



**Supplementary table 2.** Scientific articles on *VDR* gene polymorphisms and vitamin D levels in the Brazilian population

Study	Database	Authors	Access link	Population	Region/city/town	Gene	SNP	Effect or minor allele	Effect or minor allele frequency	Prevalence of vitamin D deficiency (95% CI)	p-value	Prevalence of vitamin D insufficiency (%)	p-value	25OHD (ng/ml) mean ± sd	p-value	N	Age (years) mean ± SD (range)	% female	Ethnicity (% white)	Beta 25OHD (ng/mL)	95% CI/SE	p-value	OR	CI 95%	p-value*	Hardy-Weinberg equilibrium (p-value)	Correction for population stratification	Type of study	Comments									
Vitamin D deficiency is a risk factor for delayed tooth eruption associated with persistent primary tooth (PPT)	PUBMED	Xavier et al. (2021)	<a href="https://pubmed.ncbi.nlm.nih.gov/33944665/">https://pubmed.ncbi.nlm.nih.gov/33944665/</a>	children with primary teeth with exfoliation time expired for more than a year (persistent primary tooth) and children with regular primary teeth exfoliation time (controls)	Ribeiraõ Preto, SP	VDR	rs2228570;	A; G			26.7 PPT/0.0 controls				14.2-37.4 PPT/21.9-48.2 controls		30 (15 PPT + 15 controls)	9.4 ± 1.8	43.3									not reported	no	case-control	data showed no association between genetic polymorphisms in <i>VDR</i> and serum 25OHD levels (p>0.05).							
							rs2228570	A	0.269 controls/0.350 PPT; 0.379 controls/0.296 DTE																													
							rs739837	G	0.500 controls/0.400 PPT; 0.366 controls/0.417 DTE																													
Genetic polymorphisms in vitamin D pathway influence 25(OH) D levels and are associated with atopy and asthma	PUBMED	Galvão et al. (2020)	<a href="https://pubmed.ncbi.nlm.nih.gov/32834827/">https://pubmed.ncbi.nlm.nih.gov/32834827/</a>	SCAALA cohort (children from deprived areas)	Salvador, BA	VDR	rs10875694;	G; C; G;			20.8		40.7		27.33 ± 9.60		792	(11-19)	47.6									in equilibrium	individual genetic ancestry using 269 AIMS	cross-sectional nested in cohort	write to them to ask the DBP (GC) SNPs vs 25OHD levels.							
							rs11168287;	G; G; G;																														
							rs2189480;	T; A; C																														
							rs2853561;																															
							rs2853564;																															
							rs4237855;																															
							rs4328262;																															
							rs59128934;																															
							rs739837;																															
							rs7963776;																															
							rs7965274;																															
							rs7967152;																															
							rs9729	C	0.480																													rs9729 C allele increases <i>VDR</i> expression (p = 0.0007) in GTEx. Rs9729 is in strong LD with rs731236 (TaqI).
