versus those without dementia (most of the non-dementia patients had depression). *ICD-10* criteria were used for diagnosis. Age, sex, previous dependence regarding activities of daily living, housing situation, and comorbidity were assessed. Comorbidity was defined as a score on the Charlson Comorbidity Index[5] ≥ 1. Between-group comparisons were performed using the nonparametric Wilcoxon test. Patients with established vitamin D deficiency received supplementation.

Results. In total, we were able to analyze data for 97 patients (mean [SD] age = 77.3 [6.6] y; 59 women, 38 men). The mean 25-hydroxyvitamin D concentration was low (14.77 [12.5] μg/L). Critical vitamin D levels of < 10 μg/L were detected in 44 patients (45.4%); levels of 10–30 μg/L were observed in 43 patients (44.3%); and higher levels, >30 μg/L, were found in only 10 patients (10.3%). Of the patients analyzed, 45 (46.4%) had dementia and 52 were diagnosed with various other diseases, with the majority of these patients suffering from depression. Patients living in nursing homes, those requiring help with the activities of daily living, and those with comorbidity were found to have lower vitamin D levels ($P < .05$; Table 1). Furthermore, a significant seasonal impact was detected. Only 7 patients (7.2%) had been receiving vitamin D supplementation before admission. No correlations between vitamin D levels and age, creatinine clearance, or serum calcium levels were noted.

In our study population, the prevalence of severe vitamin D deficiency was exceedingly high. In particular, patients who were institutionalized or aid dependent or who had comorbidity appeared to be at a risk. Only 10.3% of patients had normal vitamin D levels, and merely 7.2% had received supplementation before admission. Despite the declining ability of aging skin to synthesize vitamin D, we confirmed a seasonal impact on vitamin D levels. This observation should encourage the recommendation of frequent exposure to daylight, which is most likely a neglected method of treatment.

Remarkably, we did not observe a significant difference between dementia and non-dementia patients. Hypovitaminosis D has been repeatedly associated with dementia. On the other hand, a recent interventional study by Stein and colleagues[6] failed to show benefits of vitamin D treatment on cognition or disability in patients with mild-to-moderate Alzheimer's disease. Hypovitaminosis D could merely constitute a nonspecific epiphenomenon since patients with dementia frequently lead an inactive lifestyle or are institutionalized and therefore are less exposed to sunlight.

Table 1. 25-Hydroxyvitamin D Concentrations in 97 Gerontopsychiatric Patients[a]

Variable	All Patients	Sex		Diagnosis		Dependency		Housing		Comorbidity		Season	
		Female	Male	Dementia	Non-Dementia	Dependent	Independent	Institution	Home	Yes	No	Jan–Mar	Apr–Jun
Patients, n	97	59	38	45	52	71	26	27	70	79	18	49	48
25-hydroxyvitamin D level μg/L, mean	14.77	15.75	13.28	13.05	16.29	13.37	18.66	10.28	16.52	13.26	21.46	12.83	16.78
P value	…	.652		.115		**.009**		**.012**		**.021**		**.038**	
Patients with 25-hydroxyvitamin D level < 10 μg/L, n (%)	44 (45.4)	27 (45.8)	17 (44.7)	25 (55.6)	19 (36.5)	37 (52.1)	7 (26.9)	17 (63.0)	27 (38.6)	39 (49.4)	5 (27.8)	28 (57.1)	16 (33.3)

[a] *P* values shown in boldface type indicate a statistically significant difference in 25-hydroxyvitamin D level between the 2 subgroups in the respective categories.
Symbol: … = not applicable.

Our observations are limited by the lack of a control group with healthy subjects. Moreover, we were not able to assess exposure to sunlight and nutritional intake of vitamin D. While the potential role of vitamin D in psychiatric conditions is not yet well understood, there is a broad consensus that patients with vitamin D levels < 10 μg/L should receive supplementation, irrespective of the diagnosis of osteoporosis. However, additional clinical intervention studies on the safety and potential benefits of vitamin D supplementation are needed. Moreover, the optimal threshold for intervention needs to be defined on the basis of the findings of such clinical intervention studies.

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Wolfgang Gronau, MD
wolfgang.gronau@zi-mannheim.de
Lutz Froelich, MD
Stefan Schwarz, MD

Author affiliations: Department of Psychiatry and Psychotherapy (Drs Gronau and Schwarz) and Department of Geriatric Psychiatry (Dr Froelich), Central Institute of Mental Health, Medical Faculty Mannheim/Heidelberg University, Mannheim, Germany.

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