

Supplementary data for

Modifiers of the Effects of Vitamin D Supplementation on Cardiometabolic Risk Factors: A Systematic Review and Meta-Analysis

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Appendix 1 - Characteristics of the publications included in the meta-analysis

Table S1. Characteristic of the publications included in the meta-analysis.

Article (first author, year)	Location	Study design	Health status	Gender	Intervention duration	Intervention substance	Comparison	Age, year	n (Ctrl, Inter)	Extracted outcome(s)	serum 25-hydroxyvitamin D level before supplementation, ng/mL	serum 25-hydroxyvitamin D level before placebo, ng/mL	serum 25-hydroxyvitamin D level after supplementation, ng/mL	serum 25-hydroxyvitamin D level after supplementation, ng/mL	BMI, kg/m ²
Ahmed 2020	India	R	Diabetes	M/F	12W	8500IU Vitamin D	control	41.1±8	101(52,49)	FBG, Insulin, HbA1c	10.1±2.6	13.8±5.9	46.6±19	12.8±5.3	26±3.1
Alves 2021	Brazil	R, C	Children with hypertriglyceridemia	M/F	12W	1000IU Vitamin D	control	6.86±1.75	44(22,22)	SBP, DBP, HDL-C, LDL-C, TG, TC, FBG	35.01±7.35	35.67±8.35	49.76±11.26	37.29±8.61	32.79±11.7
Al-Zahrani 2014	Saudi	R	Diabetes	M/F	3M	45000IU Vitamin D	control	56.9±9.4	183(91,92)	SBP, DBP, HDL-C, LDL-C, TG, TC	14.9±4.3	17.0±4.6	33.3±4.3	16.2±4.6	32.0±5.9
Andersen 2009	Denmark	R, DB	Healthy	M/F	1Y	20ug Vitamin D	control	36.1±16.22	59(29,30)	HDL-C, LDL-C, TG, TC	5.59±8.3	4.69±7.5	-	-	27.1±8.9
Ansari 2020	Italy	R	Diabetes	M/F	6M	7100IU Vitamin D	control	30-60	203(146,57)	HDL-C, LDL-C, TG, TC, FBG	13.03±11.6	12.79±15.3	26.54±18.01	11.67±12.4	-

Online Supporting Material

Asemi 2013	Iran	R, DB	Pregnant	F	9W	400 IU Vitamin D	placebo	18-40	48(24,24)	SBP, DBP, HDL-C, LDL-C, TG, TC	20.44±14.31	20.41±13.43	38.95±24.72	20.92±13.79	30.7±4.5
Barale 2021	Italy	R	Diabetes	M/F	12M	500IU Vitamin D	control	71.5±3.2	30(14,16)	SBP, DBP, HDL-C, LDL-C, TG, TC, FBG, HbA1c	8.82±4.53	8.93±4.41	-	-	29.8±3.6
Bareng olts 2015	USA	R	Diabetes	M/F	1Y	7000IU Vitamin D	control	58.2±6	173(87,86)	HbA1c	14.7±4.7	14.0±4.8	35.3±10.0	22.0±6.5	31.5±2.4
Baziar 2014	Korea	R, DB	Diabetes	M/F	24W	2000IU Vitamin D	control	54.8±7.6	129(64,65)	FBG, Insulin	14.33±5.85	15.50±5.55	45.03±12.60	16.85±6.25	27.33±1.64
Bhatt 2020(1)	India	R	Diabetes	F	8W	8500IU Vitamin D	control	20-60	82(41,41)	HDL-C, LDL-C, TG, TC, FBG, Insulin	11.99±2.37	12.87±2.09	22.69±5.05	19.69±4.85	31.1±6.2
Bhatt 2020(2)	India	R, DB	Obesity	M/F	26W	7000IU Vitamin D	control	18-50	121(60,61)	HDL-C, LDL-C, TG, TC, FBG, Insulin	-	-	22.76±12.86	19.51±12.98	31.1±6.2
Bischo ff- Ferrari 2020	Switzer land	R, DB	Healthy	M/F	3Y	2000IU Vitamin D3	placebo	75±4.5	2157(1076,10 81)	SBP, DBP	22.4±8.4	22.4±8.5	-	-	26.5±4.4
Bislev 2018	Denma rk	R, DB	Postmeno pausal Women	F	3M	2800IU Vitamin D	control	65±4.4	81(40,41)	SBP, DBP, HDL-C, LDL-C, TG, TC	13.23±3.61	13.23±3.61	82.93±6.31	8.02±4.53	27±4.3
Bonak daran 2012	Iran	R	PCOS	F	12W	200IU VitaminD	control	24.7±3.3	31(15,16)	SBP, DBP, FBG, Insulin	11.4±8.2	19.9±16.5	20.1±16.2	19.0±15.3	28.2±5.03

Online Supporting Material

Breslavsky 2013	Israel	R	Diabetes	M/F	12M	1000U Vitamin D	control	66.8±9.2	47(24,23)	SBP, DBP, HDL-C, LDL-C, TG, TC	-	-	-	-	27.9±5.2
Cheung 2022	USA	R, DB	Obesity	M/F	12W	1000IU Vitamin D	control	45.3±13.5	57(23,34)	SBP, DBP	27.7±7.3	27.7±8.5	29.9±7.6	26.5±6.8	31.0±4.9
Dastorani 2019	Iran	R, DB	PCOS	F	8W	3500IU Vitamin D	control	29.9±4.4	40(20,20)	HDL-C, LDL-C, TG, TC, FBG, Insulin	10.5±2.5	11.0±2.4	21.7±5.9	10.9±2.1	-
Desouza 2022	USA	R, DB	Pre-diabetes	M/F	3Y	4000IU Vitamin D	control	60.0±9.9	2423(1212,1211)	SBP, DBP, HDL-C, LDL-C, TG, TC	-	-	-	-	-
Didriksen 2015	Norway	R, C	Diabetes	M/F	5Y	2800IU Vitamin D	control	60.8±9.33	29(18,11)	HbA1c	24.95±2.32	21.73±3.42	39.70±5.43	24.86±5.32	30.7±4.3
Boerdodoorn 2008(1)	USA	R	Diabetes	M/F	7Y	400 IU Vitamin D	control	50-79	1460(730,730)	FBG, Insulin	-	-	-	-	-
Boerdodoorn 2008(2)	USA	R	Diabetes	M/F	7Y	400 IU Vitamin D	control	50-79	360(180,180)	FBG, Insulin	-	-	-	-	-
Dutta 2014	India	R	Diabetes	M/F	1Y	8500IU Vitamin D	control	48.4±10.5	125(68,57)	HDL-C, LDL-C, TG, FBG, HbA1c	17.04±7.66	18±7.16	35.47±10.1	17.53±5.31	26.32±4.52
Ebadi 2021	Iran	R, DB	Obesity	M/F	8W	7100IU Vitamin D	control	39.6±12.7	64(32,32)	HDL-C, LDL-C, TG, FBG, Insulin	12.2±5.6	14.5±6.6	38.6±8.1	14.9±6.4	28.0±2.3

Online Supporting Material

Ebrahi mkhani 2020	Iran	R, DB	Diabetes	M/F	12W	7100IU Vitamin D	control	52.16±5.96	36(19,17)	SBP, DBP	8.05±4.25	-	20.07±3.81	-	30.4±4.7
Eftekh ari 2014	Iran	R, DB	Diabetes	M/F	12W	Vitamin D	control	53.8±8.9	70(35,35)	HDL-C, LDL-C, TG, TC	-	-	-	-	28.3±4.4
Ferreir a 2020	Brazil	R, DB	Postmeno pausal Women	F	9M	1000IU Vitamin D	control	50-65	160(80,80)	SBP, DBP, HDL-C, LDL-C, TG, TC, FBG, Insulin	15.0±7.5	16.9±6.7	27.5±10.4	13.8±5.9	29.4±5.4
Garibal la 2022	United Arab Emirat es	R	Patients with Low 25- Hydroxy vitamin D Levels	M/F	6M	2000IU Vitamin D	control	42±11	134(66,68)	SBP, DBP, HbA1c	22.8±9.0	25.1±11.0	-	-	29.3±5.0
Ghader i 2017	Iran	R, DB	Healthy	M/F	12W	50000IU Vitamin D	control	42.5±8.9	68(34,34)	HDL-C, LDL-C, TG, TC	13.9±4.5	13.5±4.5	22.0±7.5	13.1±5.9	25.5±4.4
Harreit er 2022	Austral ia	R, DB	Obesity	F	12W	1600IU Vitamin D	control	32.8±5.4	154(75,79)	HDL-C, LDL-C, TG	27.76±10.74	26.72±10.74	46.71±14.10	31.53±15.75	33.7±4.3
Harris 2012	USA	R	Diabetes	M/F	12W	4000IU Vitamin D	control	71.1±0.7	89(43,46)	FBG, Insulin, HbA1c	15.87±5.17	15.32±6.21	32.56±6.40	14.98±7.39	31.9±4.0
Heikki nen 1997	Finland	R	Postmeno pausal Women	F	3Y	300 IU Vitamin D	control	52.9±0.29	142(77,65)	HDL-C, LDL-C, TG, TC	-	-	-	-	26.8±0.47
Hosein i 2013	Iran	R	Diabetes	M/F	12W	7000IU Vitamin D	control	46.3±6.5	36(21,15)	FBG, HbA1c	12.46±15.72	7.20±3.34	19.09±22.57	5.56±2.57	30.4±4.3

Online Supporting Material

Hu 2023	China	R, DB	Diabetes	M/F	30M	800IU Vitamin D	control	50-70	270(135,135)	TC, Insulin, HbA1c	22.77±6.79	22.87±8.69	35.16±7.13	28.22±8.07	24.55±3.23
Jafari 2016	Iran	R, DB	Diabetes	F	12W	2000IU Vitamin D	control	57.8±5.5	59(30,29)	SBP, DBP, HDL-C, LDL-C, TG, TC	24.95±1.81	25.15±1.71	34.82±1.80	22.51±1.16	28.00±0.82
Jamilian 2017	Iran	R, DB	Diabetes	M/F	6W	50000IU Vitamin D	control	30.7±4.1	70(35,35)	HDL-C, LDL-C, TG, TC	15.2±3.8	16.6±2.6	34.4±6.1	16.5±2.6	29.2±3.4
Javed 2019	UK	R, DB	PCOS	F	12W	3200IU Vitamin D	control	28.6±5.5	37(18,19)	SBP, DBP, HDL-C, LDL-C, TG, TC, FBG, Insulin	10.26±4.57	12.39±4.45	36.35±7.82	19.09±8.22	35.4±10.6
Jorde 2016	Norway	R	Diabetes	M/F	5Y	2800IU Vitamin D	control	62.3±8.1	227(116,111)	HDL-C, LDL-C, TG, TC, FBG, Insulin, HbA1c	24.0±8.8	24.4±8.5	44.1±11.6	25.6±8.1	30.1±4.1
Jorde 2010(1)	Norway	R, DB, C	Diabetes	M/F	1Y	2800IU Vitamin D	control	47.5±11.4	226(112,114)	SBP, DBP, HDL-C, LDL-C, TG, TC, FBG, Insulin, HbA1c	23.54±8.50	23.58±8.42	55.34±21.01	22.98±14.42	34.7±3.8
Jorde 2010(2)	Norway	R, DB, C	Diabetes	M/F	1Y	5800IU Vitamin D	control	47.5±11.4	216(112,104)	SBP, DBP, HDL-C, LDL-C, TG, TC, FBG, Insulin, HbA1c	22.73±8.50	23.58±8.42	39.89±17.44	22.98±14.42	34.7±3.8
Kampmann 2014	Denmark	R, DB	Diabetes	M/F	10W	280ug Vitamin D	control	61.6±4.4	16(8,8)	SBP, DBP, HDL-C, LDL-C, TC, FBG, Insulin, HbA1c	12.43±1.96	13.95±1.52	42.06±10.22	12.91±1.28	35.3±2.9
Khan 2018(1)	Pakistan	R	Diabetes	M	12W	7000IU Vitamin D	control	54.8±8.6	140(70,70)	HbA1c	13.49±3.73	13.39±3.36	28.80±6.16	15.11±3.54	8.21±0.48

Online Supporting Material

Khan 2018(2)	Pakistan	R	Diabetes	F	12W	7000IU Vitamin D	control	54.8±8.6	140(70,70)	HbA1c	13.49±3.73	13.39±3.36	28.80±6.16	15.11±3.54	5.84±0.60
Kim 2014	Korea	R	Diabetes	F	12W	Vitamin D	control	73.27±2.06	24(13,11)	HDL-C, LDL-C, TG, TC	10.44±1.80	11.66±2.80	-	-	25.02±0.59
Kuchay 2015	India	R	Diabetes	M/F	1Y	8500IU Vitamin D	control	48.5±11.8	111(56,55)	FBG, HbA1c	19.8±15	18.9±13	43.4±23	22.4±12	25.2±3.1
Levy 2023	USA	R, DB	Patients with Low 25- Hydroxy vitamin D Levels	M/F	52W	3500IU Vitamin D	control	45.4±7.6	113(58,55)	SBP, DBP	10.55±3.59	11.40±3.96	25.20±11.26	13.43±8.29	34.2±7.8
Lind 1987	Sweden	R, DB	Healthy	M/F	6M	Vitamin D	control	63±1	25(10,15)	SBP, DBP	-	-	-	-	-
Lind 1989	Sweden	R, DB	Hyperten sion	M/F	18W	1ug Vitamin D3	control	51±1.2	40(20,20)	SBP, DBP	-	-	-	-	-
Maktabi 2017	Iran	R, DB	PCOS	F	12W	3500IU Vitamin D	control	22±1.6	70(35,35)	HDL-C, LDL-C, TG, TC, FBG, Insulin	12.8±4.5	14.5±5.1	27.5±9.8	14.4±5.2	-
Meng 2020	USA	R	Diabetes	M/F	24W	4000IU Vitamin D	control	65±9	114(58,56)	HDL-C, LDL-C	26.3±10.8	26.9±11.6	-	-	31.3±3.7
Mitri 2011	USA	R, DB	Diabetes	M/F	16W	2000IU Vitamin D	control	57±9.59	92(46,46)	FBG, HbA1c	26.5±1.6	24.2±1.3	30.7±2.1	18.3±2.1	32±0
Moghasssemi 2014	Iran	R	Postmeno pausal Women	F	3M	2000IU Vitamin D	control	52.73±4.56	74(38,36)	SBP, DBP, HDL-C, LDL-C, TG, TC	13.81±1.96	13.28±7.93	-	-	29.98±5.96

Online Supporting Material

Mohammadi 2016	Iran	R, DB	Diabetes	M/F	12W	7000IU Vitamin D	control	38.5±6.8	53(28,25)	TG, TC	19.0±2.2	23.0±1.8	69.0±7.5	25.0±2.2	-
Moreira-Lucas 2017	Canada	R	Diabetes	M/F	24W	4000IU Vitamin D	control	49.1±13.9	63(32,31)	SBP, DBP, HDL-C, LDL-C, TG, TC, FBG, Insulin, HbA1c	19.29±5.73	19.09±5.73	39.29±6.54	18.29±4.86	31.7±4.9
Muñoz-Aguirre 2015	Mexico	R, DB	Postmenopausal Women	F	6M	4000IU Vitamin D	control	57.4±5	104(52,52)	HDL-C, LDL-C, TG, TC	21.97±5.73	21.77±6.86	-	-	30.5±3.4
Nagpal 2009	India	R, DB	Healthy	M/F	6W	120000IU Vitamin D3	control	42.4±6.6	71(36,35)	SBP, DBP	14.63±5.83	12.03±5.01	28.7±16.77	12.27±9.67	26.7±4.54
Naharci 2012	Turkey	R	Diabetes	M/F	5M	800IU Vitamin D	control	75.1±7.3	51(28,23)	FBG, Insulin	22.37±14.99	19.04±9.70	-	-	29.2±4.4
Nikooyeh 2011	Iran	R	Diabetes	M/F	12W	500IU Vitamin D3	control	50.7±6.1	90(45,45)	SBP, DBP, HDL-C, LDL-C, TG, TC	17.80±11.51	16.68±17.84	31.15±11.47	14.92±17.64	29.2±4.4
NirooMAND 2019	Iran	R, DB	Diabetes	M/F	13W	7000IU Vitamin D	control	45±14	83(43,40)	SBP, DBP, FBG, Insulin	12.3±6.6	12.7±6.3	36±11	16±10	31±6
Pfeifer 2001	Germany	R, DB	Healthy	F	8W	400 IU Vitamin D3	control	74.7±4.2	148(74,74)	SBP, DBP	25.65±13.63	24.63±12.14	64.84±25.84	44.36±27.38	24.8±4.1
Rajabi-Naeeni 2020	Iran	R	Diabetes	M/F	8W	4200IU Vitamin D	control	39.46±6.91	168(84,84)	FBG, Insulin	21.43±8	29.71±12.11	25.47±5.38	20.97±6.63	27.28±2.74

Online Supporting Material

Ramly 2014	Malaysia	R, DB	Premenopausal Women	F	12M	7000IU Vitamin D	control	42.58±5.35	192(99,93)	SBP, DBP, HDL-C, LDL-C, TG	12.11±3.49	12.02±3.89	34.38±8.25	14.47±3.63	27.23±5.49
Randhawa 2017	Pakistan	R	Diabetes	M/F	13W	6700IU Vitamin D	control	43.3±4.9	114(57,57)	HbA1c	-	-	-	-	-
Rendina 2022	Italy	R, DB	Hypertension	M/F	10M	50000IU Vitamin D	control	59.3±8.3	35(20,15)	SBP, DBP, HDL-C, LDL-C, TG, TC, FBG, Insulin	17.07±4.17	17.27±4.05	33.21±4.45	20.11±3.97	27.3±3.3
Ryu 2014	Korea	R	Diabetes	M/F	24W	2000IU Vitamin D3	control	56.7±7.9	62(30,32)	SBP, DBP, HDL-C, LDL-C, TG, TC, FBG, HbA1c	12.3±3.0	10.7±2.6	34.6±9.7	18.3±9.7	25.3±3.4
Sadiya 2015	UAE	R, DB	Diabetes	M/F	3M	3000IU Vitamin D	control	45±9	82(39,43)	SBP, DBP, HDL-C, LDL-C, TG, TC, FBG, HbA1c	11.435±9.2	12.23±11.2	30.95±3.1	11.55±2.9	37.9±6.1
Safari 2023	Iran	R, DB	women with subclinical hypothyroidism	F	12W	7000IU Vitamin D	control	36.1±11.1	44(22,22)	HDL-C, LDL-C, TG, TC	-	-	-	-	29.7±2.6
Samarayanayake 2020(1)	Sri Lanka	R, TB	Obesity	M/F	6M	2500IU Vitamin D	control	9.75±2.26	64(31,33)	SBP, DBP, HDL-C, LDL-C, TG, TC, FBG, Insulin	14.92±3.92	15.47±2.78	15.26±3.68	15.77±3.43	2.83±0.86

Online Supporting Material

Samara nayake 2020(2)	Sri Lanka	R, TB	Obesity	M/F	6M	5000IU Vitamin D	control	9.95±2.02	65(31,32)	SBP, DBP, HDL-C, LDL-C, TG, TC, FBG, Insulin	14.92±3.04	15.47±2.78	18.24±5.77	15.77±3.43	2.72±0.65
Samim i 2016	Iran	R, DB	Pre- Eclampsia	F	32W	7000IU Vitamin D	placeb o	18-40	60(30,30)	SBP, DBP, HDL-C, LDL-C, TG, TC	13.1±6.4	16.2±3.5	21.3±8.4	16.3±4.9	25.6±4.0
Serran o 2023	Colom bia	R, TB	Healthy	M/F	15W	1000U Vitamin D	control	22.6±1.5	101(54,47)	HDL-C, LDL-C, TG, TC, FBG	25±7	26±8	31±10	29±8	23.3±2.08
Shab- Bidar 2011	Iran	R, DB	Diabetes	M/F	12W	500IU Vitamin D	control	52.5±7.4	100(50,50)	SBP, DBP, HDL-C, LDL-C, TG, TC	15.44±8.10	15.24±9.14	28.87±9.42	13.39±9.14	30.0±4.2
Sharifa n 2021(1)	Iran	R, DB	Obesity	M/F	10W	1500IU Vitamin D	control	40.42±8.03	146(73,73)	SBP, DBP, HDL-C, LDL-C, TG, TC, FBG, Insulin	14.08±5.15	14.02±5.16	19.10±5.69	13.89±5.85	23.11±3.19
Sharifa n 2021(2)	Iran	R, DB	Obesity	M/F	10W	1500IU Vitamin D	control	40.26±8.27	143(74,69)	SBP, DBP, HDL-C, LDL-C, TG, TC, FBG, Insulin	14.14±5.04	15.34±5.68	20.88±5.76	14.47±3.93	23.24±3.20
Shehab 2015	Kuwait	R	Diabetes	M/F	8W	Vitamin D	control	61.8±8.1	112(57,55)	HDL-C, LDL-C, TG, TC	25.3±10.9	29.2±9.5	58.2±23.8	30.3±8.9	-
Sheikh 2020(1)	Iran	R, DB	Hyperten sion	M/F	2M	1000IU Vitamin D	control	54.41±10.70	208(104,104)	SBP, DBP	13.21±6.70	14.58±6.22	35.21±12.21	15.86±10.31	27.13±4.05

Online Supporting Material

Sheikh 2020(2)	Iran	R, DB	Hyperten sion	M/F	2M	7100IU Vitamin D	control	54.41±10.70	208(104,104)	SBP, DBP	13.21±6.70	14.58±6.22	35.21±12.21	15.86±10.31	27.13±4.05
Sinha 2022	USA	R	Healthy	M/F	12W	3500IU Vitamin D	control	50.0±9.5	130(65,65)	SBP, DBP	17.0±5.2	16.5±5.0	35.0±7.0	17.0±6.0	34.7±4.8
Sollid 2014	Norwa y	R	Diabetes	M/F	1Y	2800IU Vitamin D	control	62.1 ± 8.7	484(242,242)	SBP, DBP, HDL-C, LDL-C, TG, TC, FBG, Insulin, HbA1c	24.02±8.78	24.50±8.50	42.38±9.70	25.86±6.78	29.9±4.3
Subra manian 2021(1)	USA	R	Healthy	F	12W	4200IU Vitamin D	control	23.1±4.3	502(250,252)	SBP, DBP	10.98±5.73	11.02±5.49	-	-	-
Subra manian 2021(2)	USA	R	Healthy	F	12W	16800IU Vitamin D	control	23.0±3.8	501(250,251)	SBP, DBP	11.54±5.65	11.02±5.49	-	-	-
Subra manian 2021(3)	USA	R	Healthy	F	12W	28000IU Vitamin D	control	23.3±4.2	754(250,504)	SBP, DBP	10.70±5.61	11.02±5.49	-	-	-
Sugden 2008	Scotlan d	R, DB	Diabetes	M/F	8W	100000IU Vitamin D2	control	64.9 ± 10.3	34(17,17)	SBP, DBP, HbA1c	16.12±4.13	14.59±3.41	25.3±10.79	17.63±8.42	31.7±6.4
Sun 2023	China	R	Diabetes	M/F	12W	1000IU Vitamin D	control	50.1 ± 7.3	30(15,15)	HDL-C, LDL-C, TG, TC, FBG, Insulin, HbA1c	-	-	-	-	25.3 ± 3. 3