*Variants rs1544410 and rs2228570 of the vitamin D receptor gene and glycemic levels in adolescents from Northeast Brazil	PUBMED	Neves et al. (2019)	<a href="https://pubmed.ncbi.nlm.nih.gov/31718198/">https://pubmed.ncbi.nlm.nih.gov/31718198/</a>	adolescents who did not present any chronic disease	João Pessoa, PB	VDR	rs59128934	G	0.057				50.0		28.0 (28.4-30.7)		208	17.7 (± 1.14)	62.5									rs1544410 out of HWE (calculated by us)	no	cross-sectional								
							rs1544410	BB = AA	31.23 (9.35)	0.281	47	1.72	0.84, 3.50	0.134																								
								Bb = GA	29.12 (7.80)		70	1.01	0.54, 1.90	0.967																								
								bb = GG	29.01 (7.90)		91	1.00																										
							rs2228570	FF = CC	29.23 (7.76)	0.840	92																											
								Ff = TC	30.03 (9.06)		94																											
								ff = TT	28.81 (6.90)		22																											
Polymorphism in the vitamin D receptor gene is associated with maternal vitamin D concentration and neonatal outcomes: A Brazilian cohort study	PUBMED	Pereira Santos et al. (2019)	<a href="https://pubmed.ncbi.nlm.nih.gov/31070844/">https://pubmed.ncbi.nlm.nih.gov/31070844/</a>	pregnant women who lived in the urban area of the municipality and received prenatal services	Santo Antônio de Jesus, BA	VDR	rs731236;	G; C	0.300; 0.400	23.0		43.0		72.62 ± 31.51 nmol/l		270	26.73 ± 5.85	100	18.15	nmol/L							0.24, 0.94	no	prospective cohort									
							rs731236	GG vs AA																	14.09	0.85, 27.34	0.03											
							rs7975232	CC vs AA																		1.15	(-10.28, 12.59)	0.84										
Association of vitamin D3, <i>VDR</i> gene polymorphisms, and LL-37 with a clinical form of Chagas Disease	SciELO	Junior et al. (2019)	<a href="https://www.scielo.br/j/rsbmt/a/z7QwDmf97Ndz6FuRtbJG6SK?lang=en">https://www.scielo.br/j/rsbmt/a/z7QwDmf97Ndz6FuRtbJG6SK?lang=en</a>	adult male patients with indeterminate and cardiac form of chronic Chagas Disease (CD)	Botucatu, SP	VDR	rs1544410;		0.40; 0.44; 0.26; 0.31	10.9		53.1	0.207; 0.767; 0.617; 0.837	29.3 ± 5.8; 25.4 ± 7.3		64 (46 indeterminate + 18 cardiac)	60.3 ± 8.1; 62.2 ± 11.0	0	76.6								not reported	no	cross-sectional									

Study ID	Study	Year	URL	Population	Location	SNPs	Alleles	OR	OR 95% CI	n	n Controls	OR 95% CI	P	Stratification	Outcome	Notes																
Apo-I polymorphism in VDR gene is related to metabolic syndrome in polycystic ovary syndrome: a cross-sectional study	PUBMED	Santos et al. (2018)	https://pubmed.ncbi.nlm.nih.gov/29689566/	patients with polycystic ovary syndrome (PCOS) + non-hirsute women with regular ovulatory cycles	Porto Alegre, RS	VDR	rs1544410; rs731236; rs7975232	A, G; C	0.400/0.350; 0.396/0.354; 0.447/0.400	21.47 ± 7.61; 21.50 ± 6.90	291 (191 PCOS + 100 controls)	22.89 ± 6.66; 25.18 ± 7.72	0.399	in equilibrium	cross-sectional																	
														rs7975232	AA + CA	21.52 ± 7.16	0.399	as														
Mutações do gene receptor da vitamina D e níveis séricos de vitamina D em crianças com asma	SciELO	Santos et al. (2018)	https://www.scielo.br/rpp/a/wVLMgrfLrBbDVScdlFcvCJ/?lang=pt	children aged 7 to 14 years (asthmatics and non-asthmatics)	Curitiba, PR	VDR	Cdx2 (rs115688207)	G	0.714 (0.716 asthmatics/0.705 non-asthmatics)	98.0	77 (60 asthmatic + 17 non-asthmatic)	10.8 ± 2.2	43.0	not reported	no	cross-sectional	There was no association between vitamin D, PTH or calcium levels with any of the polymorphisms studied.															
