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SERUM 25-HYDROXYVITAMIN D LEVEL AND KIDNEY FUNCTION DECLINE IN A SWISS GENERAL ADULT POPULATION

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Supplementary material

Altitude, sunshine hours

In order to account for the fact that most of the 25(OH)D is synthesized following exposure to sunshine and in the absence of information on exposure to sunshine, studies generally adjust for month or season of blood sampling. We directly collected data on sunshine hours and altitude. To do so, participants were first geocoded by merging the information on the participant's private address with latitude, longitude and altitude information using Python programming and Google Maps Find Altitude software. Data on sunshine hours were obtained from the Swiss meteorological office (MeteoSwiss) which collects sunshine hours using meteorological stations distributed throughout Switzerland. For each participant, data on sunshine hours collected in the station nearest to the participant's home address were used. The exposure period considered in this study was the month before the participant's date of blood collection and was used to estimate the monthly mean sunshine hours.

Table S1 Associations of baseline vitamin D status with annual change in eGFR among participants with ACR <30 mg/g (i.e., no albuminuria) at baseline (N=4048)

Baseline 25(OH)D status	Annual change in eGFR (mL/min/1.73m^2)		
	Beta coefficients	95%CI	P value
Model 1 unadjusted			
Vitamin D sufficiency (>30 ng/mL)	0 (Ref)	--	--
Vitamin D insufficiency (20-30 ng/mL)	-0.23	-0.40, -0.05	0.01
Vitamin D deficiency (<20 ng/mL)	-0.44	-0.60, -0.28	<0.001
Model 2*			
Vitamin D sufficiency (>30 ng/mL)	0.0 (Ref)	--	--
Vitamin D insufficiency (20-30 ng/mL)	-0.20	-0.37, -0.03	0.02
Vitamin D deficiency (<20 ng/mL)	-0.39	-0.56, -0.22	<0.001
Model 2* + adjusted for log ACR at baseline			
Vitamin D sufficiency (>30 ng/mL)	0.0 (Ref)	--	--
Vitamin D insufficiency (20-30 ng/mL)	-0.19	-0.36, -0.01	0.03
Vitamin D deficiency (<20 ng/mL)	-0.37	-0.54, -0.20	<0.001
Model 2* + adjusted for eGFR at baseline			
Vitamin D sufficiency (>30 ng/mL)	0.0 (Ref)	--	--
Vitamin D insufficiency (20-30 ng/mL)	-0.03	-0.19, 0.12	0.67
Vitamin D deficiency (<20 ng/mL)	-0.05	-0.21, 0.10	0.50
Model 2* + adjusted for log ACR and eGFR at baseline			
Vitamin D sufficiency (>30 ng/mL)	0.0 (Ref)	--	--
Vitamin D insufficiency (20-30 ng/mL)	-0.03	-0.19, 0.12	0.68
Vitamin D deficiency (<20 ng/mL)	-0.05	-0.21, 0.10	0.51

ACR, urine albumin-to-creatinine ratio.*Model 2 is adjusted for age, gender, education, smoking status, physical activity, hypertension, diabetes, oral contraceptives (women), waist circumference, albumin-corrected calcium, Vitamin D supplements or medications, hsCRP, triglycerides, and HDL-cholesterol.

The proportions of participants without albuminuria at baseline with vitamin sufficiency (>30 ng/mL), insufficiency (20-30 ng/mL), and deficiency (<20 ng/mL) were as follows: 535/4048 (13.2%), 1347/4048 (33.3), and 2166/4142 (53.5%).

Table S2 Associations of baseline vitamin D status with rapid decline in eGFR among participants with ACR <30 mg/g (i.e., no albuminuria) at baseline (N=4048)

Baseline 25(OH)D status	Rapid eGFR decline		
	OR	**95%CI**	**P value**
Model 1 unadjusted			
Vitamin D sufficiency (>30 ng/mL)	1.00 (Ref)	--	--
Vitamin D insufficiency (20-30 ng/mL)	1.22	0.75, 1.98	0.42
Vitamin D deficiency (<20 ng/mL)	1.86	1.19, 2.91	0.006
Model 2*			
Vitamin D sufficiency (>30 ng/mL)	1.00 (Ref)	--	--
Vitamin D insufficiency (20-30 ng/mL)	1.18	0.72, 1.92	0.51
Vitamin D deficiency (<20 ng/mL)	1.74	1.09, 2.76	0.02
Model 2* + adjusted for log ACR at baseline			
Vitamin D sufficiency (>30 ng/mL)	1.00 (Ref)	--	--
Vitamin D insufficiency (20-30 ng/mL)	1.17	0.72, 1.91	0.53
Vitamin D deficiency (<20 ng/mL)	1.71	1.08, 2.73	0.02
Model 2* + adjusted for eGFR at baseline			
Vitamin D sufficiency (>30 ng/mL)	1.00 (Ref)	--	--
Vitamin D insufficiency (20-30 ng/mL)	1.02	0.62, 1.68	0.93
Vitamin D deficiency (<20 ng/mL)	1.31	0.82, 2.10	0.26
Model 2* + adjusted for log ACR and eGFR at baseline			
Vitamin D sufficiency (>30 ng/mL)	1.00 (Ref)	--	--
Vitamin D insufficiency (20-30 ng/mL)	1.02	0.62, 1.68	0.93
Vitamin D deficiency (<20 ng/mL)	1.31	0.82, 2.10	0.26

ACR, urine albumin-to-creatinine ratio; eGFR, estimated glomerular filtration rate.*Model 2 is adjusted for age, gender, education, smoking status, physical activity, hypertension, diabetes, oral contraceptives (women), waist circumference, albumin-corrected calcium, Vitamin D supplements or medications, hsCRP, triglycerides, and HDL-cholesterol.

Rapid eGFR decline was a priori defined as an annual loss greater than 3 mL/min/1.73m^2. The proportions of participants without albuminuria at baseline with vitamin sufficiency (>30 ng/mL), insufficiency (20-30 ng/mL), and deficiency (<20 ng/mL) were as follows: 535/4048 (13.2%), 1347/4048 (33.3), and 2166/4142 (53.5%).