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Tamadon 2018	Iran	R	Diabetes	M/F	12W	50000IU Vitamin D	control	65.1±10.1	60(30,30)	HDL-C, LDL-C, TG, TC	15.2±6.7	15.4±6.9	25.2±6.1	16.6±5.5	25.8±4.4
Thams 2022(1)	Denmark	R, DB	Healthy	M/F	24W	20ug Vitamin D	control	7.8±1.3	89(44,45)	HDL-C, LDL-C, TC, FBG, Insulin	32.25±5.73	32.13±7.89			-
Thams 2022(2)	Denmark	R, DB	Healthy	M/F	24W	20ug Vitamin D	control	7.6±2.3	95(49,46)	HDL-C, LDL-C, TC, FBG, Insulin	32.61±7.33	31.25±7.05	-	-	-
Thani 2019	Qatar	R	Diabetes	M/F	6M	4200IU Vitamin D	control	45.51±8.96	132(57,75)	SBP, DBP, HDL-C, LDL-C, TG, TC, HbA1c	14.9±4.3	17.0±4.6	33.3±5.4	16.2±5.5	32.0±5.9
Theiler - Schwet z 2022	Switzerland	R, DB	Patients with Low 25-Hydroxy vitamin D Levels	M/F	8W	2800IU Vitamin D	control	60.5±10.9	200(100,100)	SBP, DBP	22.0±5.7	20.5±5.7	-	-	30.4±4.4
Trummer 2018	Australia	R, DB	PCOS	F	24W	2800IU Vitamin D	control	25.4±4.6	123(81,42)	TG, TC, FBG, HbA1c	20.33±7.82	20.01±7.34	36.17±8.06	22.77±11.83	27.3±7.4
Tuominen 2015(1)	Finland	R, DB	Diabetes	M/F	5M	40ug Vitamin D	control	65.7±7	45(24,21)	FBG, Insulin, HbA1c	22.86±4.41	22.86±4.41	33.96±6.90	24.40±6.94	29.4±2.7
Tuominen	Finland	R, DB	Diabetes	M/F	5M	80ug Vitamin D	control	65.7±8	42(21,21)	FBG, Insulin, HbA1c	22.86±4.41	22.86±4.41	40.90±9.38	24.40±6.94	29.4±2.7

Online Supporting Material

2015(2
)

Upreti 2018	India	R	Diabetes	M/F	6W	8500IU Vitamin D	control	48.3±9.8	60(30,30)	SBP, DBP, HDL-C, LDL-C, TG, TC, FBG, HbA1c	25.29±8.58	26.69±11.92	68.46±10.22	28.71±9.69	24.56±3.76
Wagner 2016	Sweden	R, DB	Diabetes	M/F	8W	4300IU Vitamin D	control	67.6±4	173(87,86)	HDL-C, LDL-C, TG, TC, FBG, HbA1c	16.84±2.32	33.28±4.23	18.85±8.73	18.44±5.84	28.5±6.75
Wallace 2019	UK	R, DB	Diabetes	M/F	26W	3000IU Vitamin D	control	52.4±2	64(34,30)	FBG, Insulin, HbA1c	12.31±5.73	12.03±6.17	40.62±10.99	14.23±6.58	34.3±6.9
Witham 2010	UK	R	Diabetes	M/F	16W	900IU Vitamin D	control	66.7±9.7	42(22,20)	SBP, DBP	19.25±8.42	18.04±6.82	31.68±12.43	21.65±8.02	33.3±7.1
Witham 2013	UK	R, DB	Healthy	F	8W	100000U Vitamin D3	control	41.7±13.4	50(25,25)	SBP, DBP, HDL-C, LDL-C, TG, TC	10.83±5.21	10.83±6.01	-	-	24.9±3.3
Wood 2012	UK	R, DB	Postmeno pausal Women	F	1Y	400IU Vitamin D	control	53.1±9.94	197(100,97)	SBP, DBP, HDL-C, LDL-C, TG, TC	13.13±5.17	14.51±6.86	26.37±7.15	13.42±8.61	26.6±4.2
Zhang 2023	China	R, DB	Healthy	M/F	1M	1000U Vitamin D	control	19.0±4.5	117(61,56)	HDL-C, LDL-C, TG, TC	18.85±7.04	19.52±8.65	26.98±5.88	17.61±8.19	22.01±3.29
Zitterman 2009	Germany	R, DB	Obesity	M/F	12M	83ug Vitamin D	control	47.4±10.3	165(82,83)	SBP, DBP, HDL-C, LDL-C, TG	12.29±7.02	12.15±8.06	34.38±23.06	16.84±14.03	33.7±4.1

Data are presented as mean ± SD or as a range.

R, randomized; SB, single-blinded; DB, double-blinded; TB, triple-blinded; C, crossover design; F, female; M, male; Ctrl, control group; Inter, Intervention group; W, week; M, month; D, day; PCOS, polycystic ovary syndrome; SBP, systolic blood pressure; DBP, diastolic blood pressure; TG, triglyceride; TC, total cholesterol; HDL-

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C, high density lipoprotein cholesterol; LDL-C, low density lipoprotein-cholesterol; FBG, fasting blood glucose; FBI, fasting blood insulin; A1C, hemoglobin A1c; BMI, body mass index.

Appendix 2-Forest plot

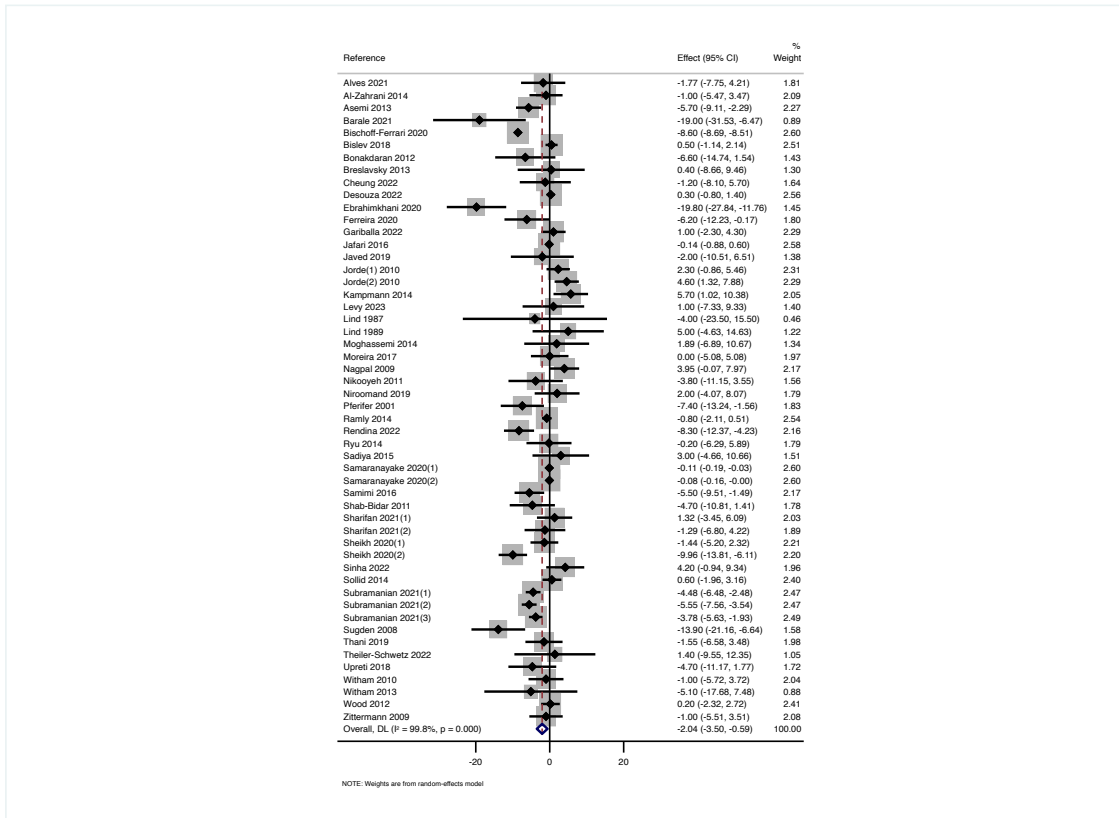


Figure S1-1-1 Forest plot of RCTs investigating the effect of vitamin D supplementation on SBP.

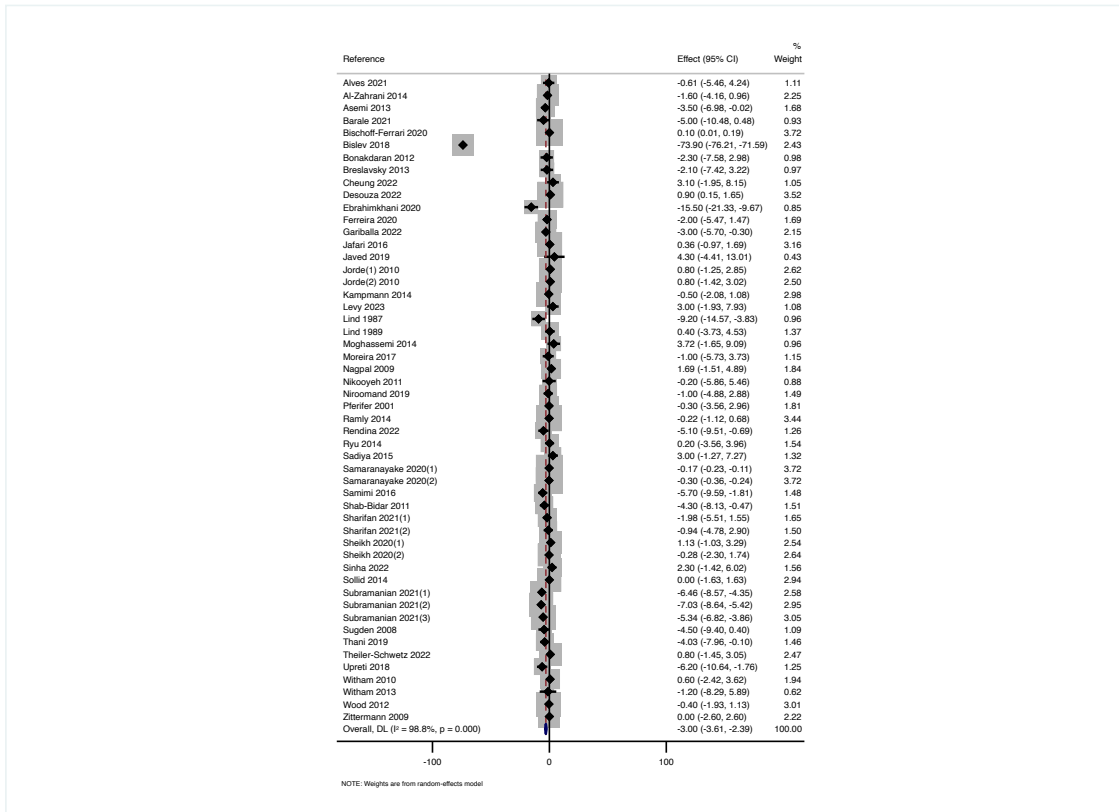


Figure S1-1-2 Forest plot of RCTs investigating the effect of vitamin D supplementation on DBP.

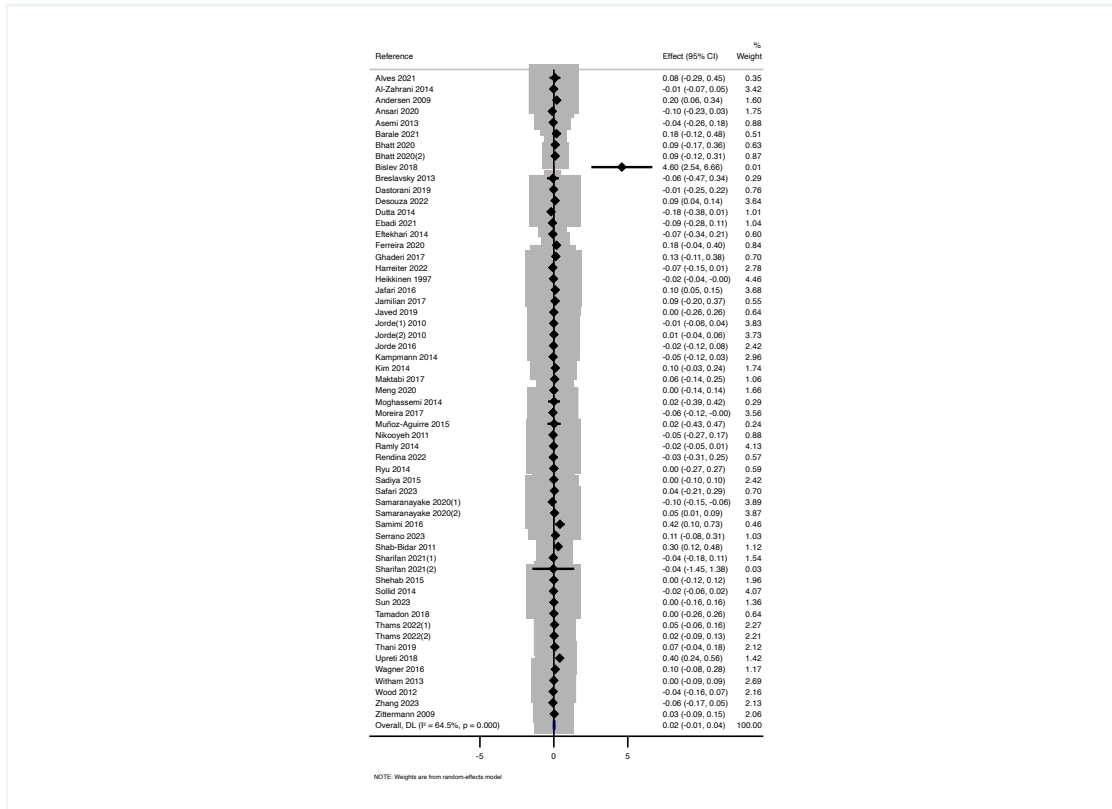


Figure S1-1-3 Forest plot of RCTs investigating the effect of vitamin D supplementation on HDL-C.

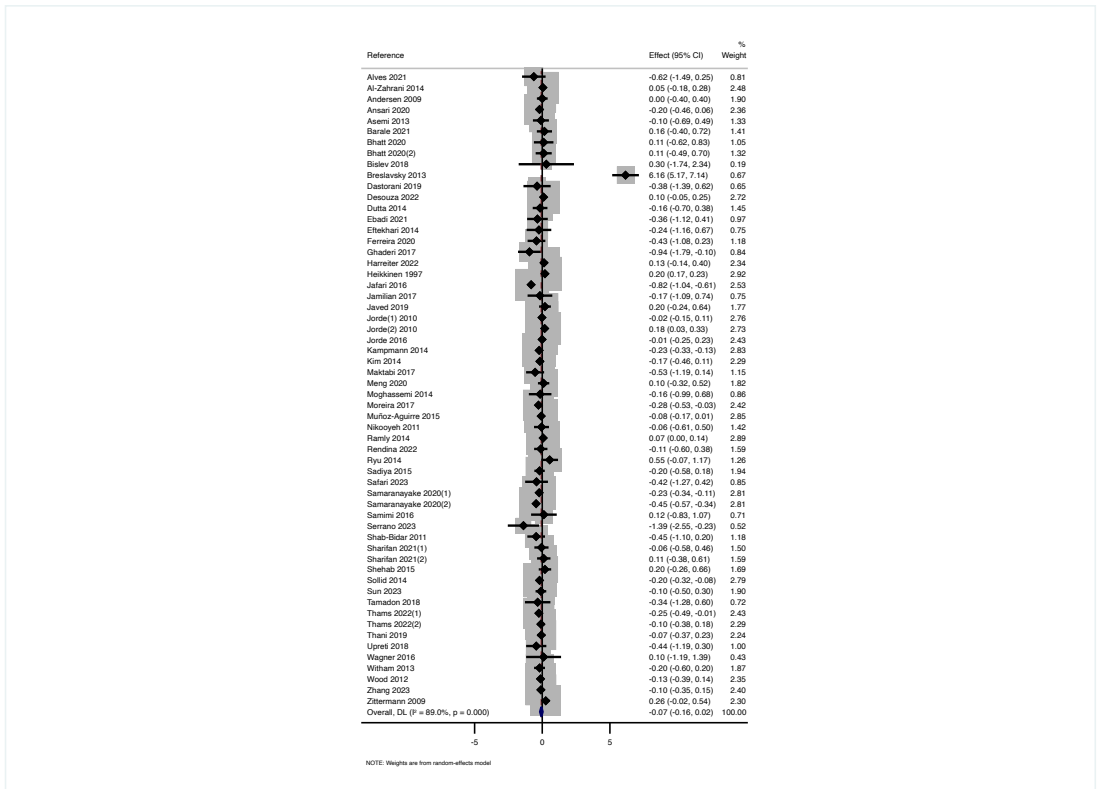


Figure S1-1-4 Forest plot of RCTs investigating the effect of vitamin D supplementation on LDL-C.

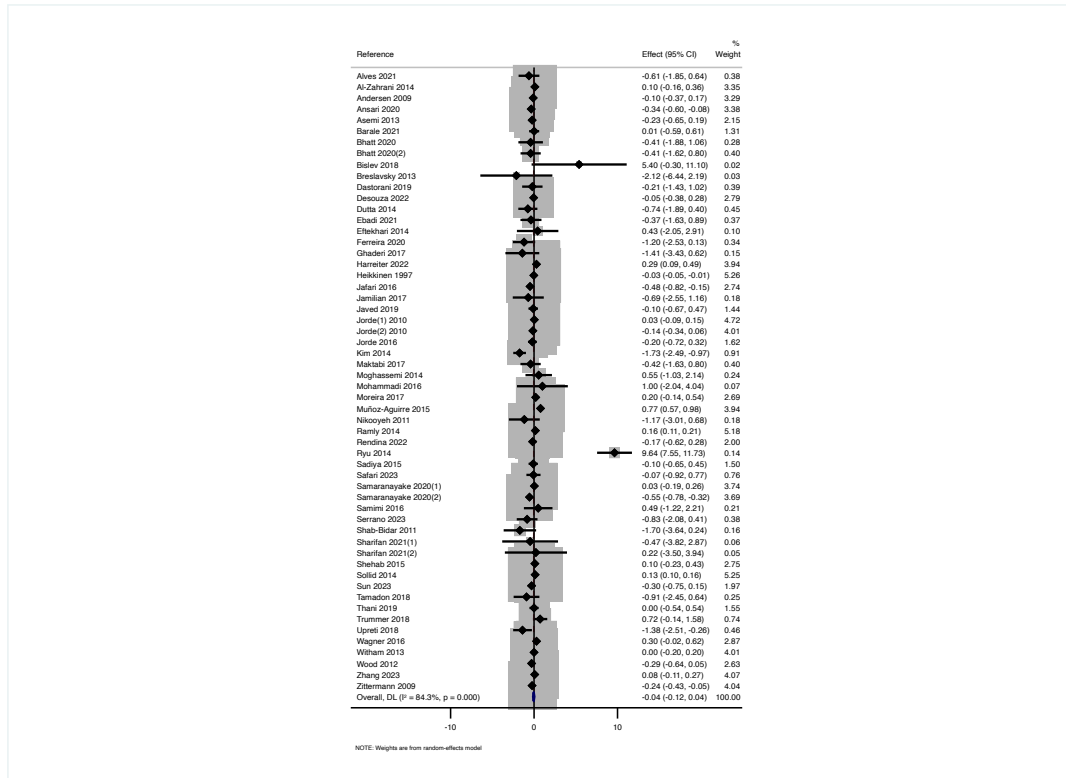


Figure S1-1-5 Forest plot of RCTs investigating the effect of vitamin D supplementation on TG

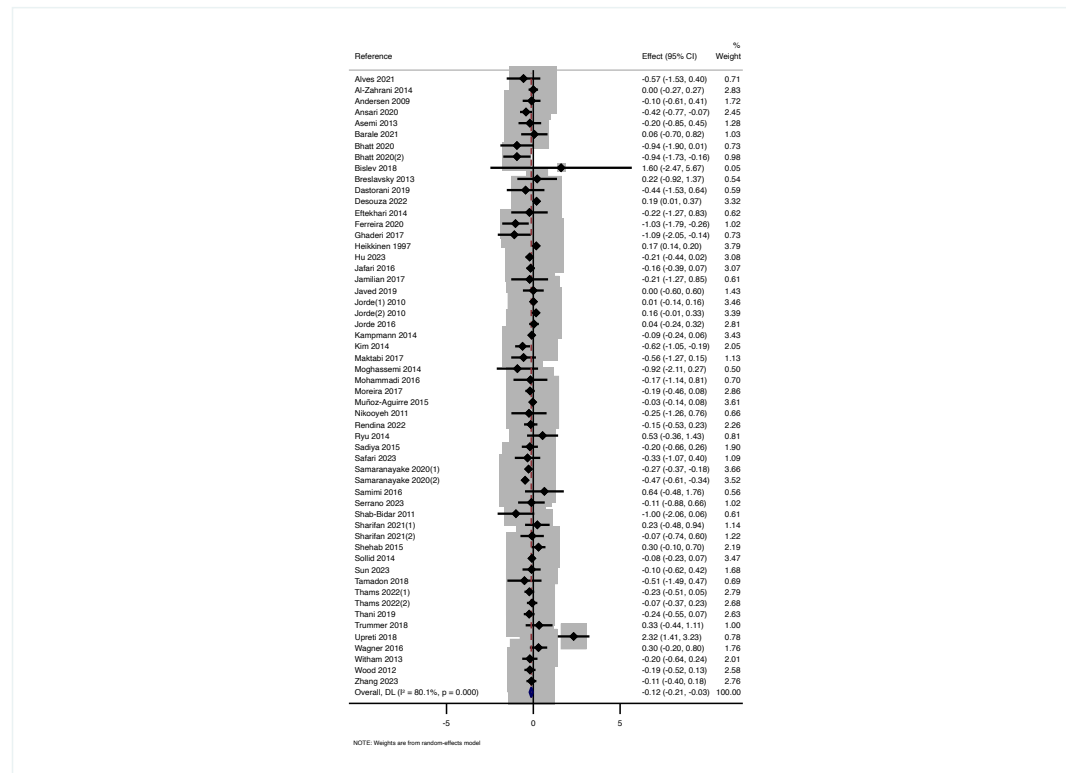


Figure S1-1-6 Forest plot of RCTs investigating the effect of vitamin D supplementation on TC.

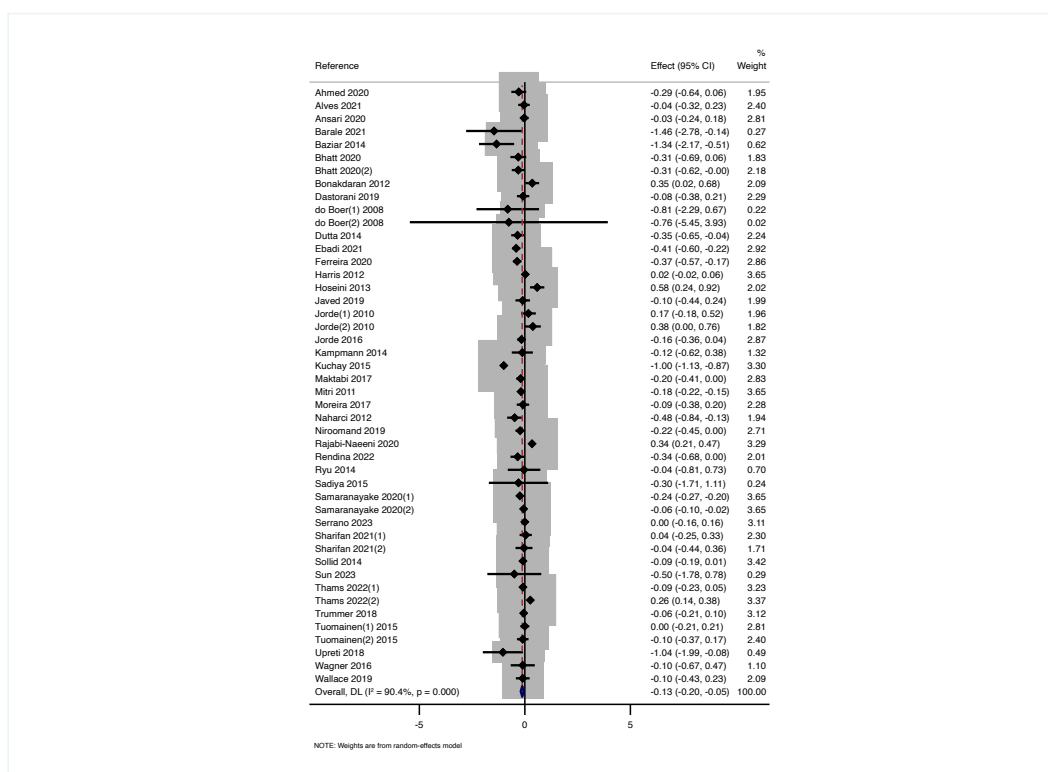


Figure S1-1-7 Forest plot of RCTs investigating the effect of vitamin D supplementation on FBS.