														Genetic polymorphisms of vitamin D metabolism genes and serum level of vitamin D in colorectal cancer	PUBMED	Vidigal et al. (2017)	https://pubmed.ncbi.nlm.nih.gov/28665452/	colorectal cancer cases & controls	São Paulo, SP	VDR	rs1544410; rs7975232	A	51.0; 43.3	18.4; 26.6	26.4 ± 17.6; 28.4 ± 19.2	473 (152 CRC + 321 controls)	62.8 ± 13.0; 62.7 ± 10.4	46.7; 49.2	not reported	no	case-control	
														rs1544410	AA	29.5; 24.4	0.482															
25-hydroxyvitamin D3 levels, Bsm1 polymorphism and insulin resistance in Brazilian Amazonian children	PUBMED	Cobayashi et al. (2015)	https://pubmed.ncbi.nlm.nih.gov/26047339/	children aged < 10 years	Acrelândia, AC	VDR	rs11568820; rs1544410; rs2228570; rs731236; rs7975232	A, T; A; G; C	0.399; 0.406; 0.299; 0.396; 0.431	11.1 (9.2-13.2)	21.8 (19.2-24.5)	66 (86-105)	1225 (974 with 25OHD levels)	5.4 ± 2.8 (2.8 months-10.4 years)	49.0	10.3	0.007; 0.100	HWE was tested, results not reported.	adjusted for race/ethnicity													
																				rs1544410	T	27.1; 27.5	0.155									
																				rs1544410	T	-0.070	-0.132; -0.008	0.026	adjusted for sex, age, race/ethn							
Vitamin D deficiency in girls from South Brazil: a cross-sectional study on prevalence and association with vitamin D receptor gene variants	PUBMED	Santos et al. (2012)	https://pubmed.ncbi.nlm.nih.gov/22681928/	healthy girls	Curitiba, PR/Porto Alegre, RS	VDR	rs1544410; rs731236; rs7975232	A, C; G	36.3	54.3	21.3 ± 6.8	234	13.0 ± 1.9 (7-18)	100.0	in equilibrium	no	cross-sectional	LD: rs1544410 & rs7975232 r2=0.330/ rs1544410 & rs731236 r2=0.807/ rs7975232 & rs731236 r2=0.319														
															rs1544410	A	0.323	GA + AA vs GG	0.014	3.114	0.881	< 0.001	1.96	1.14, 3.37								
															rs731236	C	0.314	TC + CC vs TT	0.034	2.505	0.890	0.005	1.78	1.04, 3.06								
															rs7975232	G	0.429	GT + TT vs GG	0.078	2.575	1.189	0.031		0.27, 1.08								
Variants in the VDR gene may influence 25(OH)D levels in type 1 diabetes mellitus in a Brazilian population	PUBMED	Ferraz et al. (2022)	https://pubmed.ncbi.nlm.nih.gov/35267984/	T1D patients & controls	Belém, PA	VDR	rs1544410; rs2228570; rs731236; rs7975232	A, T; C; T	na/na; 0.308/0.331; 0.315/0.283; 0.638/0.554	59.7; 12.0	26.04 ± 8.45; 32.60 ± 8.85	148 (65 T1D + 83 controls)	27.3 ± 10.4; 38.5 ± 13.6	53.9; 77.1	in equilibrium in both cases and controls	61 AIMS used to estimate individual ancestry but no correction made	case-control															
															rs1544410	AA		lower levels than GG + GA	< 0.05													
															rs2228570	TT		higher levels than CC + CT	< 0.05													
															rs731236	CC		lower levels than TT + TC	< 0.05													
															rs7975232			n.s														
Lower vitamin D levels, but not VDR polymorphisms, influence type 2 diabetes mellitus in Brazilian population independently of obesity	PUBMED	Rodrigues et al. (2019)	https://pubmed.ncbi.nlm.nih.gov/31121922/	T2D patients & controls	Belo Horizonte, MG	VDR	rs1544410; rs2228570; rs731236; rs7975232	A, T; C; C	0.401/0.411; 0.245/0.306; 0.332/0.403; 0.245/0.210	59.7; 12.0	17.2 ± 16.6; 30.8 ± 16.2	163 (101 T2D + 62 controls)	56 ± 13; 53 ± 18	81.0 (81.2; 80.6)	all > 0.025	no	case-control															