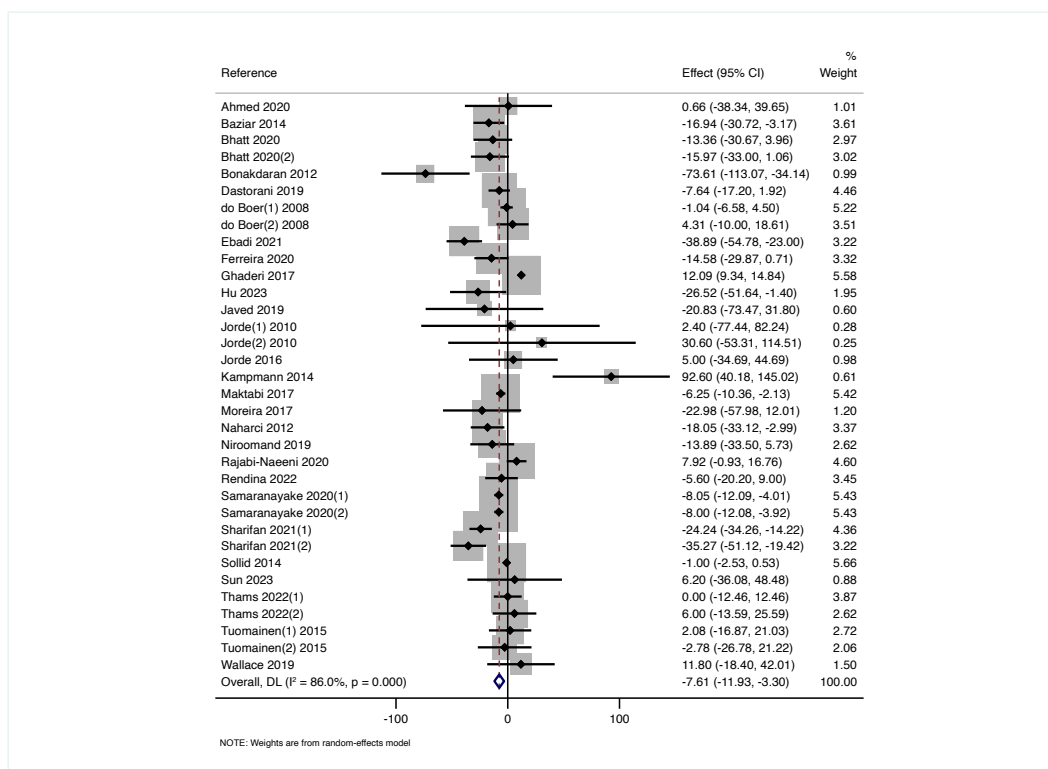


Figure S1-1-8 Forest plot of RCTs investigating the effect of vitamin D supplementation on FBI.

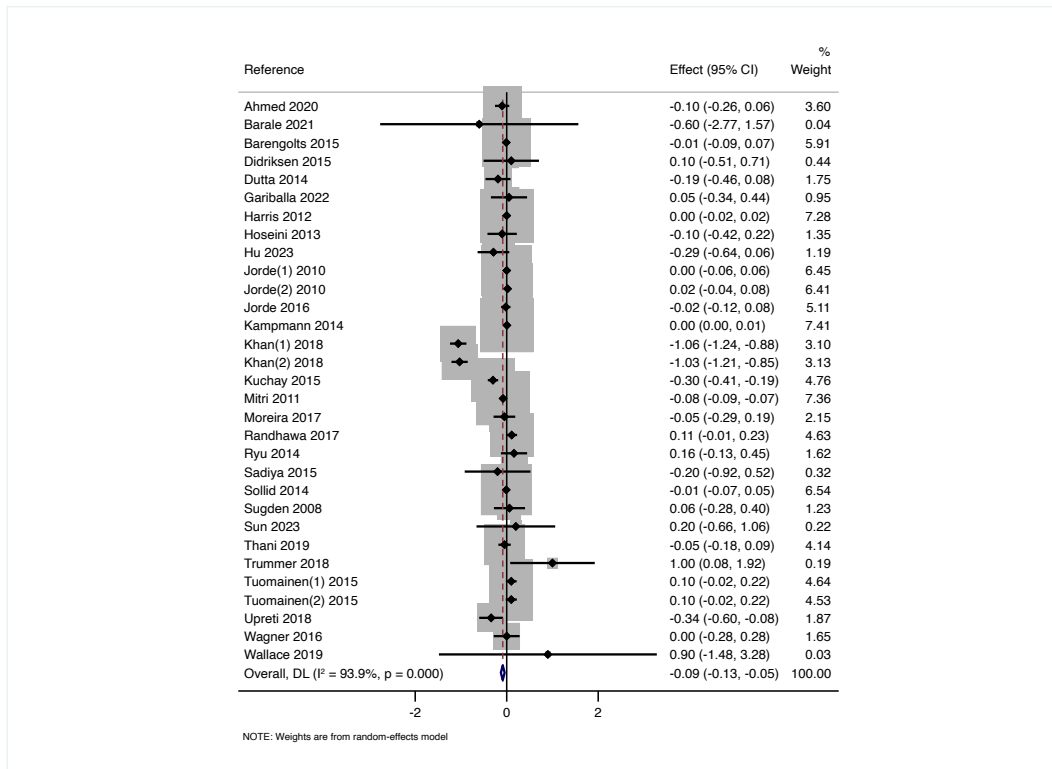


Figure S1-1-9 Forest plot of RCTs investigating the effect of vitamin D supplementation on A1C.

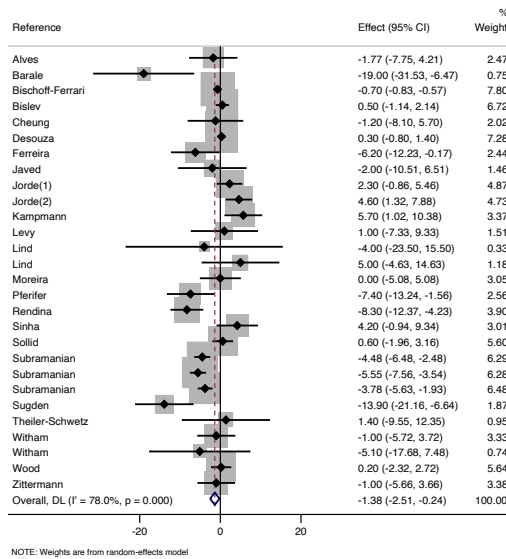


Figure S1-2-1 Forest plot of RCTs investigating the effect of vitamin D supplementation on SBP in participants from Western countries.

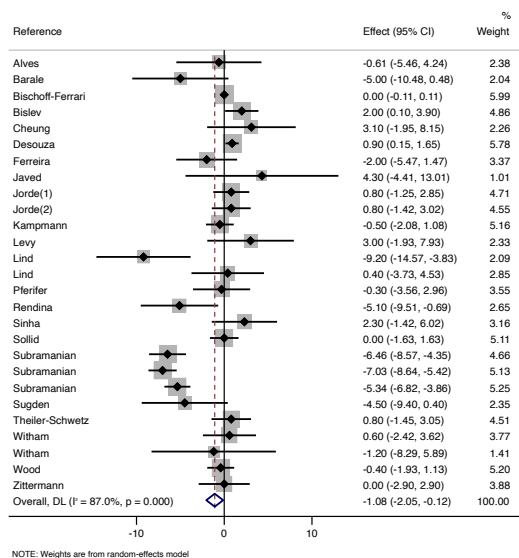


Figure S1-2-2 Forest plot of RCTs investigating the effect of vitamin D supplementation on DBP in participants from Western countries.

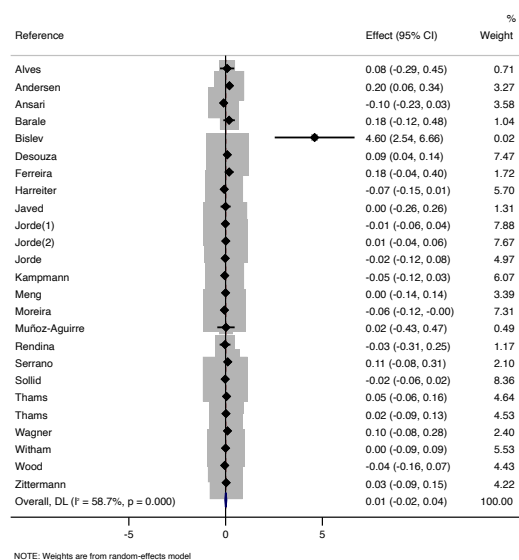


Figure S1-2-3 Forest plot of RCTs investigating the effect of vitamin D supplementation on HDL-C in participants from Western countries.

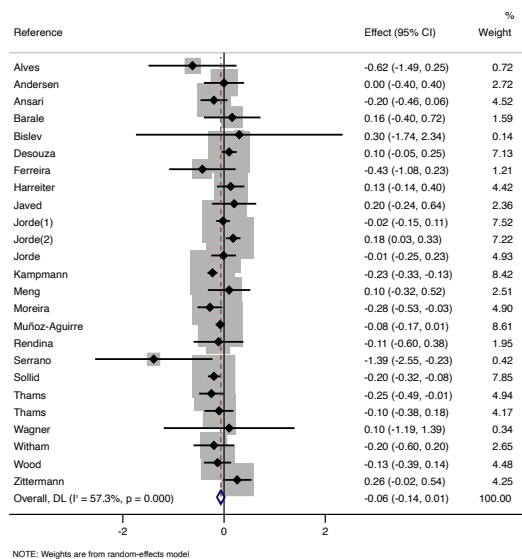


Figure S1-2-4 Forest plot of RCTs investigating the effect of vitamin D supplementation on LDL-C in participants from Western countries.

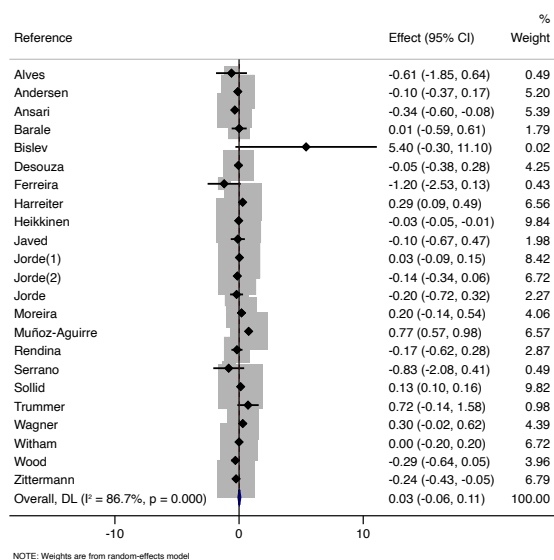


Figure S1-2-5 Forest plot of RCTs investigating the effect of vitamin D supplementation on TG in participants from Western countries.

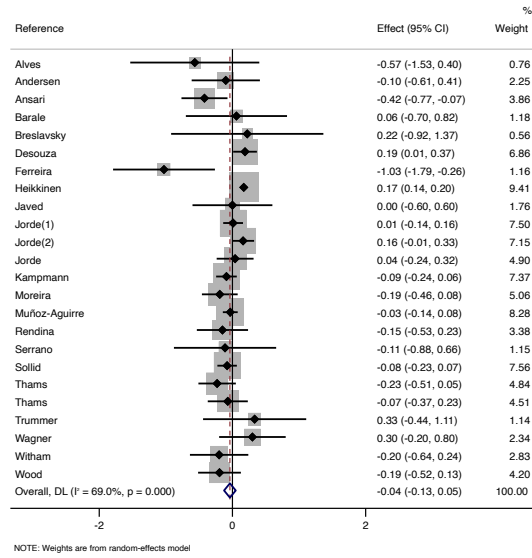


Figure S1-2-6 Forest plot of RCTs investigating the effect of vitamin D supplementation on TC in participants from Western countries.

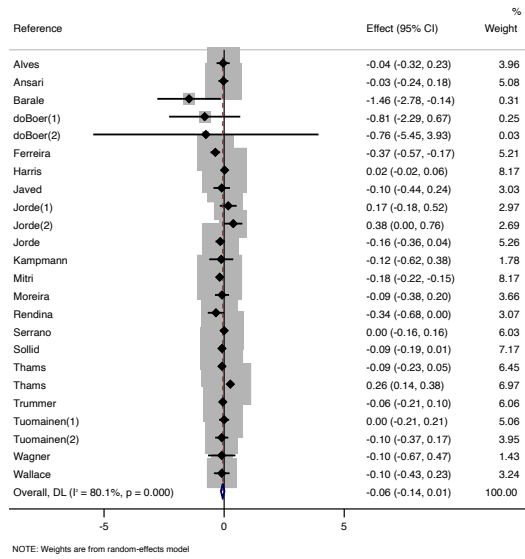


Figure S1-2-7 Forest plot of RCTs investigating the effect of vitamin D supplementation on FBS in participants from Western countries.

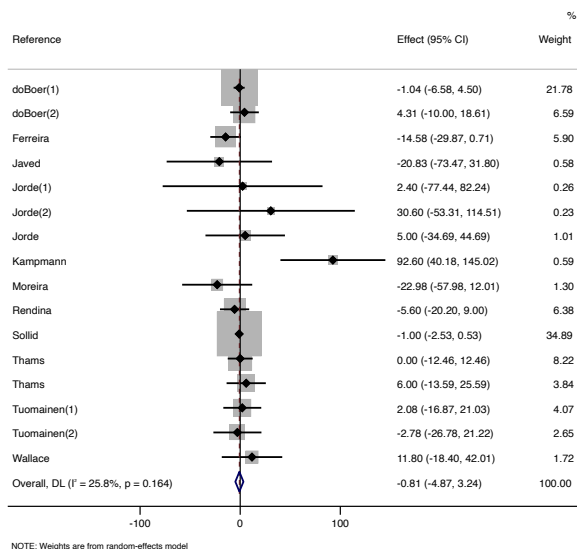


Figure S1-2-8 Forest plot of RCTs investigating the effect of vitamin D supplementation on FBI in participants from Western countries.

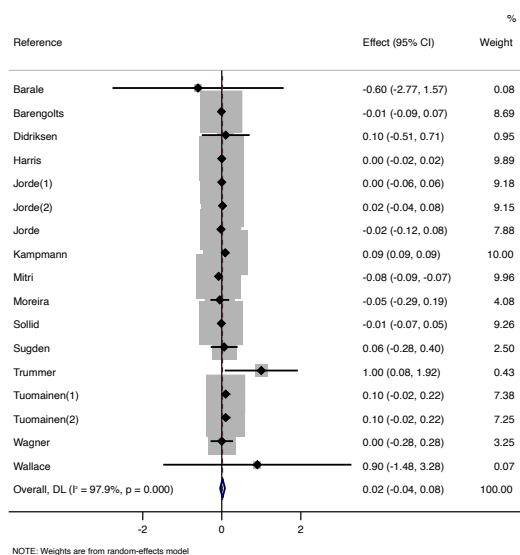


Figure S1-2-9 Forest plot of RCTs investigating the effect of vitamin D supplementation on A1C in participants from Western countries.

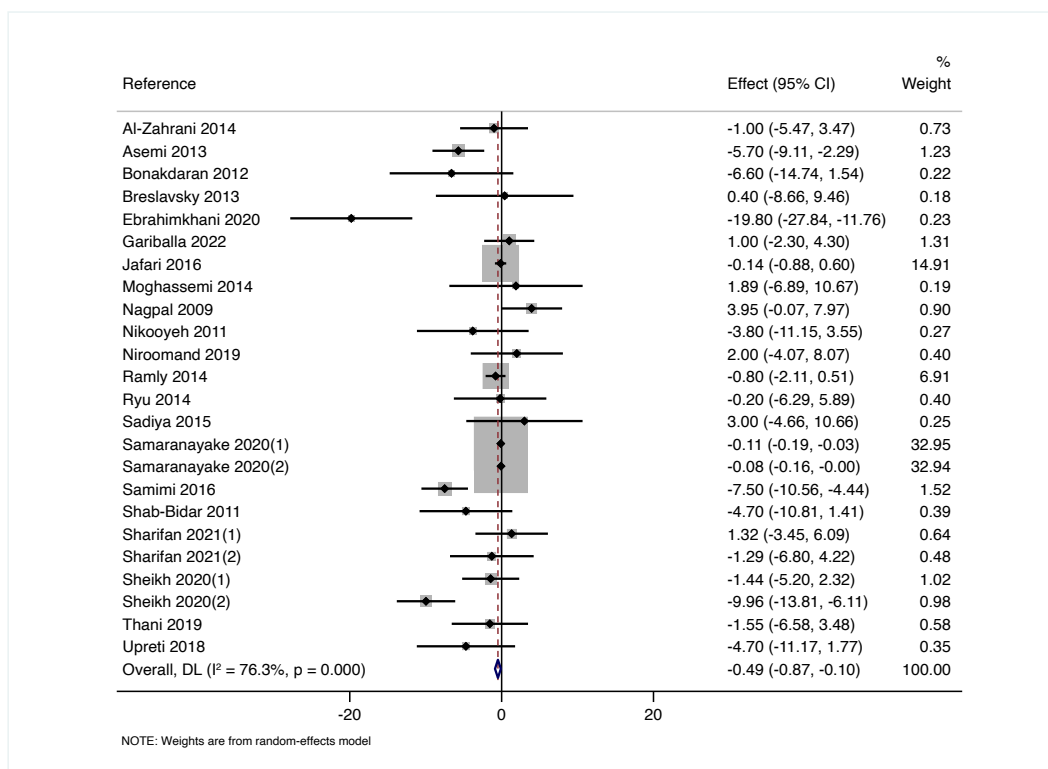


Figure S1-3-1 Forest plot of RCTs investigating the effect of vitamin D supplementation on SBP in participants from non-Western countries.

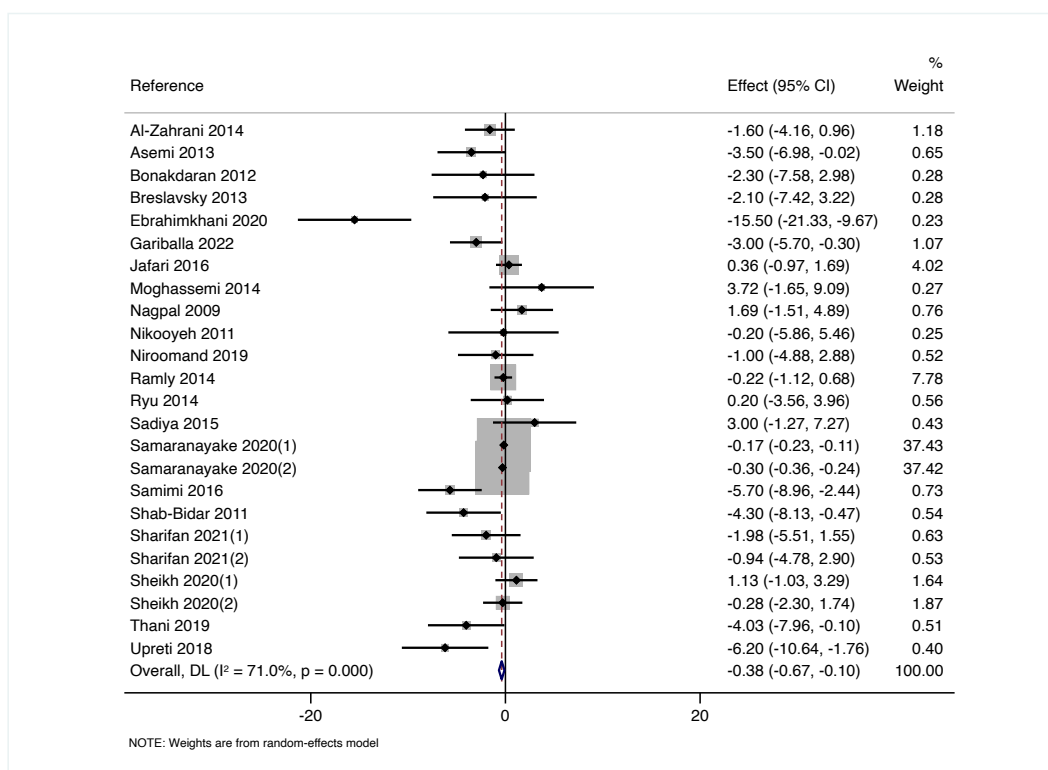


Figure S1-3-2 Forest plot of RCTs investigating the effect of vitamin D supplementation on DBP in participants from non-Western countries.

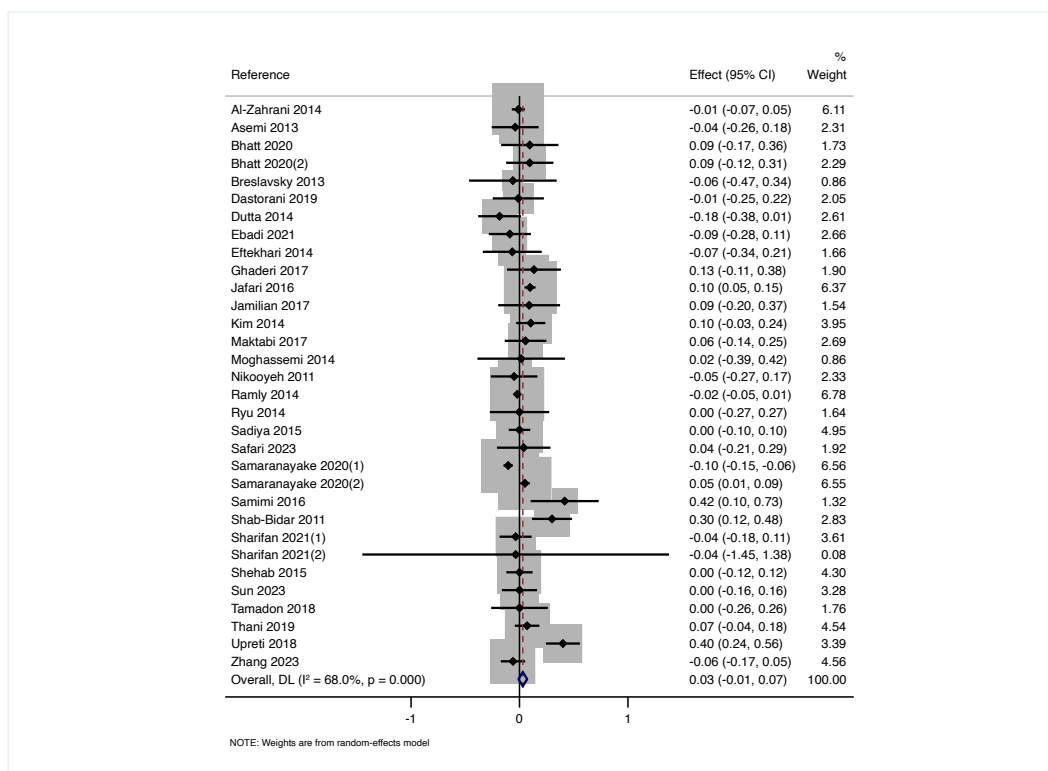


Figure S1-3-3 Forest plot of RCTs investigating the effect of vitamin D supplementation on HDL-C in participants from non-Western countries.

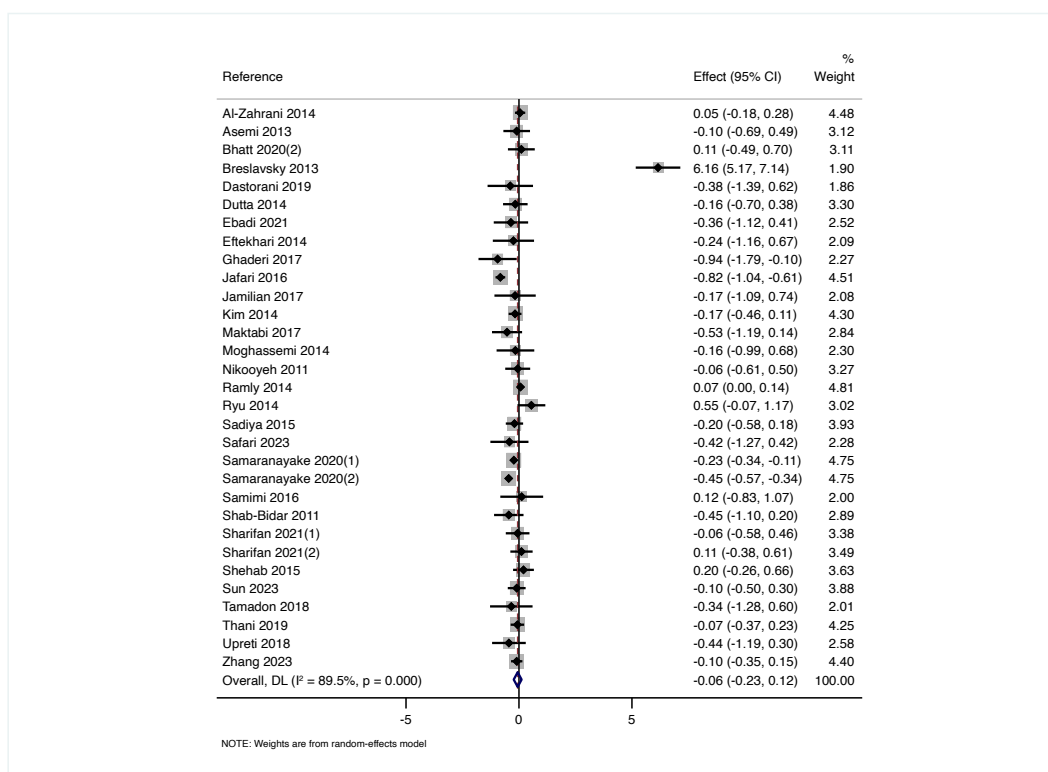


Figure S1-3-4 Forest plot of RCTs investigating the effect of vitamin D supplementation on LDL-C in participants from non-Western countries.

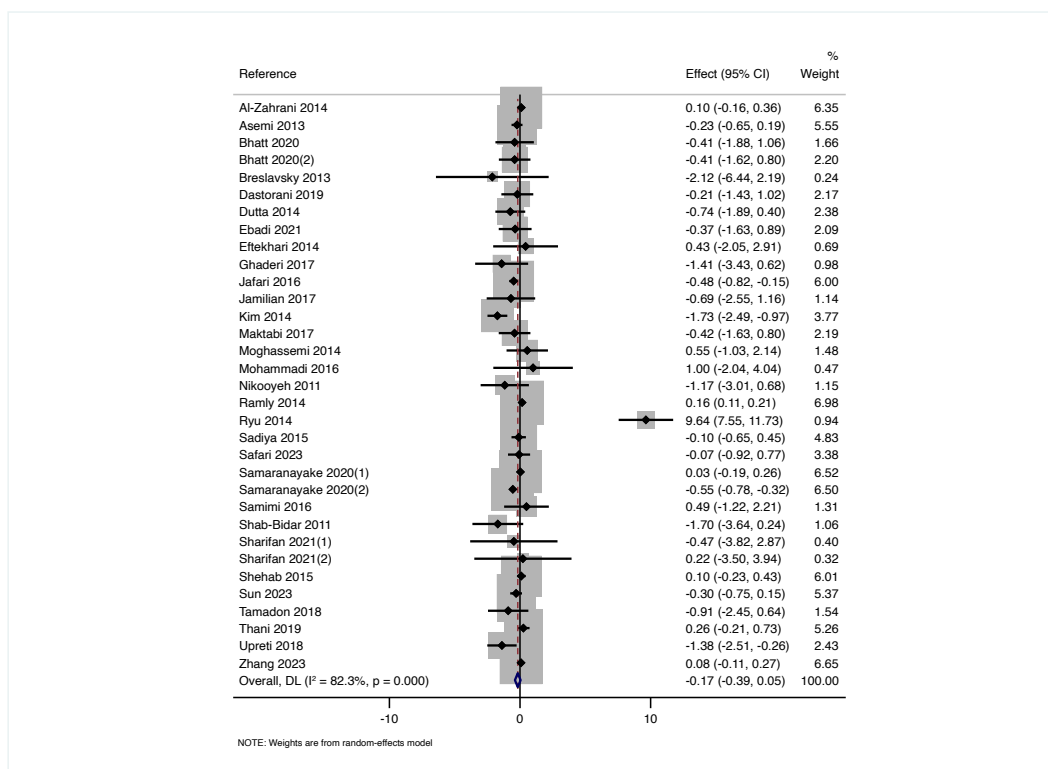


Figure S1-3-5 Forest plot of RCTs investigating the effect of vitamin D supplementation on TG in participants from non-Western countries.

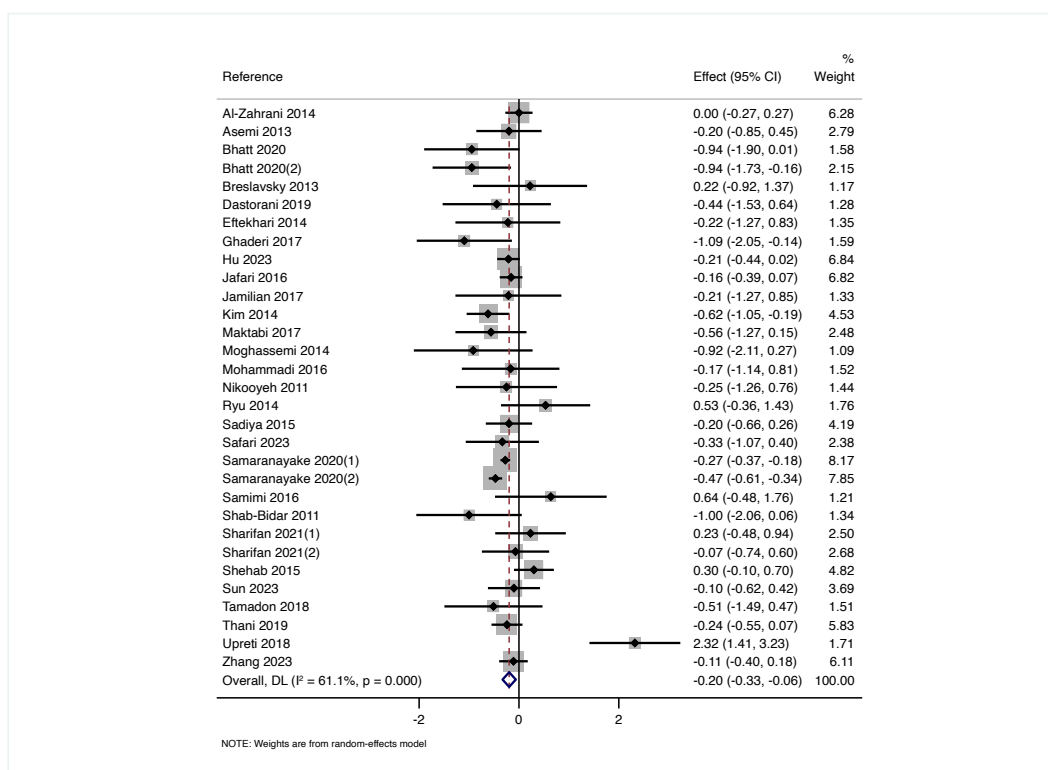


Figure S1-3-6 Forest plot of RCTs investigating the effect of vitamin D supplementation on TC in participants from non-Western countries.

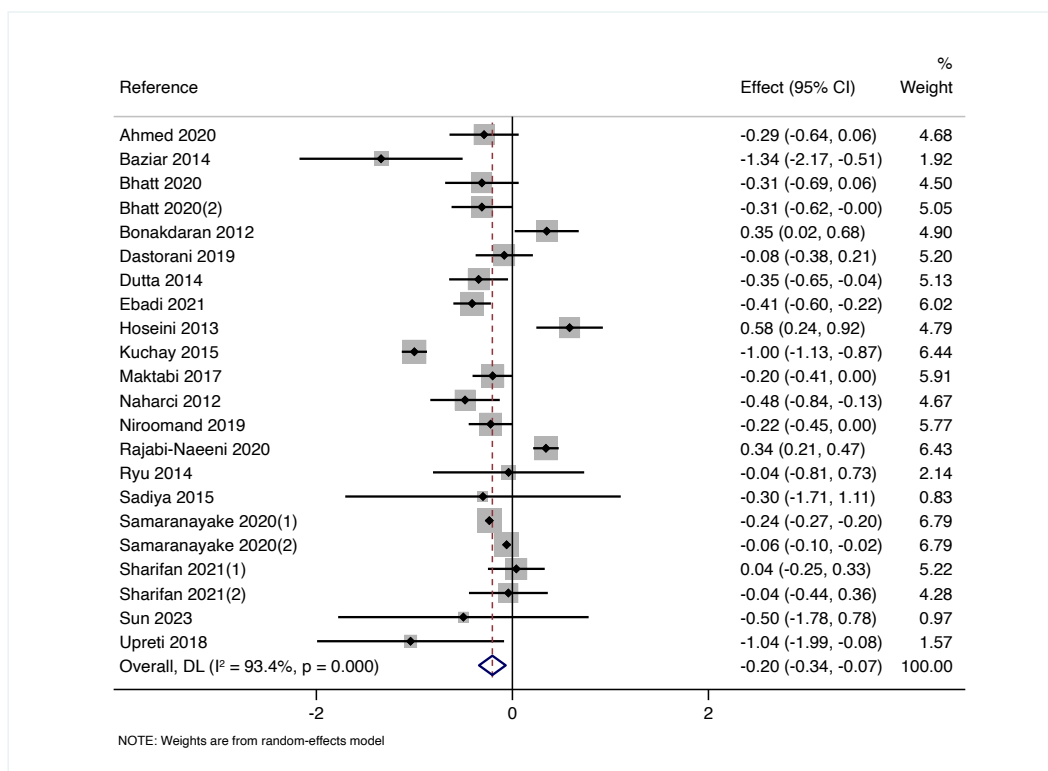


Figure S1-3-7 Forest plot of RCTs investigating the effect of vitamin D supplementation on FBS in participants from non-Western countries.

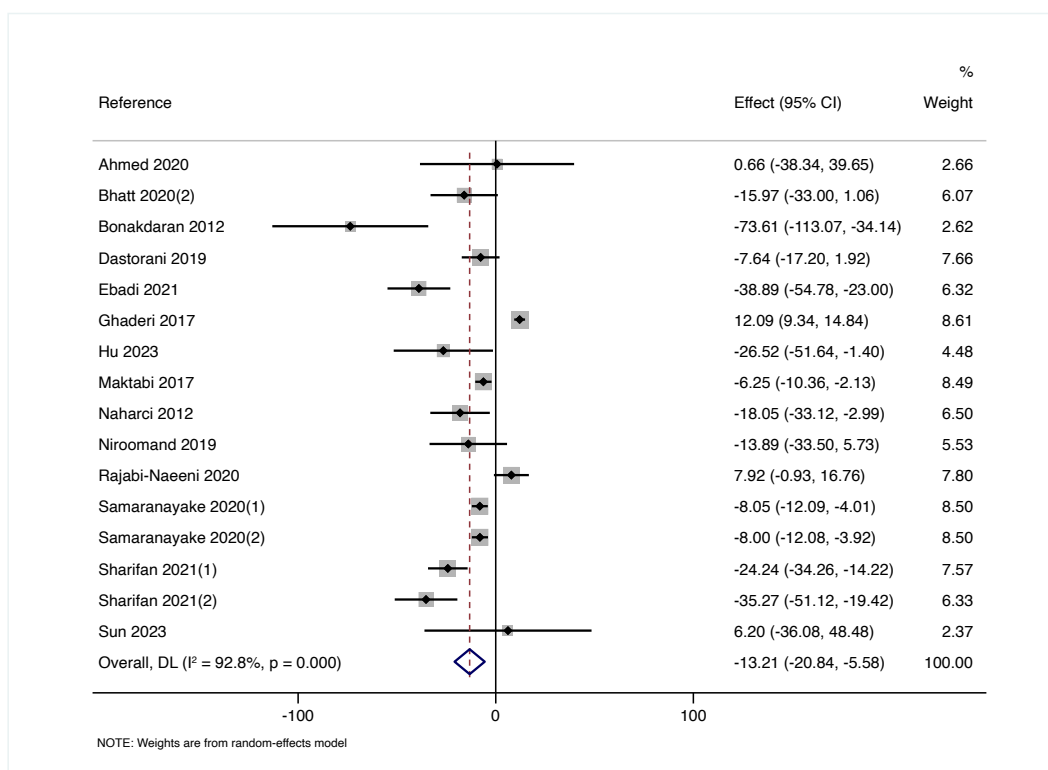


Figure S1-3-8 Forest plot of RCTs investigating the effect of vitamin D supplementation on FBI in participants from non-Western countries.

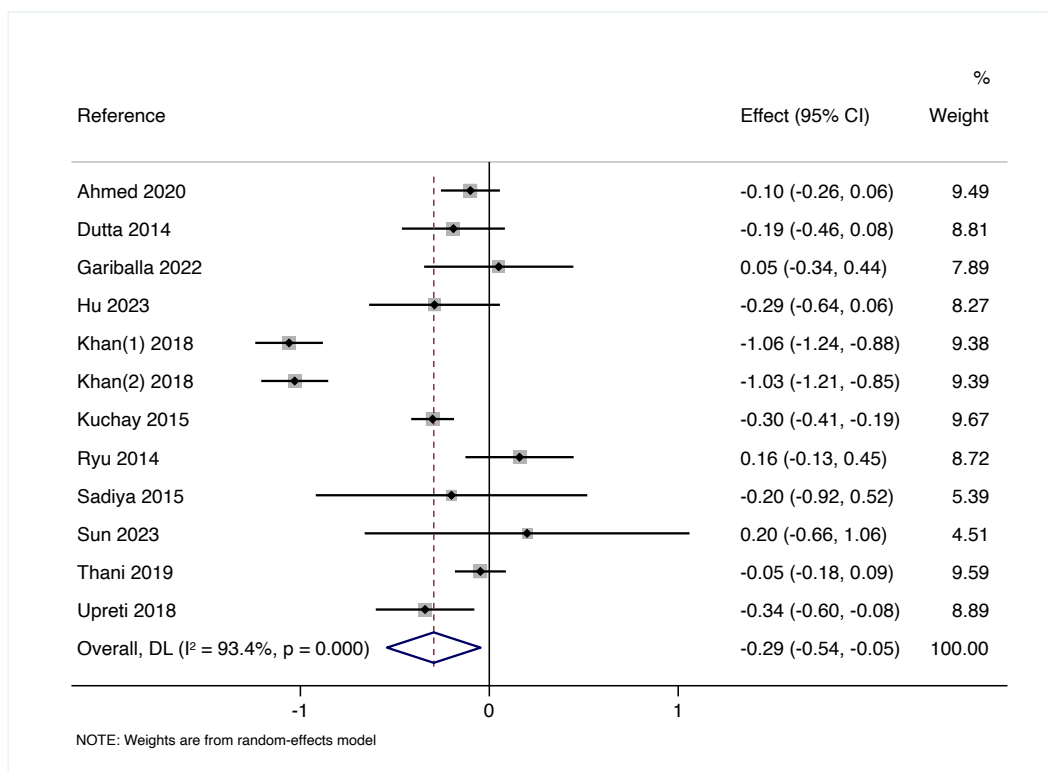


Figure S1-3-9 Forest plot of RCTs investigating the effect of vitamin D supplementation on A1C in participants from non-Western countries.

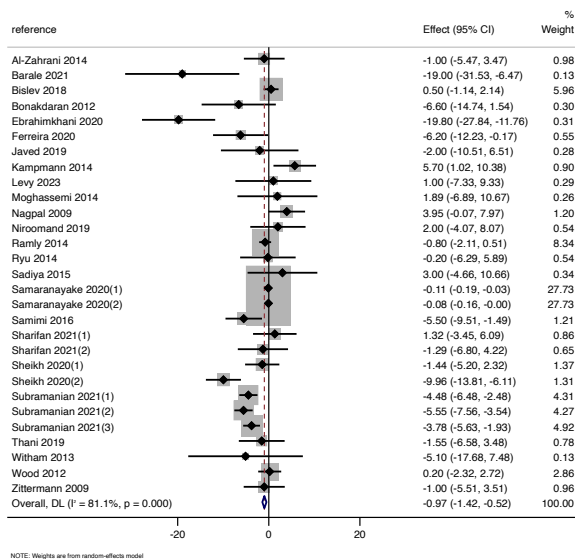


Figure S1-4-1 Forest plot of RCTs investigating the effect of vitamin D supplementation on SBP in participants with baseline 25-hydroxyvitamin D < 15.0 ng/mL.

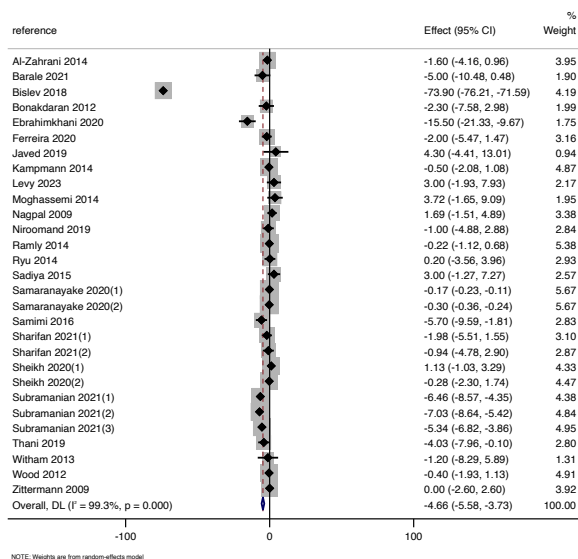


Figure S1-4-2 Forest plot of RCTs investigating the effect of vitamin D supplementation on DBP in participants with baseline 25-hydroxyvitamin D < 15.0 ng/mL.

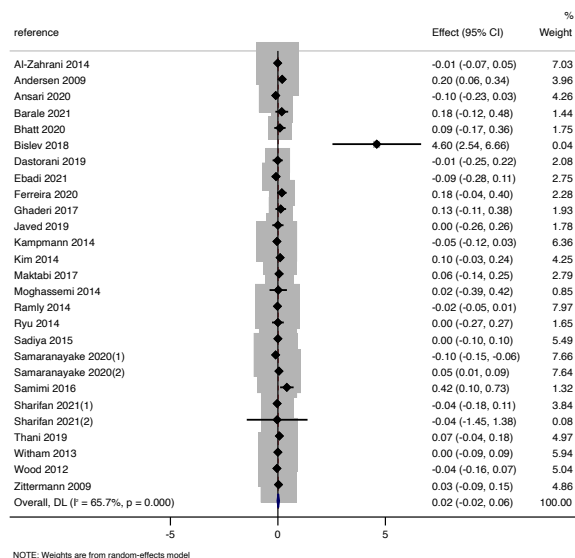


Figure S1-4-3 Forest plot of RCTs investigating the effect of vitamin D supplementation on HDL-C in participants with baseline 25-hydroxyvitamin D < 15.0 ng/mL.

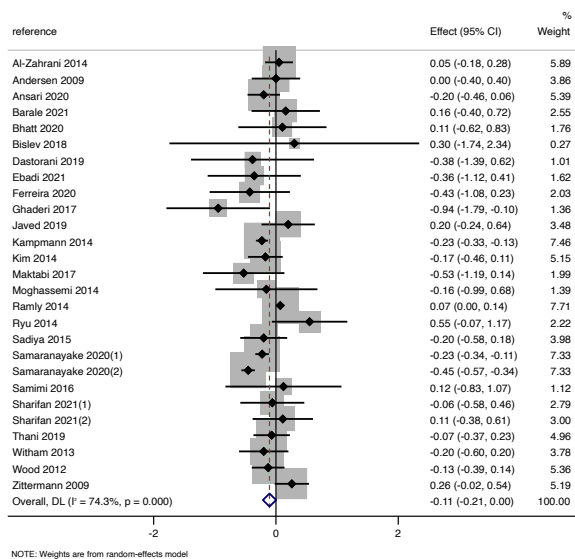


Figure S1-4-4 Forest plot of RCTs investigating the effect of vitamin D supplementation on LDL-C in participants with baseline 25-hydroxyvitamin D < 15.0 ng/mL.

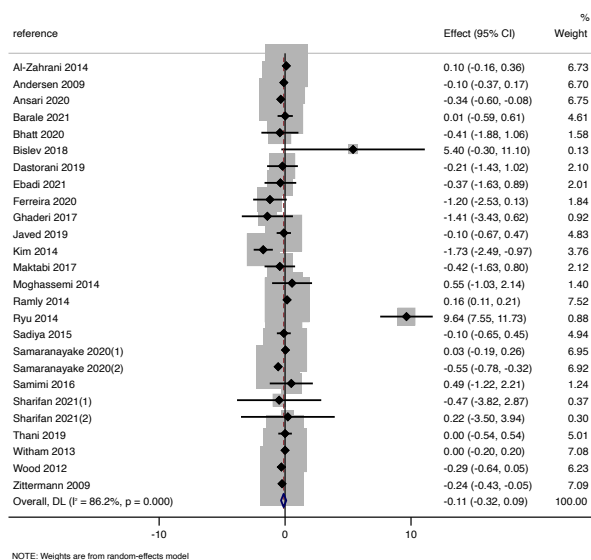


Figure S1-4-5 Forest plot of RCTs investigating the effect of vitamin D supplementation on TG in participants with baseline 25-hydroxyvitamin D < 15.0 ng/mL.

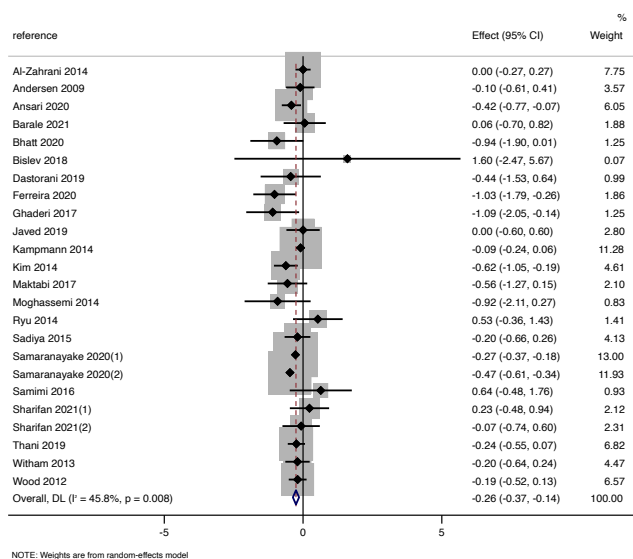


Figure S1-4-6 Forest plot of RCTs investigating the effect of vitamin D supplementation on TC in participants with baseline 25-hydroxyvitamin D < 15.0 ng/mL.

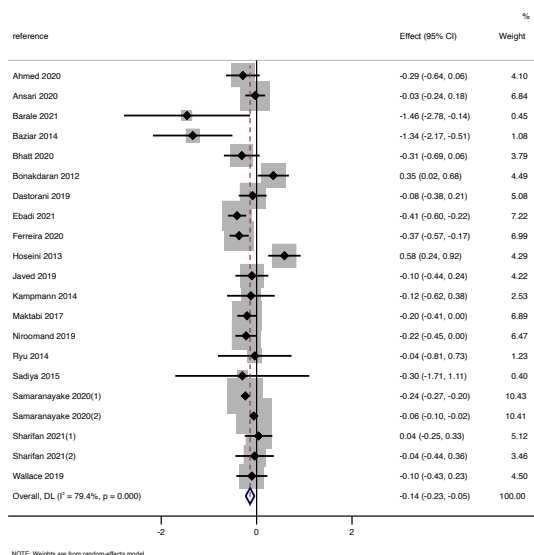


Figure S1-4-7 Forest plot of RCTs investigating the effect of vitamin D supplementation on FBG in participants with baseline 25-hydroxyvitamin D < 15.0 ng/mL.