															rs1544410	AA	26.0 (37.6)	0.415														
																AG	24.8 (18.5)															
																GG	21.2 (19.3)															
															rs2228570	TT	23.2 (20.2)	0.764														
																TC	27.4 (24.5)															
																CC	22.9 (35.2)															
															rs731236	CC	20.3 (30.3)	0.222														
																CT	25.6 (23.3)															
																TT	21.4 (19.3)															
															rs7975232	AA	24.7 (22.7)	0.656														
																AC	25.2 (17.5)															
																CC	17.9 (29.9)															



**Supplementary table 4.** Single nucleotide polymorphisms in the *VDR* gene associated with complex traits according to the GWAS catalog

Beta	CI	Mapped gene	Reported trait	Trait(s)	Study accession	Location
0.063426755 unit decrease	[0.042-0.085]	VDR	basal cell carcinoma	basal cell carcinoma	GCST90013410	12:47844438
0.0481096 unit increase	[0.033-0.064]	VDR	total testosterone levels	testosterone measurement	GCST90012112	12:47860570
0.13136138 unit increase	[0.088-0.175]	VDR	medication use (diuretics)	Diuretic use measurement	GCST007928	12:47860570
0.3943 unit increase	[0.28-0.51]	VDR	diastolic blood pressure	diastolic blood pressure	GCST90132904	12:47860570
0.1314 unit increase	[0.088-0.175]	VDR	medication use (diuretics)	diuretic use measurement	GCST90018985	12:47860570
		VDR	cardiovascular disease	cardiovascular disease	GCST007072	12:47860570
		VDR	gout	gout	GCST001356	12:47862166
0.32741 unit increase	[0.18-0.47]	VDR	COVID-19 (hospitalized vs not hospitalized)	COVID-19	GCST90104752	12:47873551
0.75 percent increase		VDR	gut microbiota (beta diversity)	gut microbiome measurement	GCST003876	12:47876015
		VDR	eosinophil counts	eosinophil count	GCST007065	12:47879112
0.0138518615 unit increase	[0.0094-0.0183]	VDR	eosinophil percentage of white cells	eosinophil percentage of leukocytes	GCST90002382	12:47879112
47.572 unit increase		VDR	serum immune biomarker levels	inflammatory biomarker measurement, YKL40 measurement	GCST010146	12:47914289
0.9905315 unit decrease		VDR	sphingomyelin (d32:2) levels	sphingomyelin measurement	GCST90094889	12:47919236
0.57862 unit increase	[0.33-0.83]	VDR	S-6-hydroxywarfarin levels	S-6-hydroxywarfarin measurement	GCST90129565	12:47920142
0.86594 unit increase	[0.52-1.21]	VDR	R-6-hydroxywarfarin to R-warfarin ratio	R-6-hydroxywarfarin to R-warfarin ratio measurement	GCST90129572	12:47927031
		VDR	adolescent idiopathic scoliosis	adolescent idiopathic scoliosis	GCST006287	12:47927916
		VDR, TMEM106C	heel bone mineral density	heel bone mineral density	GCST007066	12:47943286
0.0304 unit increase	[0.024-0.037]	VDR, TMEM106C	glycated hemoglobin levels	HbA1c measurement	GCST90019509	12:47943286
0.0541 unit decrease	[0.038-0.07]	TMEM106C, VDR	glycated hemoglobin levels	HbA1c measurement	GCST90019509	12:47943734
0.049543403 unit increase	[0.032-0.067]	VDR, TMEM106C	medication use (calcium channel blockers)	calcium channel blocker use measurement	GCST007929	12:47944639
		TMEM106C, VDR	red blood cell count	erythrocyte count	GCST007069	12:47952685
0.015703138 unit increase	[0.011-0.02]	VDR, TMEM106C	lymphocyte percentage of white cells	lymphocyte percentage of leukocytes	GCST90002389	12:47963231