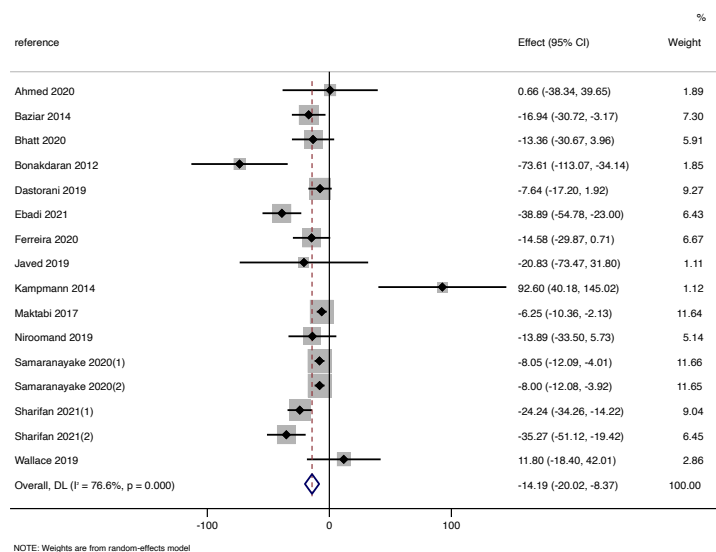


Figure S1-4-8 Forest plot of RCTs investigating the effect of vitamin D supplementation on FBI in participants with baseline 25-hydroxyvitamin D < 15.0 ng/mL.

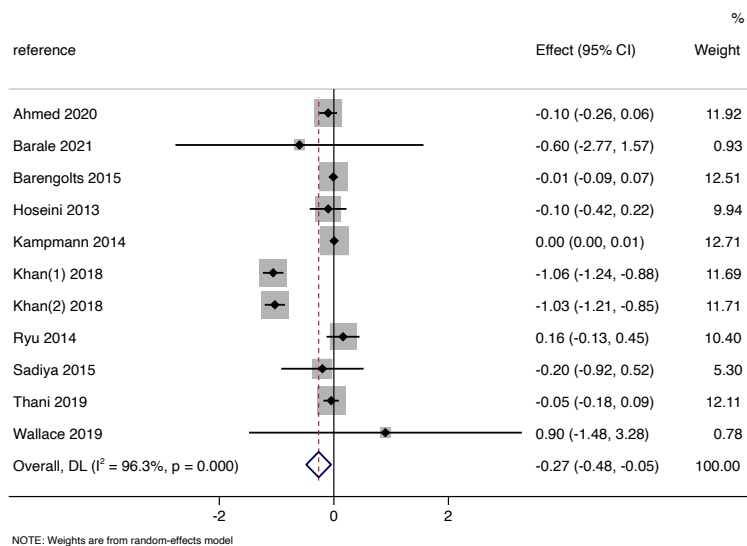


Figure S1-4-9 Forest plot of RCTs investigating the effect of vitamin D supplementation on A1c in participants with baseline 25-hydroxyvitamin D < 15.0 ng/mL.

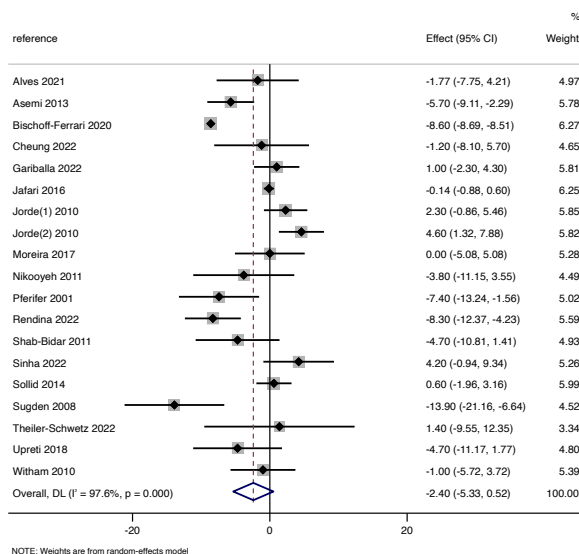


Figure S1-5-1 Forest plot of RCTs investigating the effect of vitamin D supplementation on SBP in participants with baseline 25-hydroxyvitamin D ≥ 15.0 ng/mL.

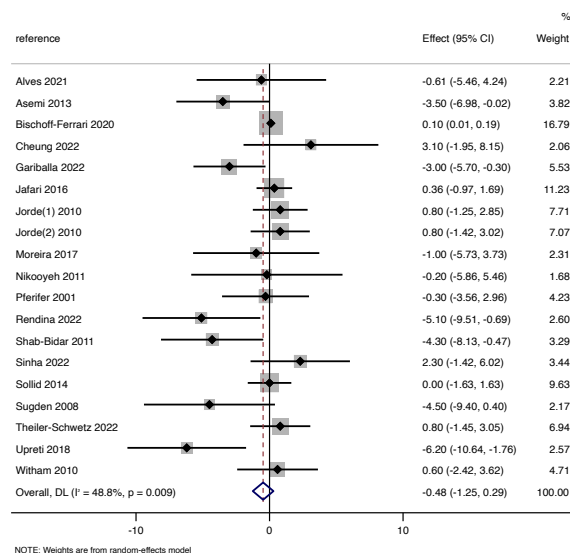


Figure S1-5-2 Forest plot of RCTs investigating the effect of vitamin D supplementation on DBP in participants with baseline 25-hydroxyvitamin D ≥ 15.0 ng/mL.

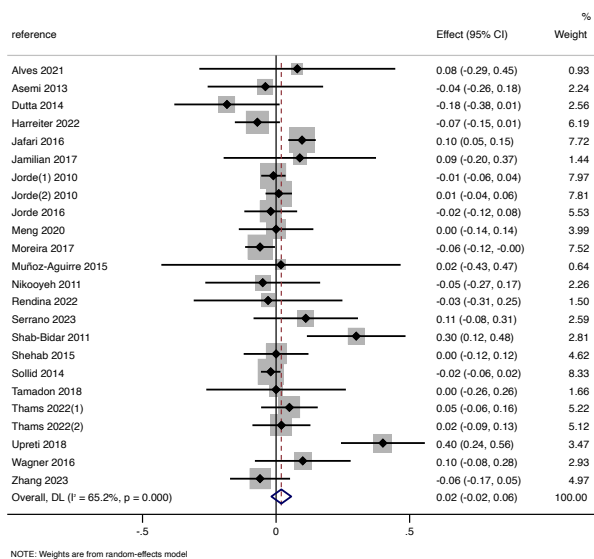


Figure S1-5-3 Forest plot of RCTs investigating the effect of vitamin D supplementation on HDL-C in participants with baseline 25-hydroxyvitamin D \geq 15.0 ng/mL.

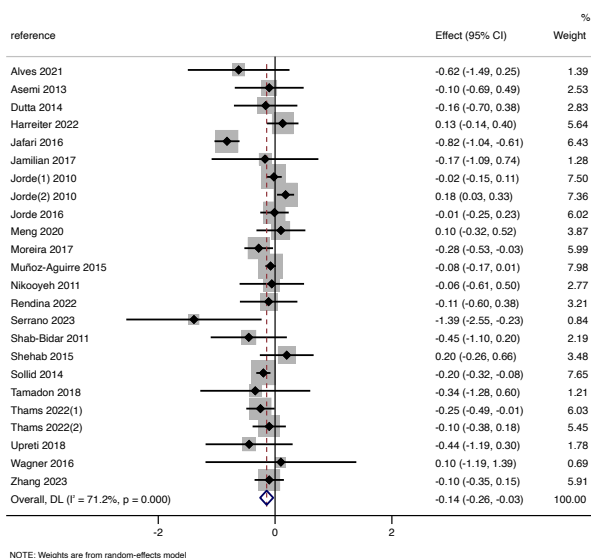


Figure S1-5-4 Forest plot of RCTs investigating the effect of vitamin D supplementation on LDL-C in participants with baseline 25-hydroxyvitamin D \geq 15.0 ng/mL.

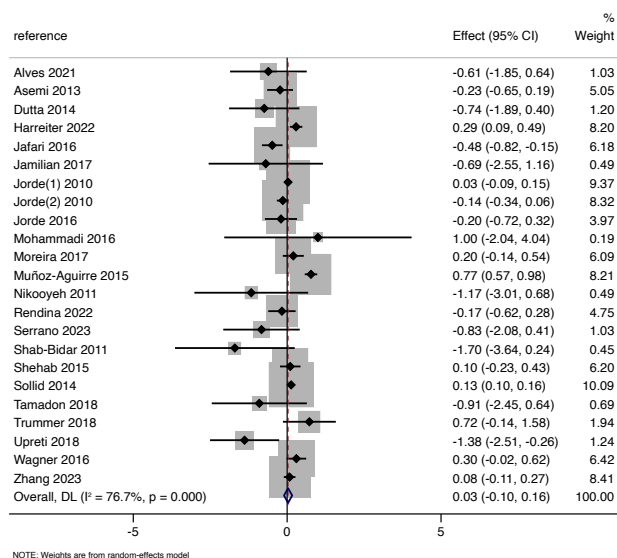


Figure S1-5-5 Forest plot of RCTs investigating the effect of vitamin D supplementation on TG in participants with baseline 25-hydroxyvitamin D \geq 15.0 ng/mL.

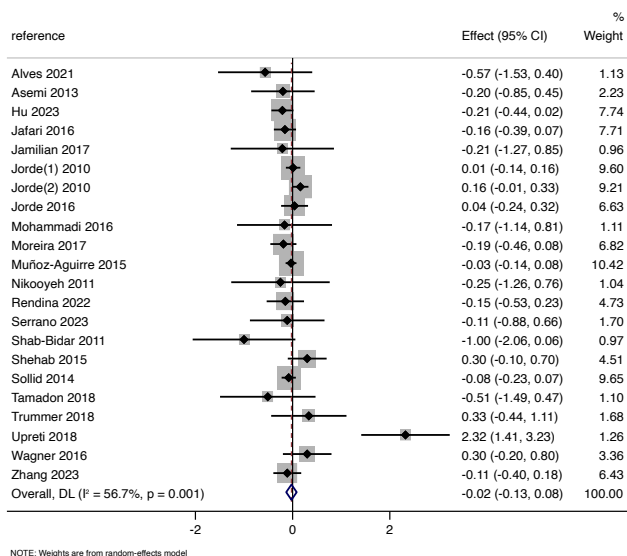


Figure S1-5-6 Forest plot of RCTs investigating the effect of vitamin D supplementation on TC in participants with baseline 25-hydroxyvitamin D \geq 15.0 ng/mL.

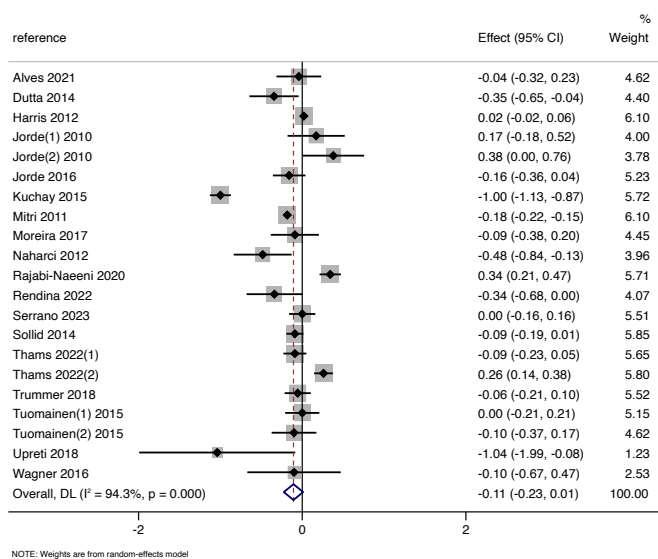


Figure S1-5-7 Forest plot of RCTs investigating the effect of vitamin D supplementation on FBG in participants with baseline 25-hydroxyvitamin D \geq 15.0 ng/mL.

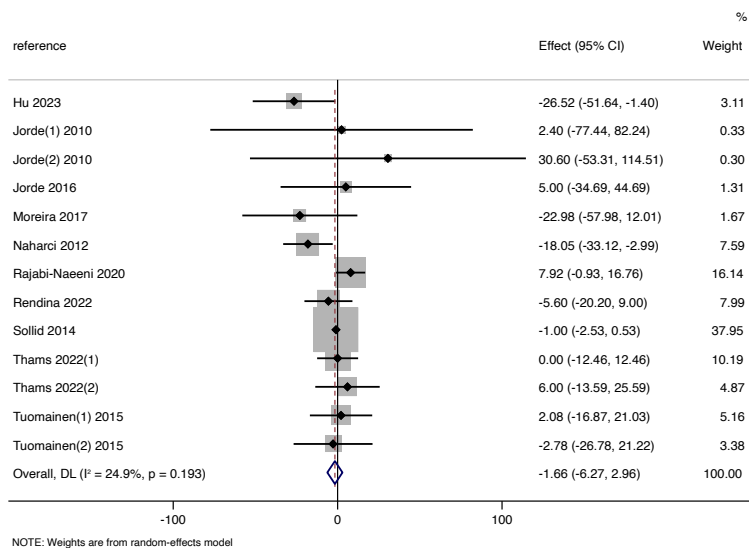


Figure S1-5-8 Forest plot of RCTs investigating the effect of vitamin D supplementation on FBI in participants with baseline 25-hydroxyvitamin D \geq 15.0 ng/mL.

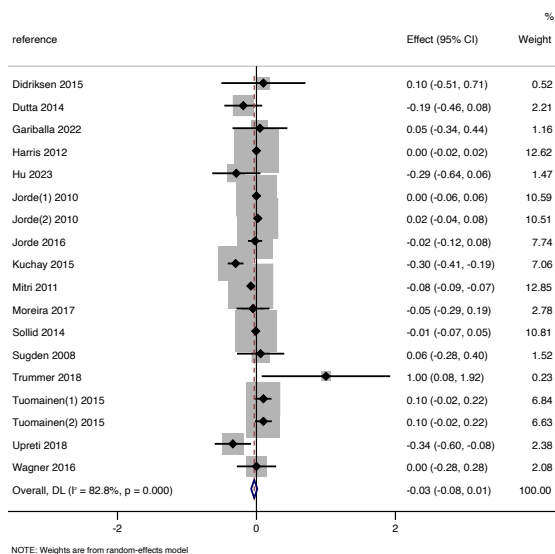


Figure S1-5-9 Forest plot of RCTs investigating the effect of vitamin D supplementation on A1c in participants with baseline 25-hydroxyvitamin D \geq 15.0 ng/mL.

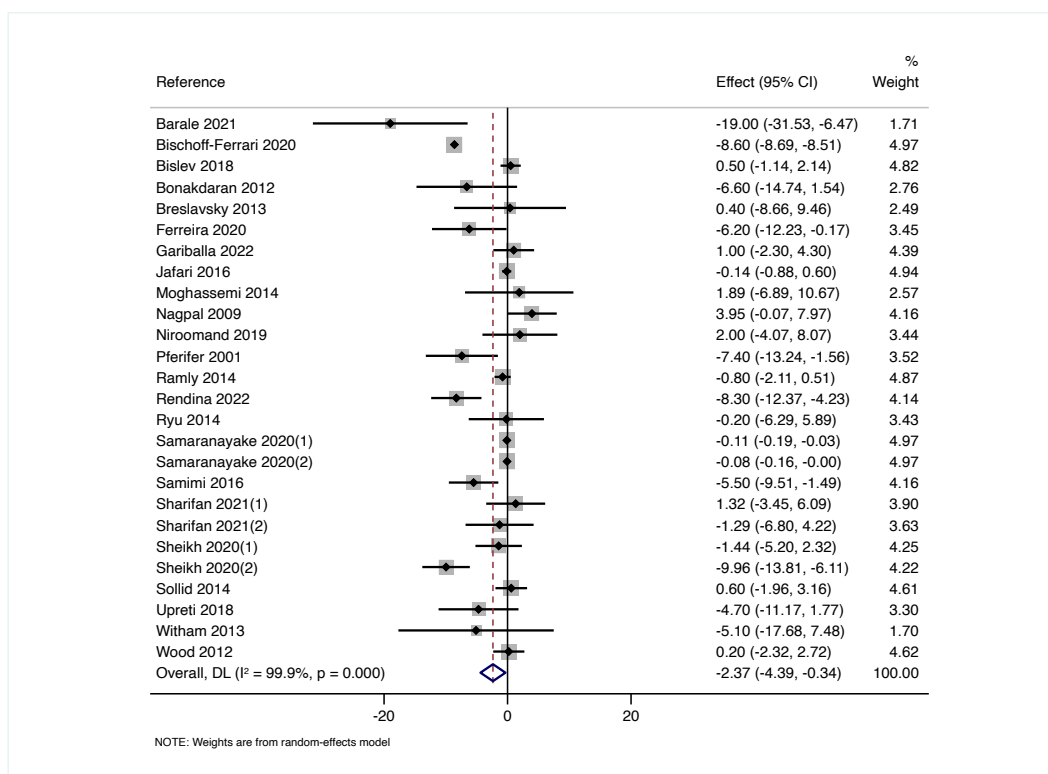


Figure S1-6-1 Forest plot of RCTs investigating the effect of vitamin D supplementation on SBP in participants with BMI < 30 kg/m².

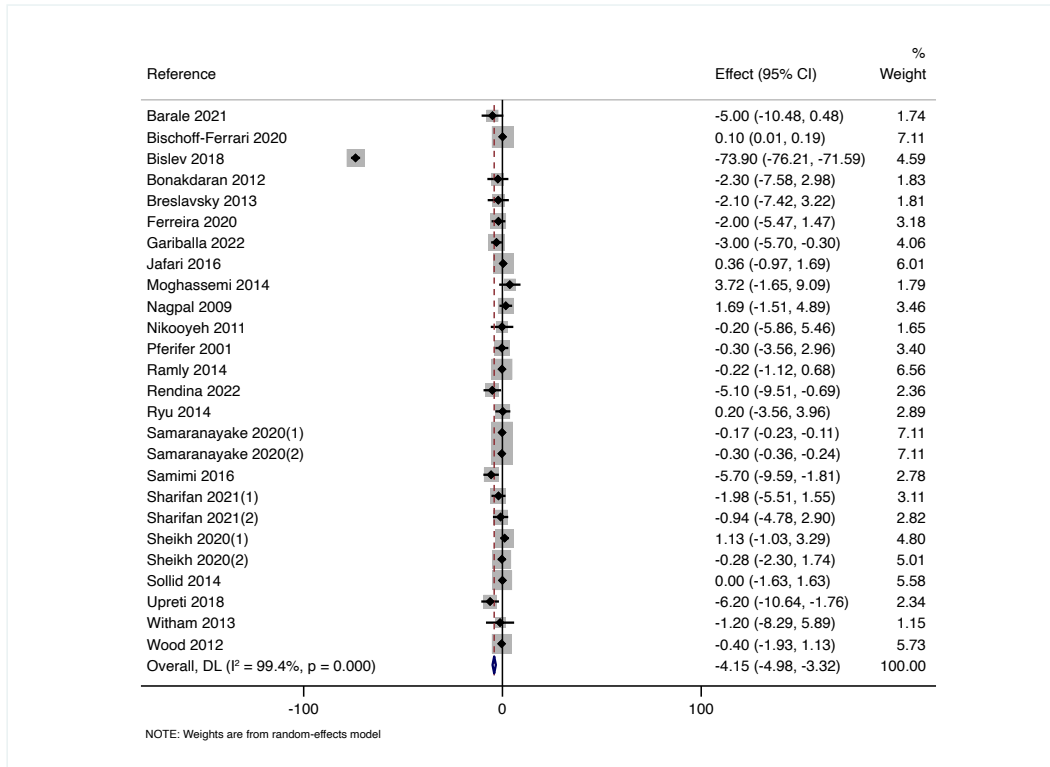


Figure S1-6-2 Forest plot of RCTs investigating the effect of vitamin D supplementation on DBP in participants with BMI < 30 kg/m².

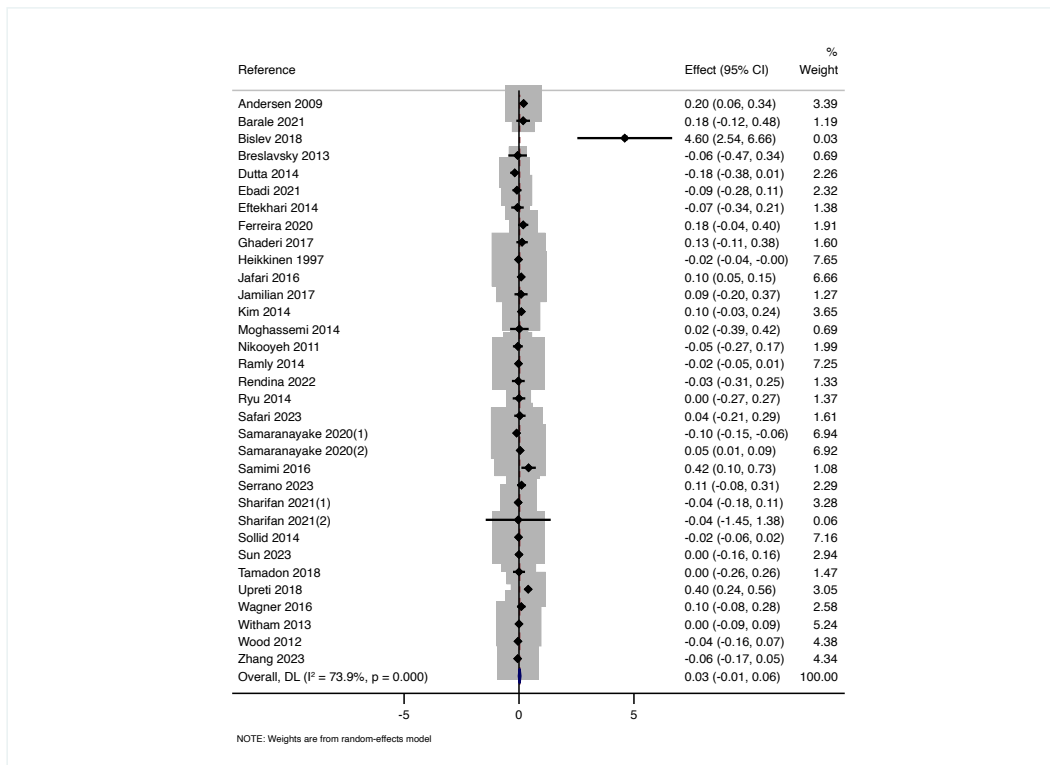


Figure S1-6-3 Forest plot of RCTs investigating the effect of vitamin D supplementation on HDL-C in participants with BMI < 30 kg/m².

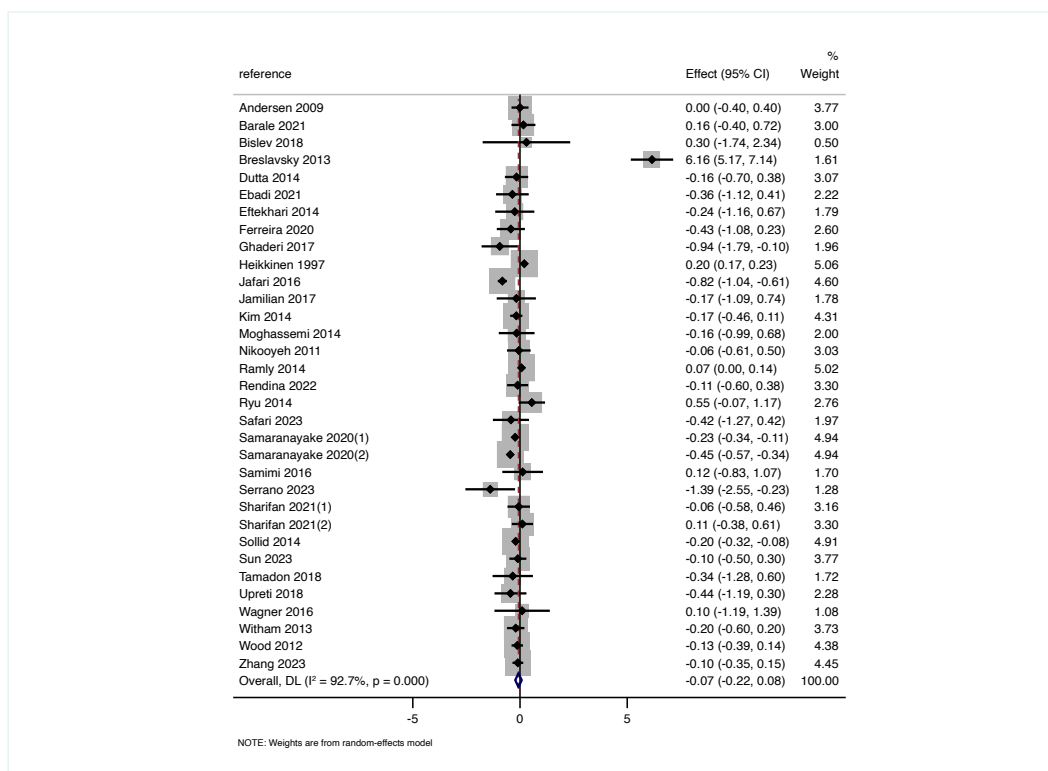


Figure S1-6-4 Forest plot of RCTs investigating the effect of vitamin D supplementation on LDL-C in participants with BMI < 30 kg/m².

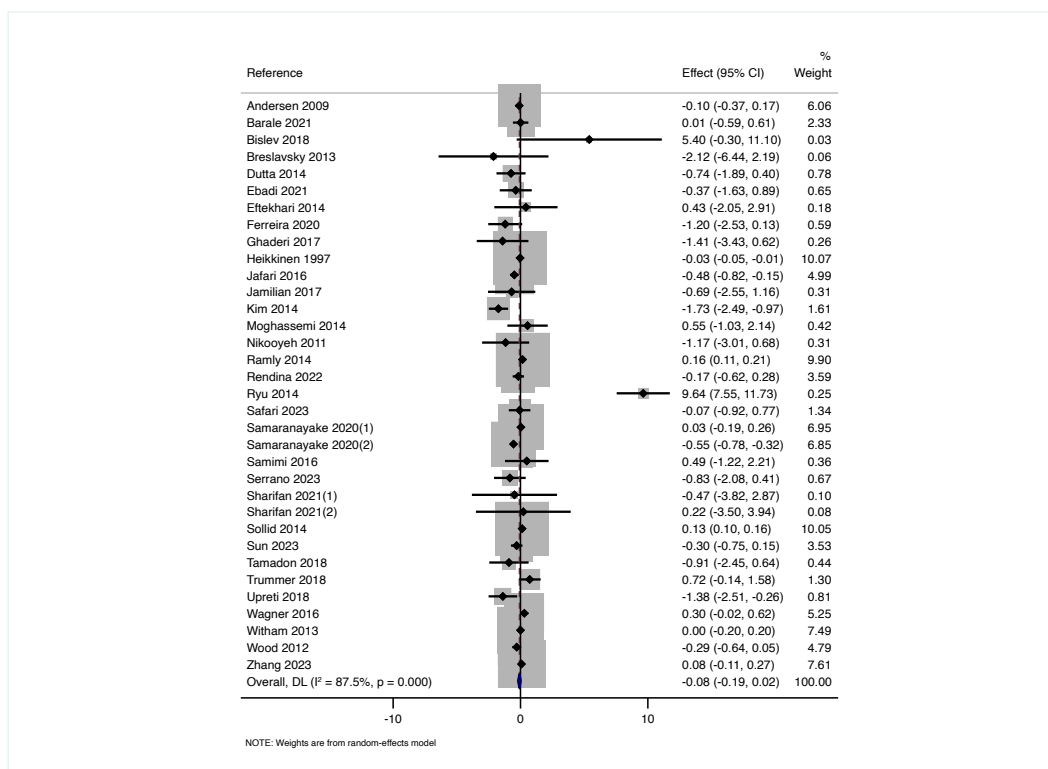


Figure S1-6-5 Forest plot of RCTs investigating the effect of vitamin D supplementation on TG in participants with BMI < 30 kg/m².

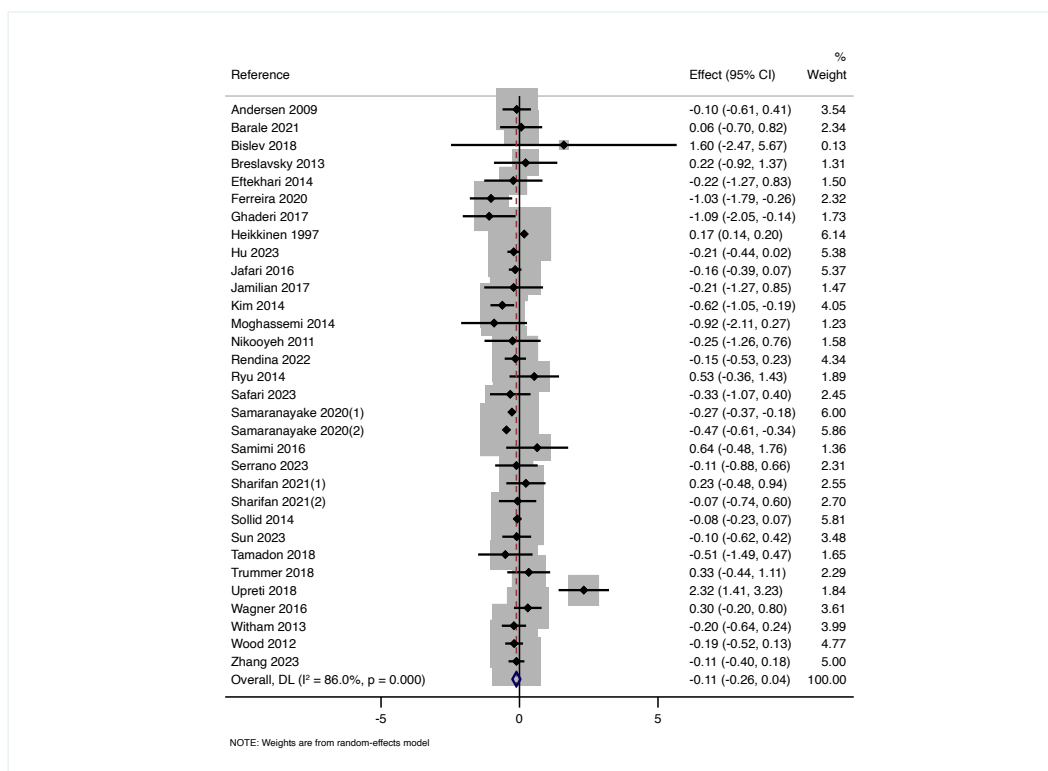


Figure S1-6-6 Forest plot of RCTs investigating the effect of vitamin D supplementation on TC in participants with BMI < 30 kg/m².

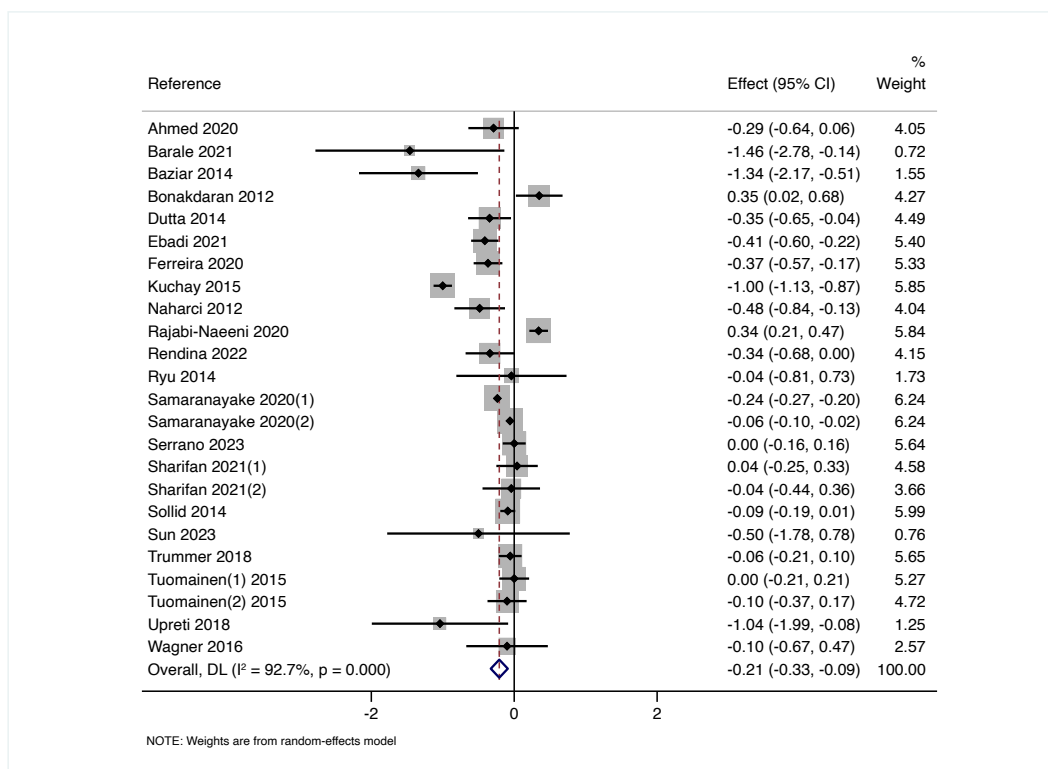


Figure S1-6-7 Forest plot of RCTs investigating the effect of vitamin D supplementation on FBG in participants with BMI < 30 kg/m².

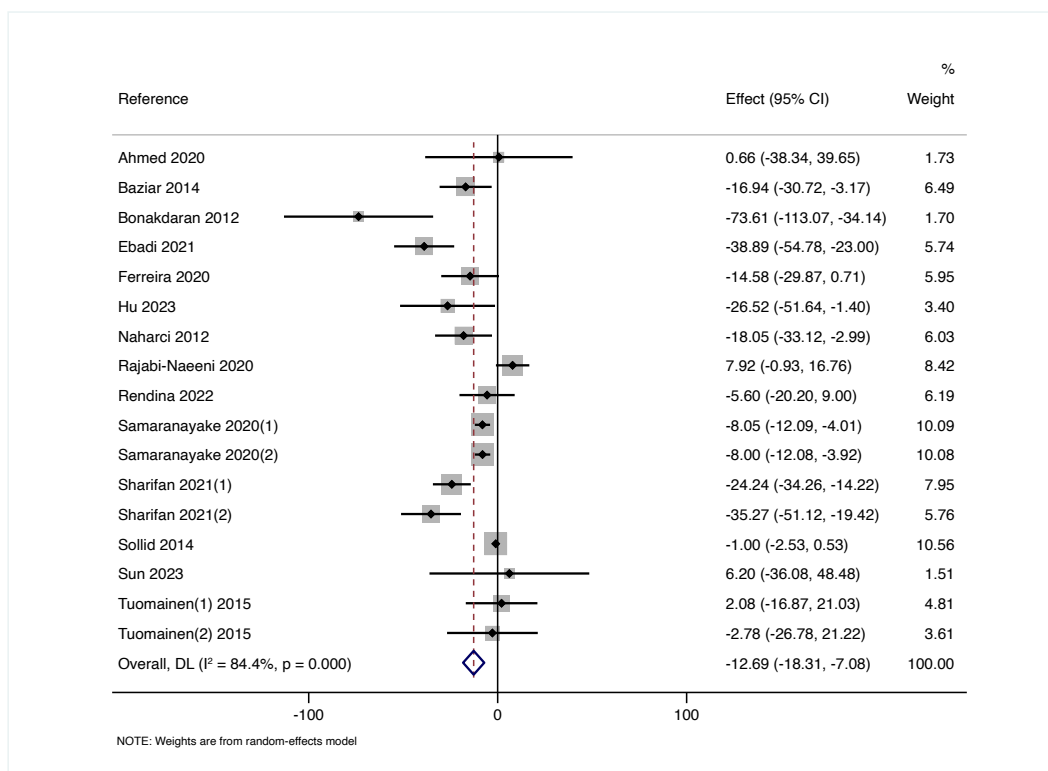


Figure S1-6-8 Forest plot of RCTs investigating the effect of vitamin D supplementation on FBI in participants with BMI < 30 kg/m².

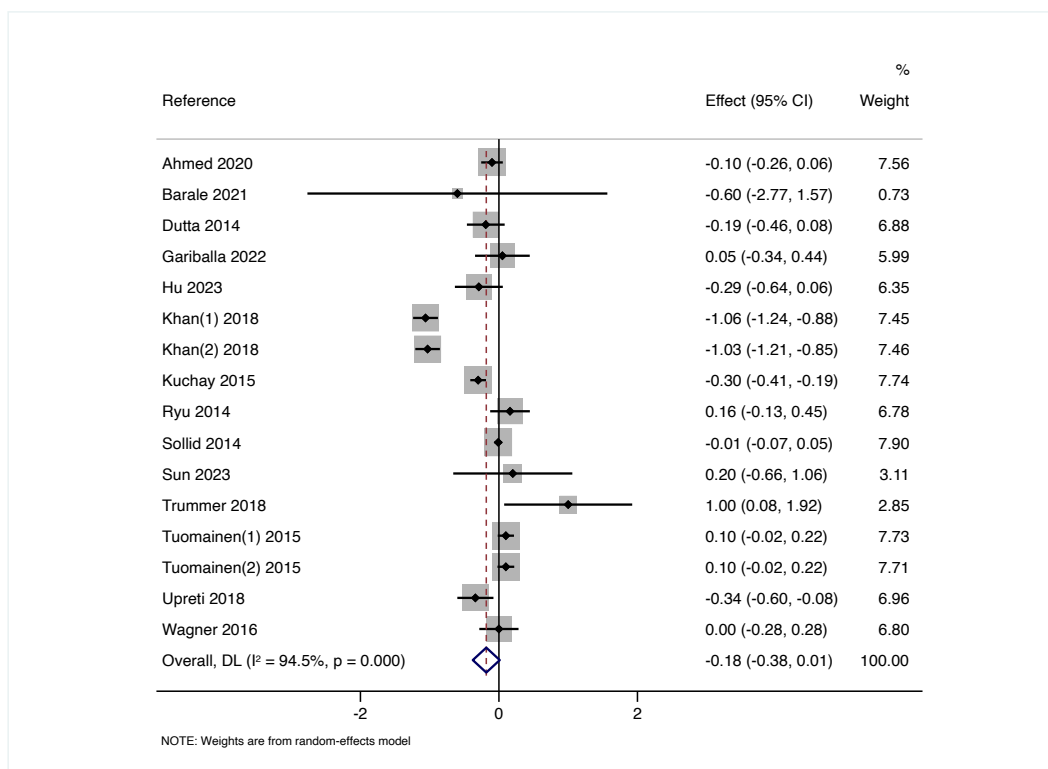


Figure S1-6-9 Forest plot of RCTs investigating the effect of vitamin D supplementation on A1c in participants with BMI < 30 kg/m².

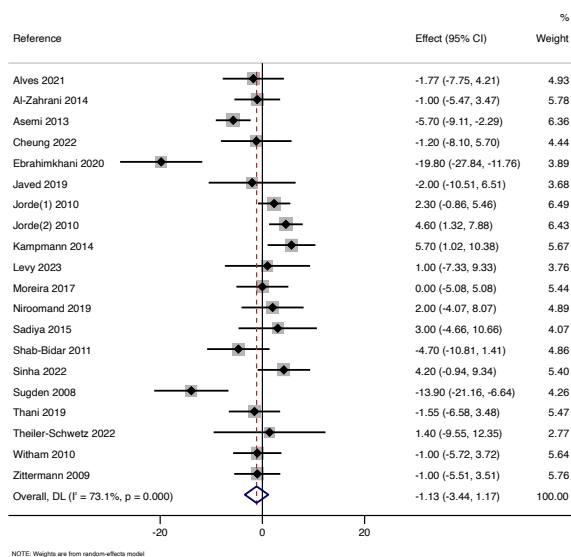


Figure S1-7-1 Forest plot of RCTs investigating the effect of vitamin D supplementation on SBP in participants with BMI \geq 30 kg/m².

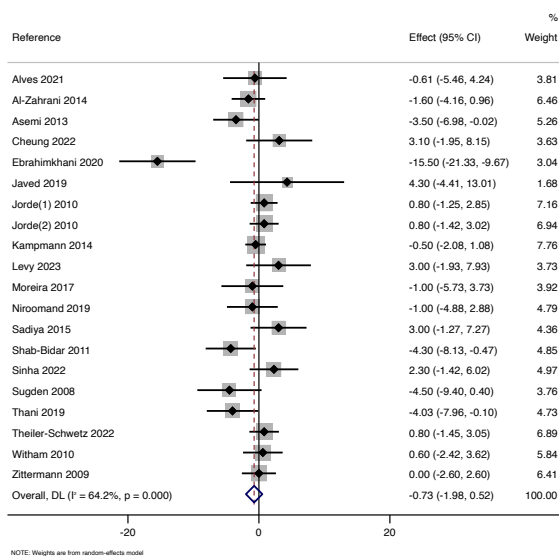


Figure S1-7-2 Forest plot of RCTs investigating the effect of vitamin D supplementation on DBP in participants with BMI \geq 30 kg/m².

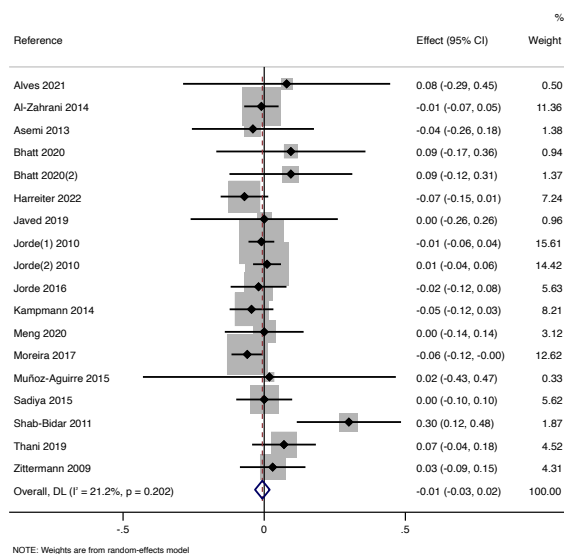


Figure S1-7-3 Forest plot of RCTs investigating the effect of vitamin D supplementation on HDL-C in participants with BMI ≥ 30 kg/m².

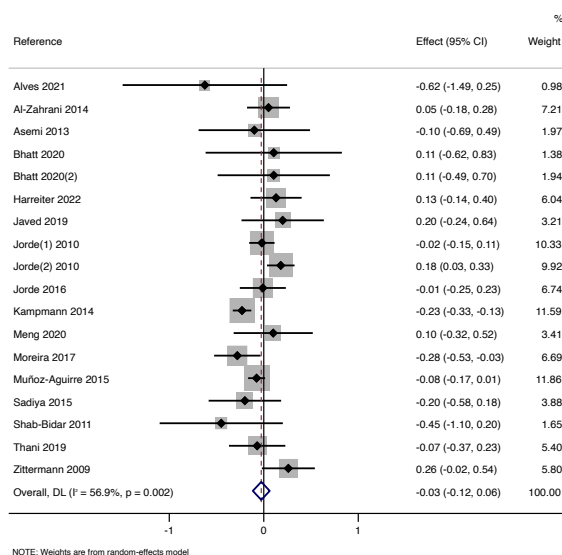


Figure S1-7-4 Forest plot of RCTs investigating the effect of vitamin D supplementation on LDL-C in participants with BMI ≥ 30 kg/m².

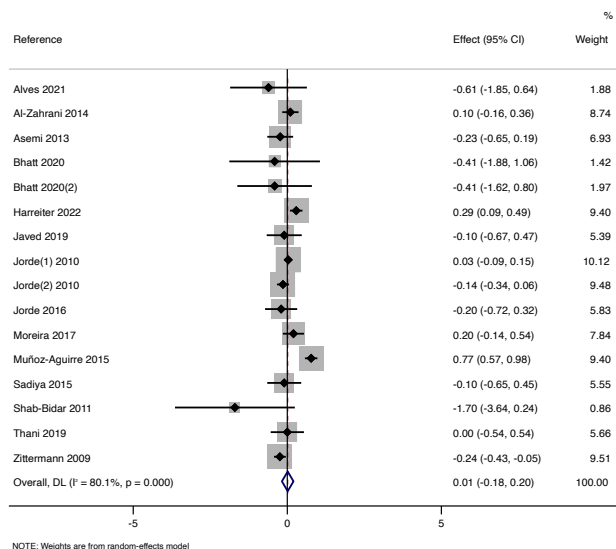


Figure S1-7-5 Forest plot of RCTs investigating the effect of vitamin D supplementation on TG in participants with BMI ≥ 30 kg/m².

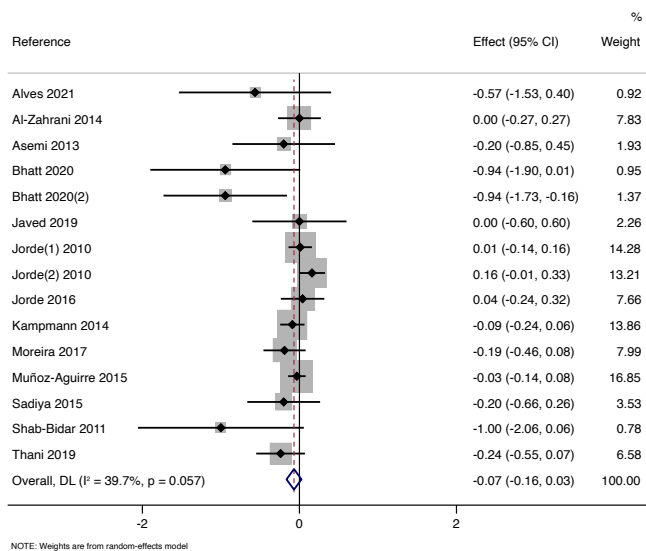


Figure S1-7-6 Forest plot of RCTs investigating the effect of vitamin D supplementation on TC in participants with BMI ≥ 30 kg/m².

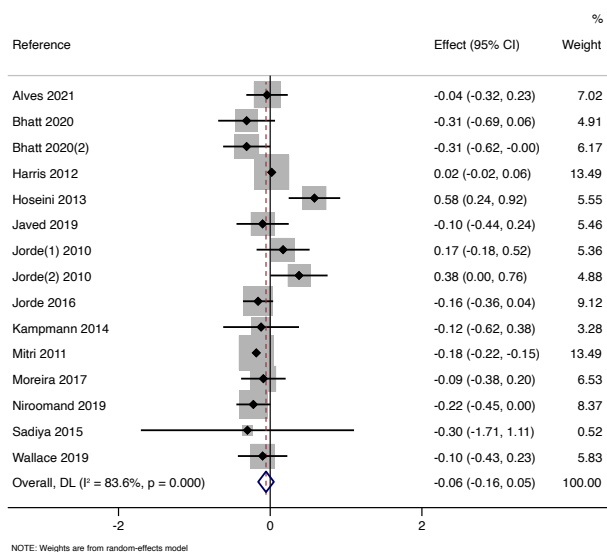


Figure S1-7-7 Forest plot of RCTs investigating the effect of vitamin D supplementation on FBG in participants with BMI ≥ 30 kg/m².

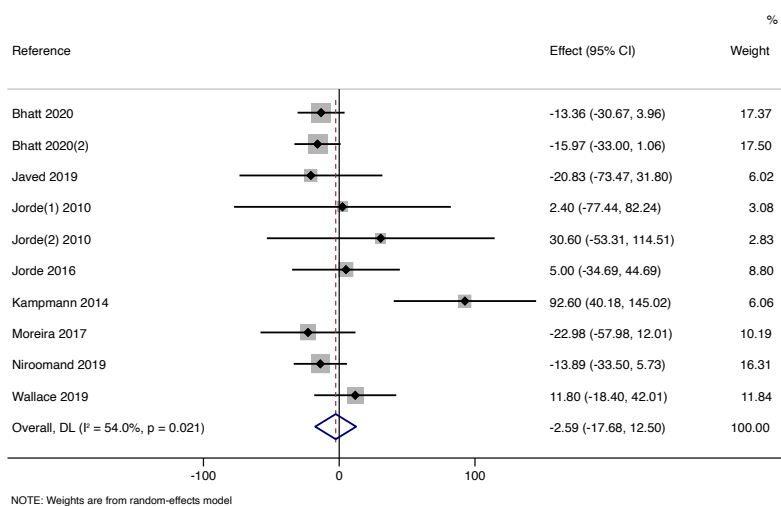


Figure S1-7-8 Forest plot of RCTs investigating the effect of vitamin D supplementation on FBI in participants with BMI ≥ 30 kg/m².

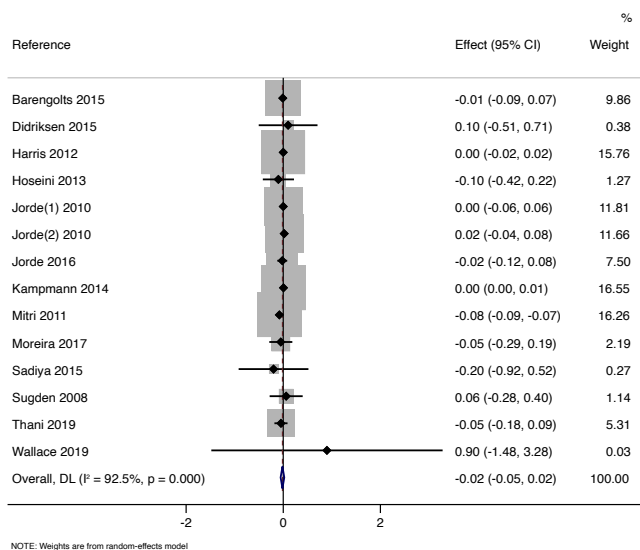


Figure S1-7-9 Forest plot of RCTs investigating the effect of vitamin D supplementation on A1c in participants with BMI ≥ 30 kg/m².

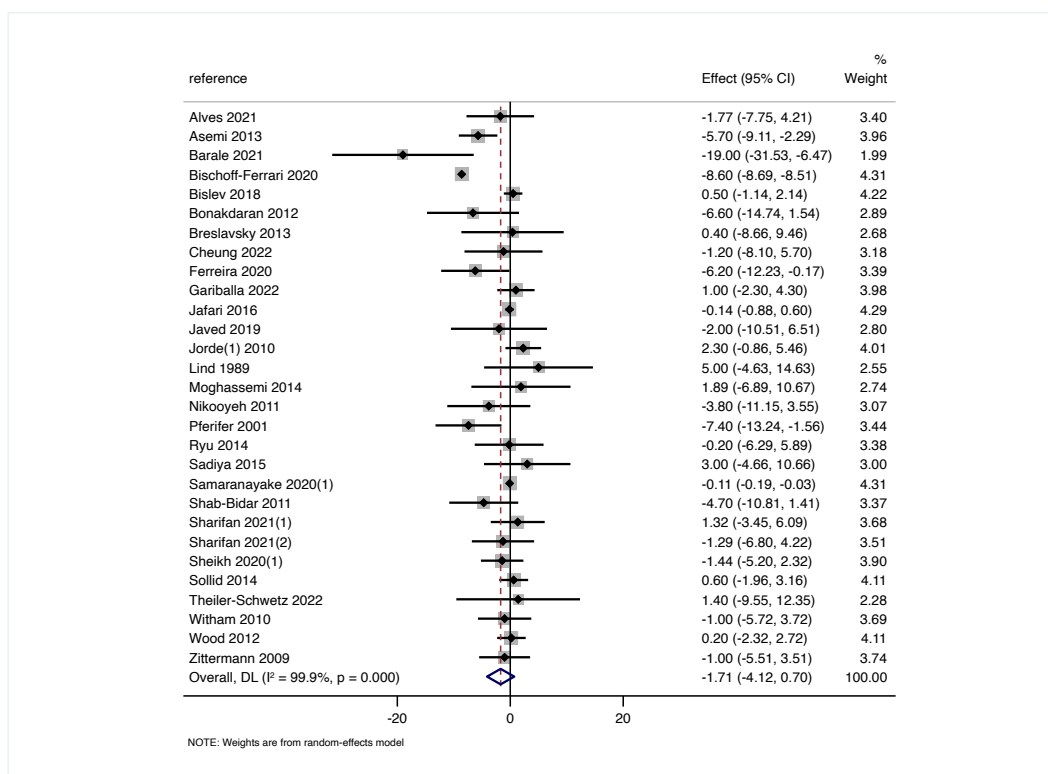


Figure S1-8-1 Forest plot of RCTs investigating the effect of vitamin D supplementation on SBP in participants with vitamin D supplementation dose < 3320IU.

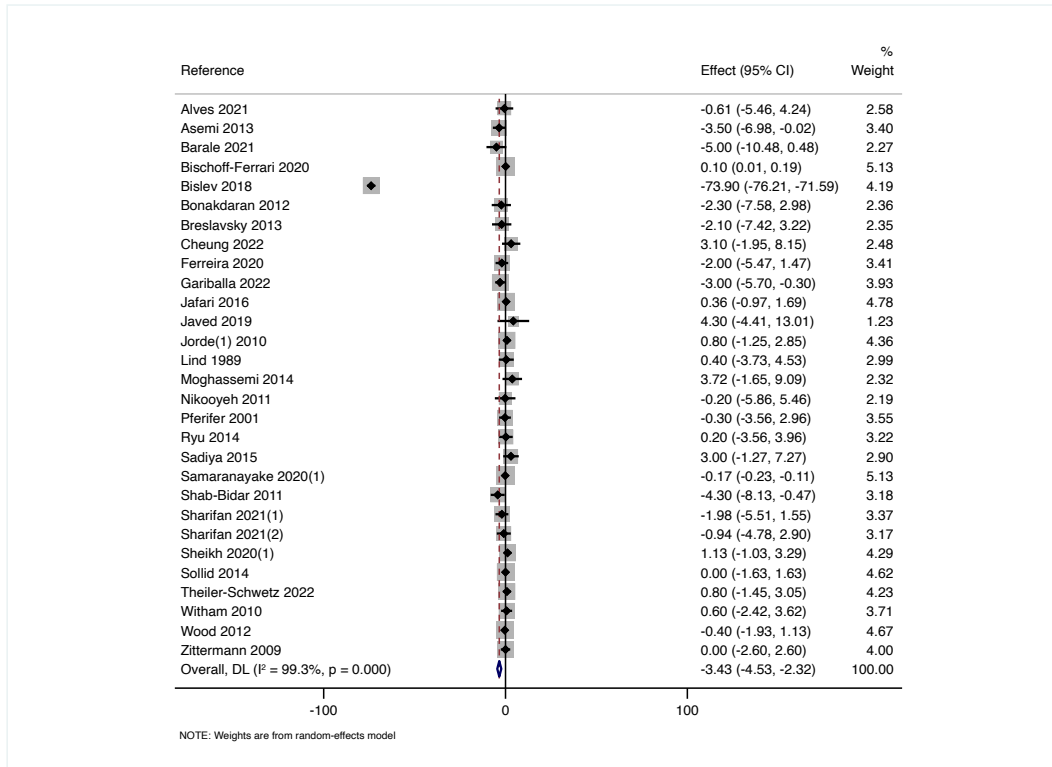


Figure S1-8-2 Forest plot of RCTs investigating the effect of vitamin D supplementation on DBP in participants with vitamin D supplementation dose < 3320IU.

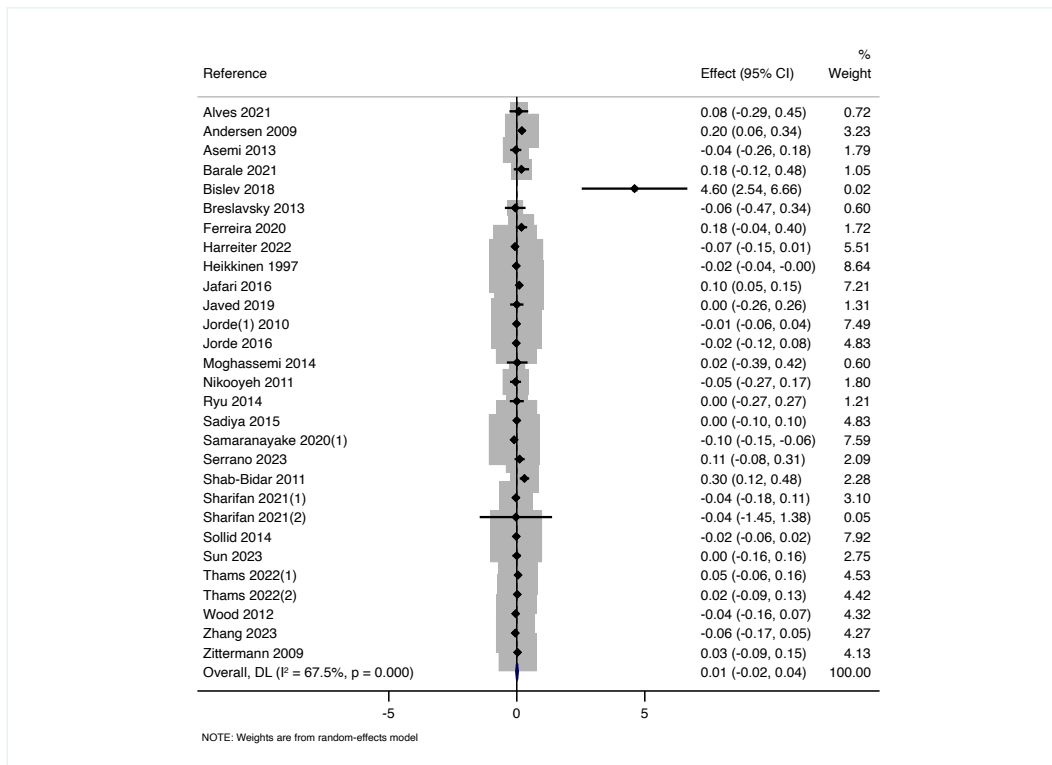


Figure S1-8-3 Forest plot of RCTs investigating the effect of vitamin D supplementation on HDL-C in participants with vitamin D supplementation dose < 3320IU.

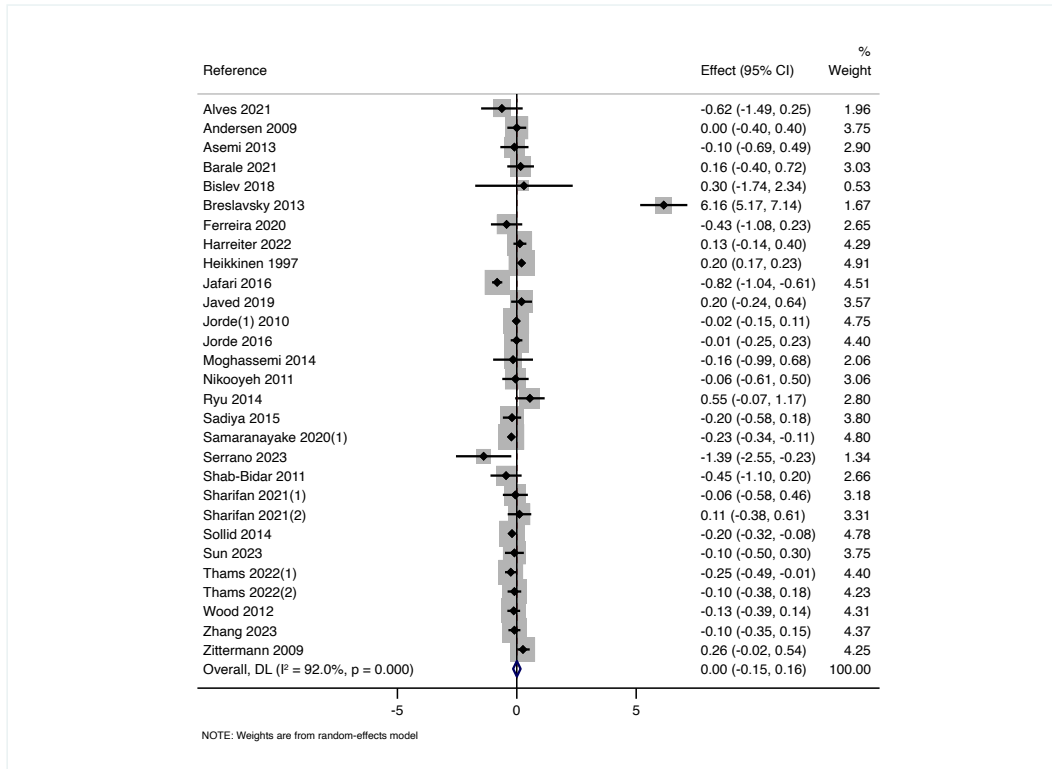


Figure S1-8-4 Forest plot of RCTs investigating the effect of vitamin D supplementation on LDL-C in participants with vitamin D supplementation dose < 3320IU.

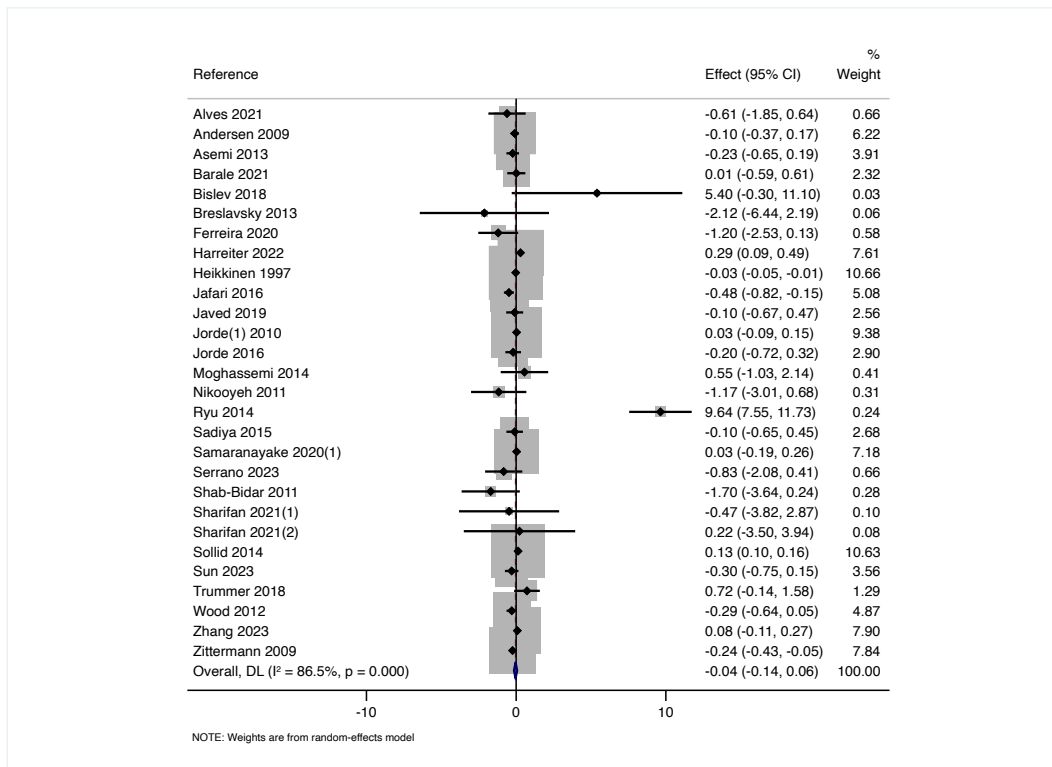


Figure S1-8-5 Forest plot of RCTs investigating the effect of vitamin D supplementation on TG in participants with vitamin D supplementation dose < 3320IU.

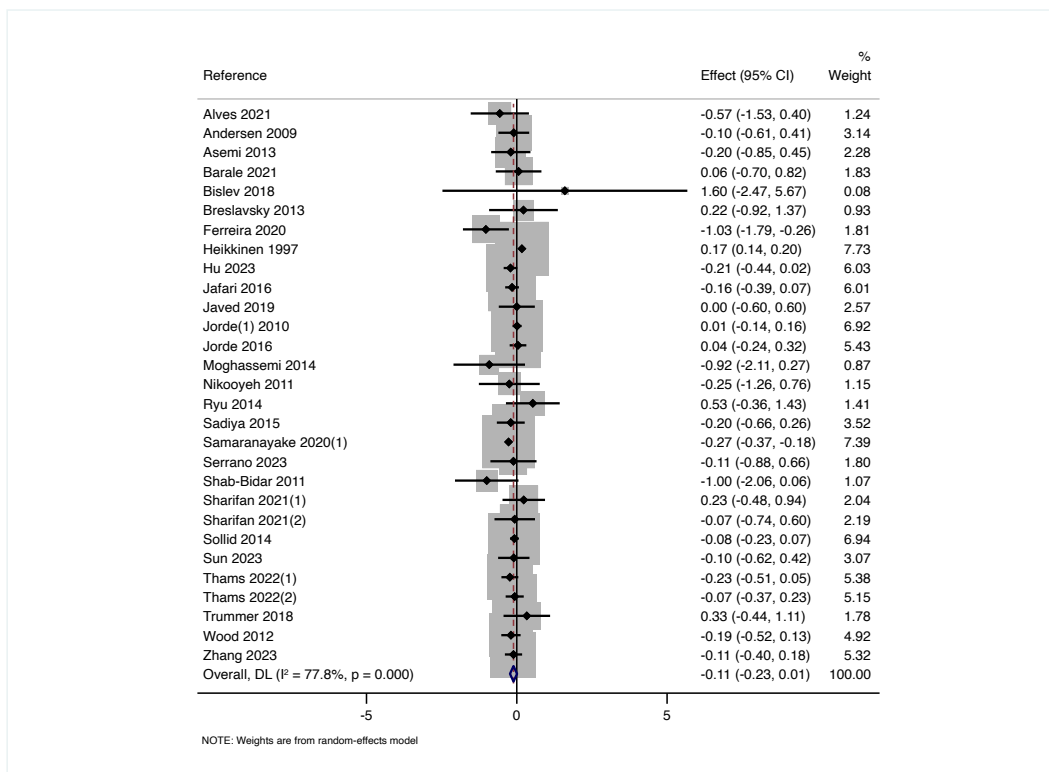


Figure S1-8-6 Forest plot of RCTs investigating the effect of vitamin D supplementation on TC in participants with vitamin D supplementation dose < 3320IU.

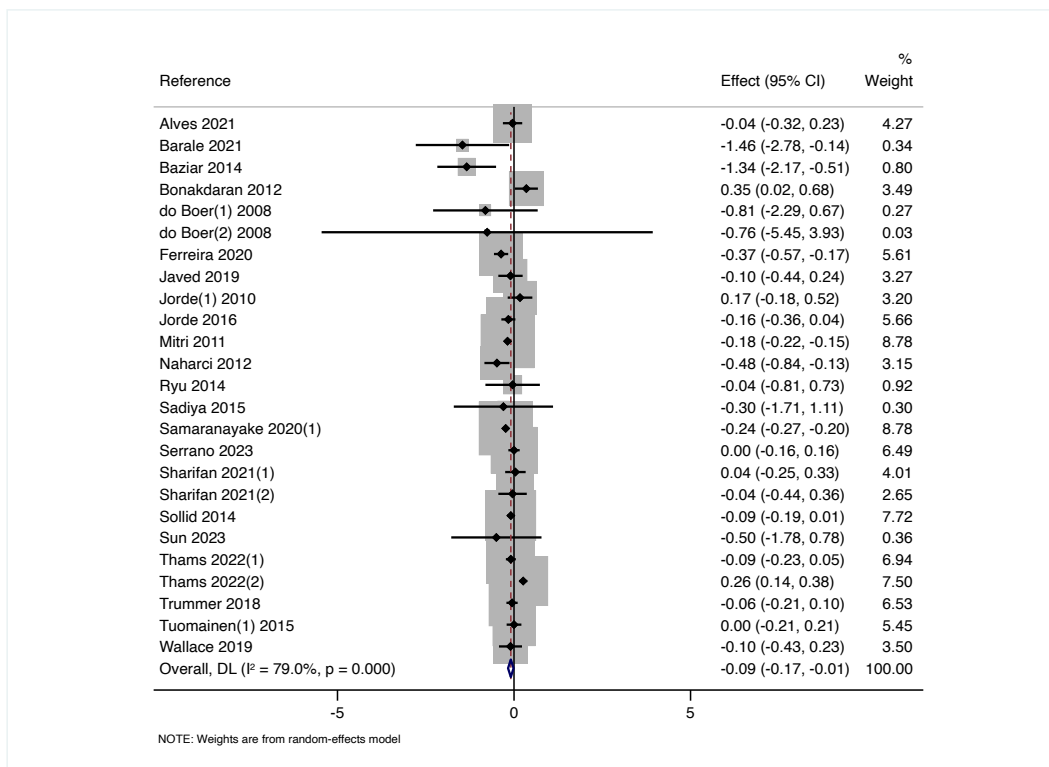


Figure S1-8-7 Forest plot of RCTs investigating the effect of vitamin D supplementation on FBG in participants with vitamin D supplementation dose < 3320IU.

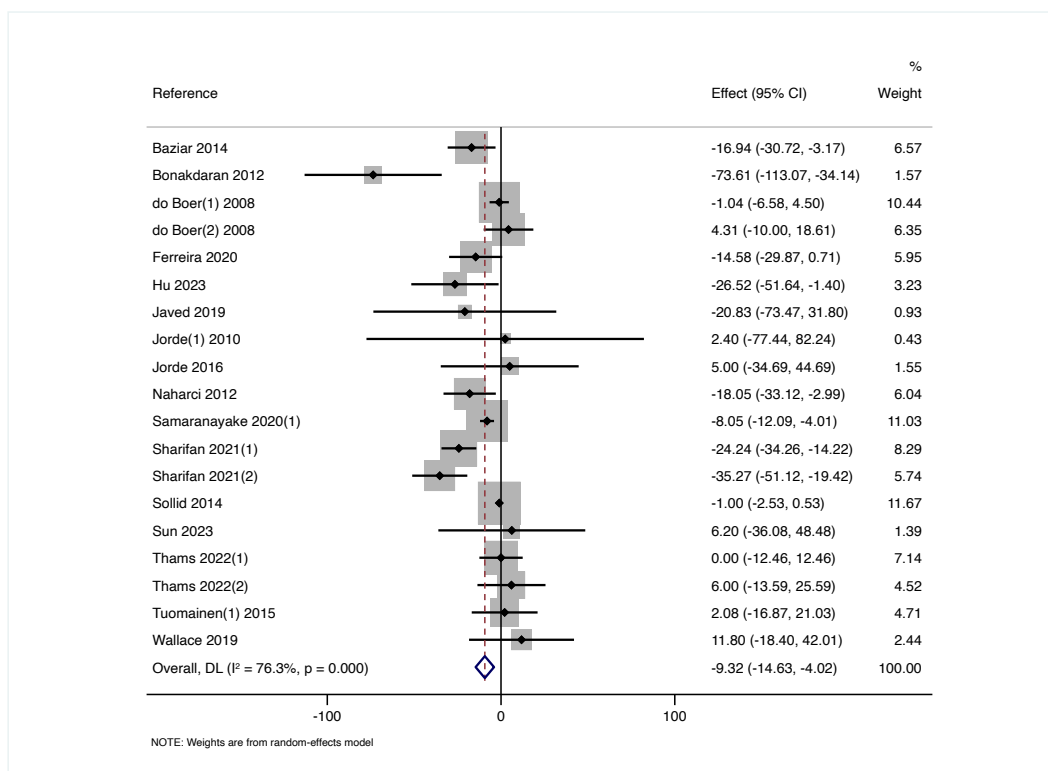


Figure S1-8-8 Forest plot of RCTs investigating the effect of vitamin D supplementation on FBI in participants with vitamin D supplementation dose < 3320IU.

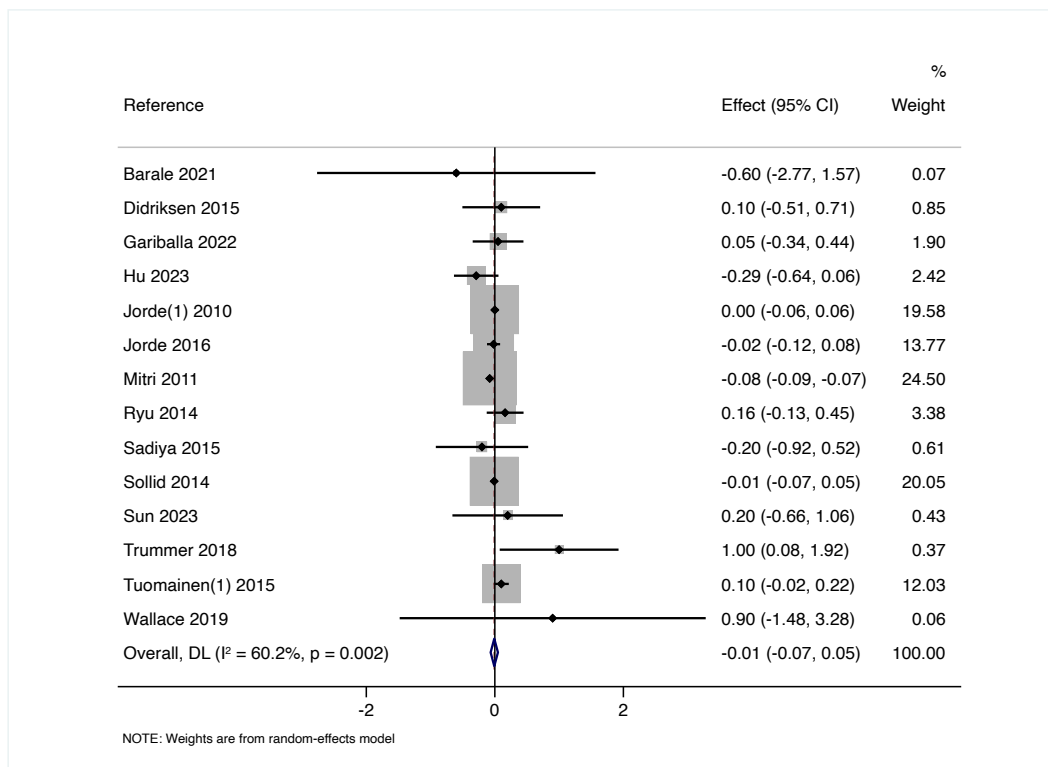


Figure S1-8-9 Forest plot of RCTs investigating the effect of vitamin D supplementation on A1c in participants with vitamin D supplementation dose < 3320IU.

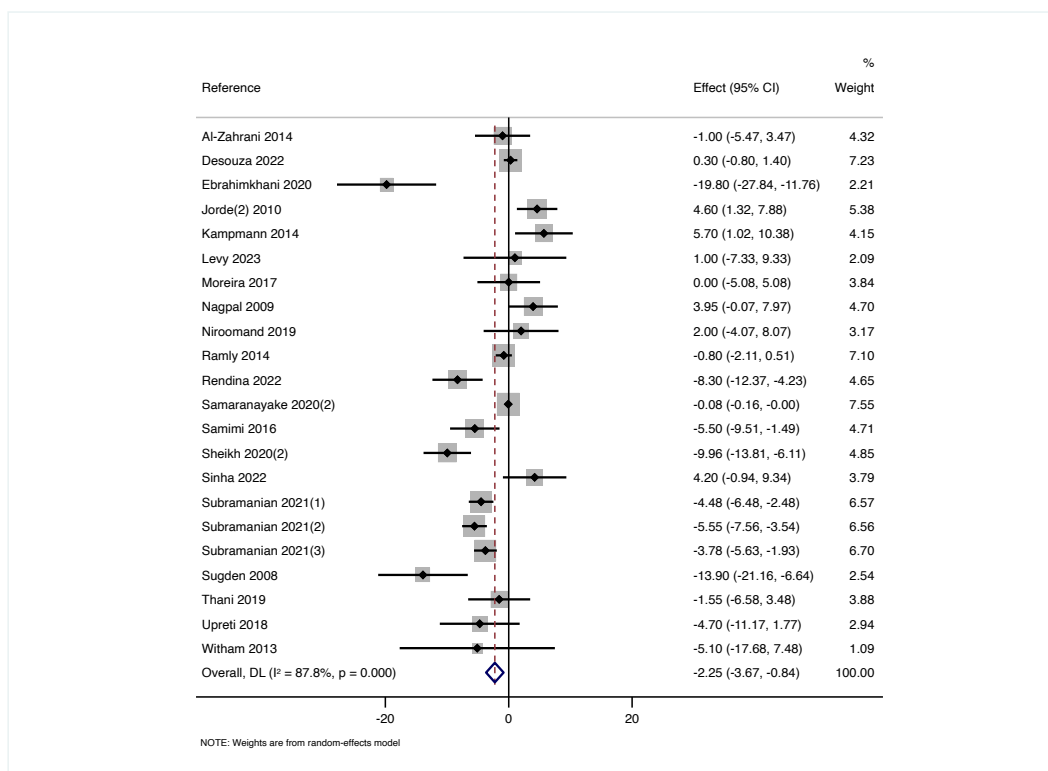


Figure S1-9-1 Forest plot of RCTs investigating the effect of vitamin D supplementation on SBP in participants with vitamin D supplementation dose \geq 3320IU.

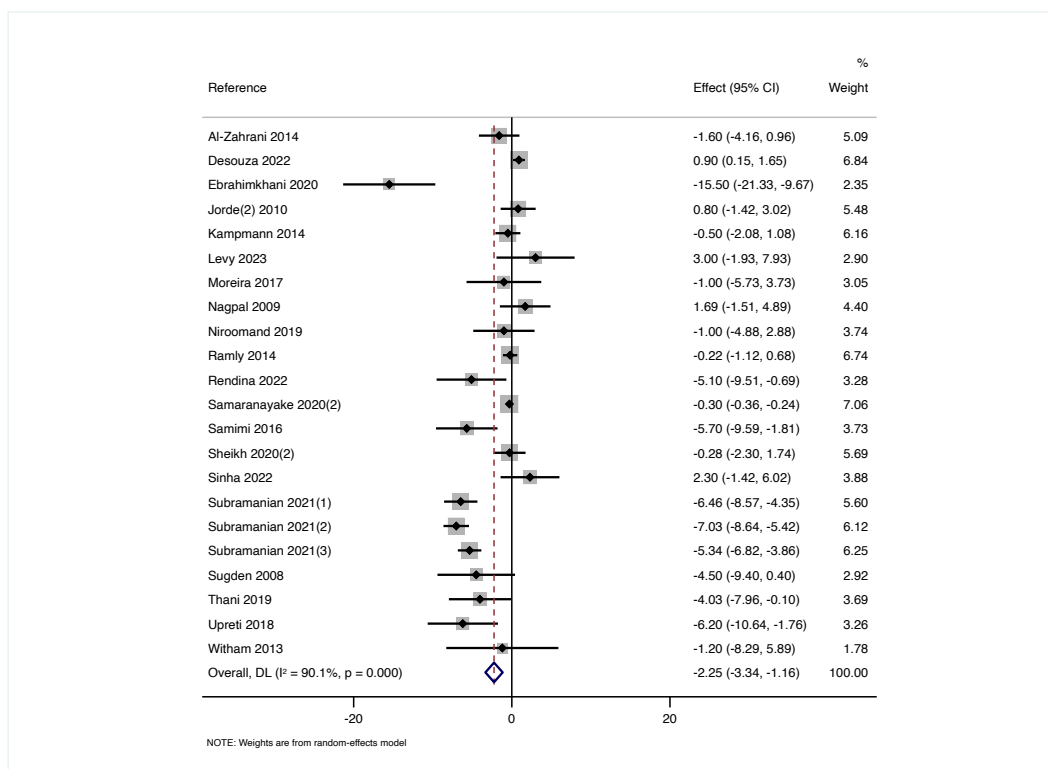


Figure S1-9-2 Forest plot of RCTs investigating the effect of vitamin D supplementation on DBP in participants with vitamin D supplementation dose \geq 3320IU.

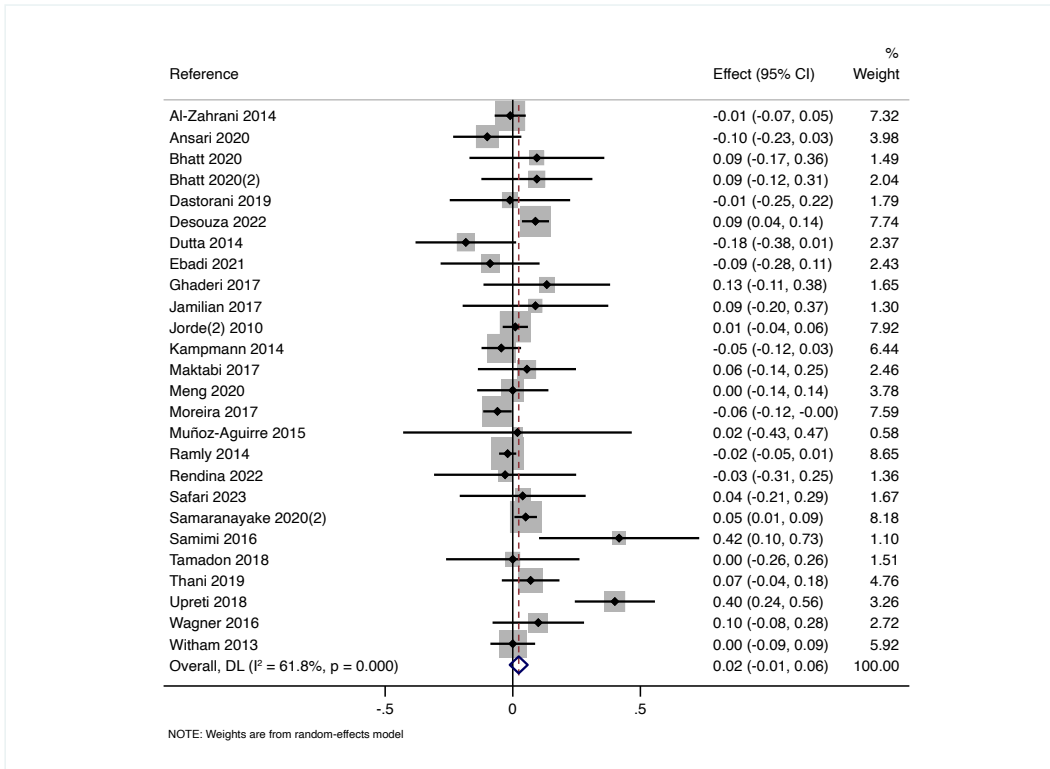


Figure S1-9-3 Forest plot of RCTs investigating the effect of vitamin D supplementation on HDL-C in participants with vitamin D supplementation dose \geq 3320IU.

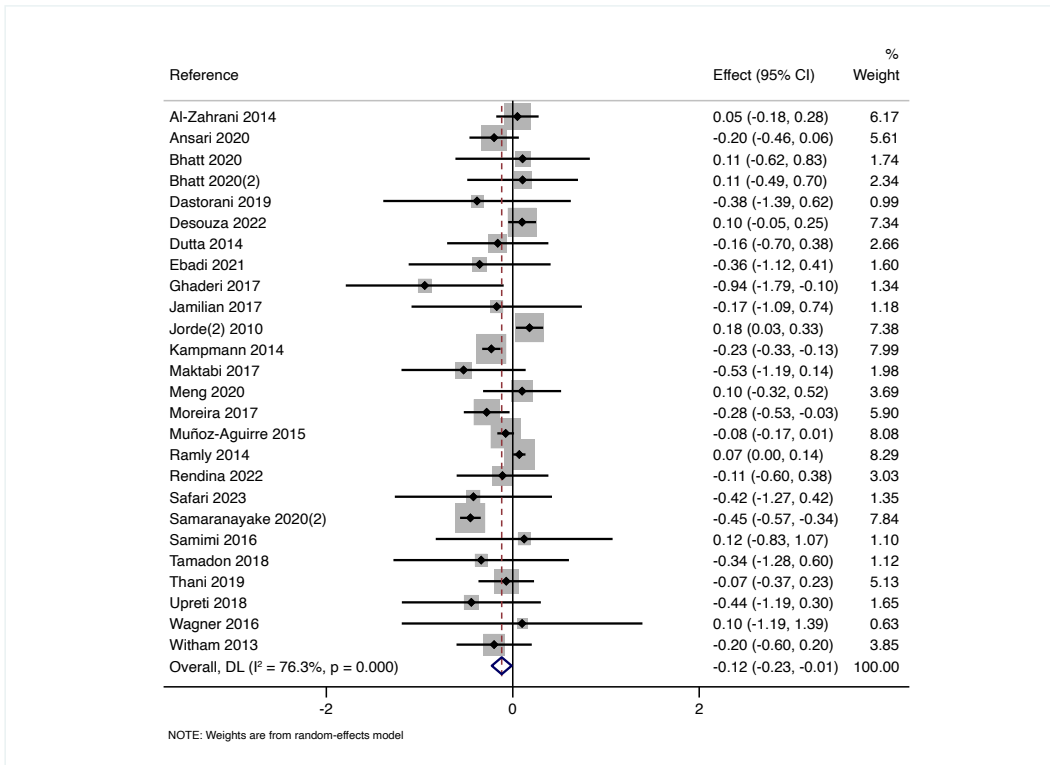


Figure S1-9-4 Forest plot of RCTs investigating the effect of vitamin D supplementation on LDL-C in participants with vitamin D supplementation dose \geq 3320IU.

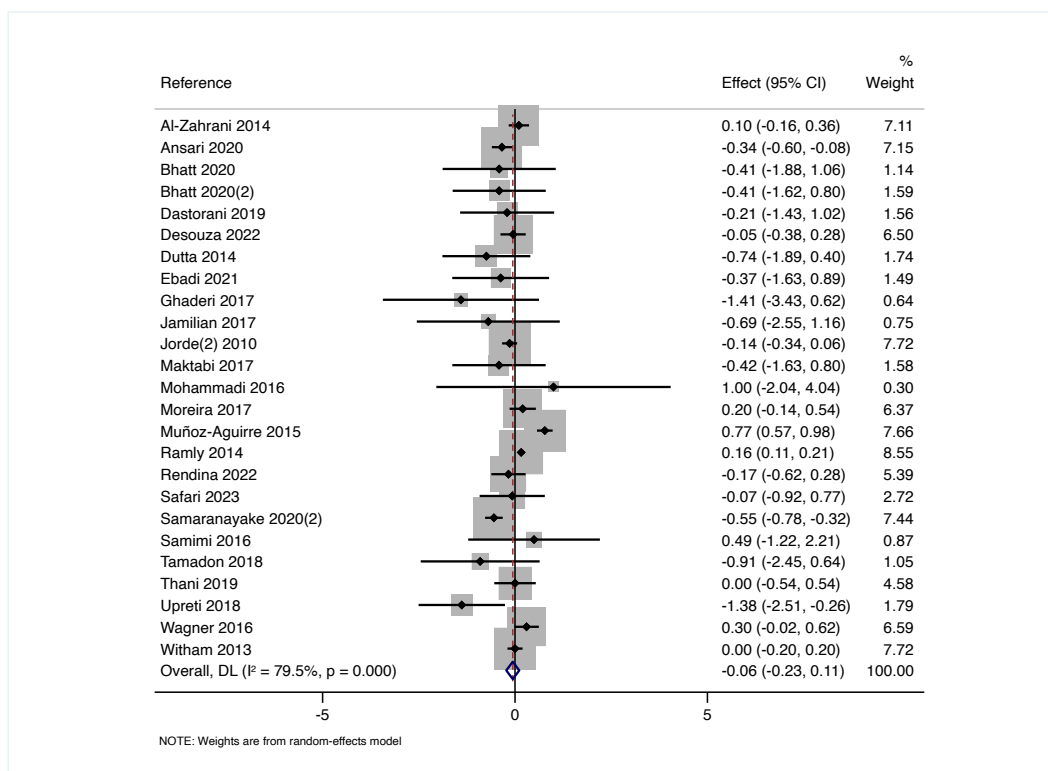


Figure S1-9-5 Forest plot of RCTs investigating the effect of vitamin D supplementation on TG in participants with vitamin D supplementation dose ≥ 3320 IU.

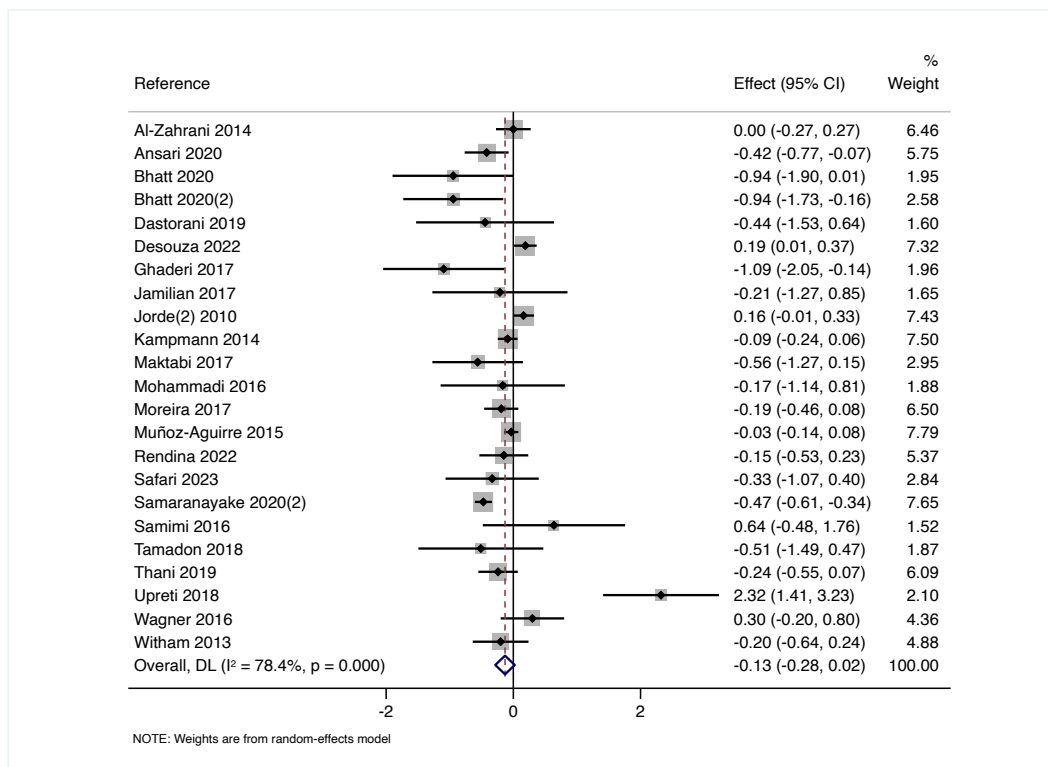


Figure S1-9-6 Forest plot of RCTs investigating the effect of vitamin D supplementation on TC in participants with vitamin D supplementation dose ≥ 3320 IU.

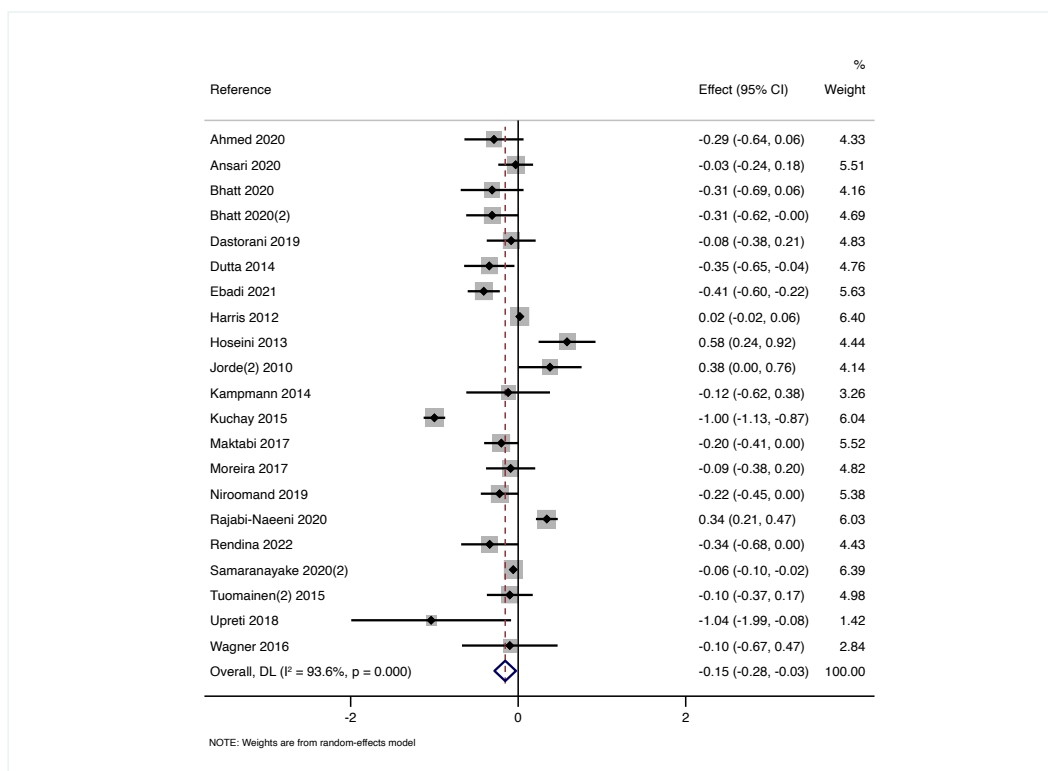


Figure S1-9-7 Forest plot of RCTs investigating the effect of vitamin D supplementation on FBG in participants with vitamin D supplementation dose \geq 3320IU.

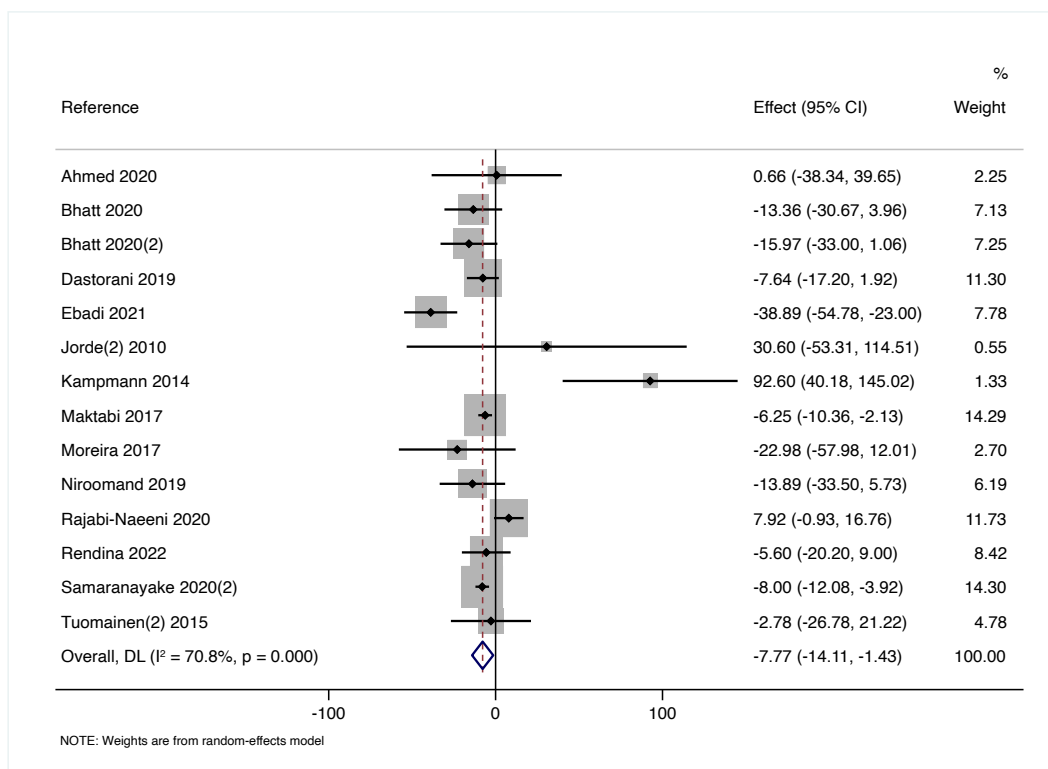


Figure S1-9-8 Forest plot of RCTs investigating the effect of vitamin D supplementation on FBI in participants with vitamin D supplementation dose \geq 3320IU.

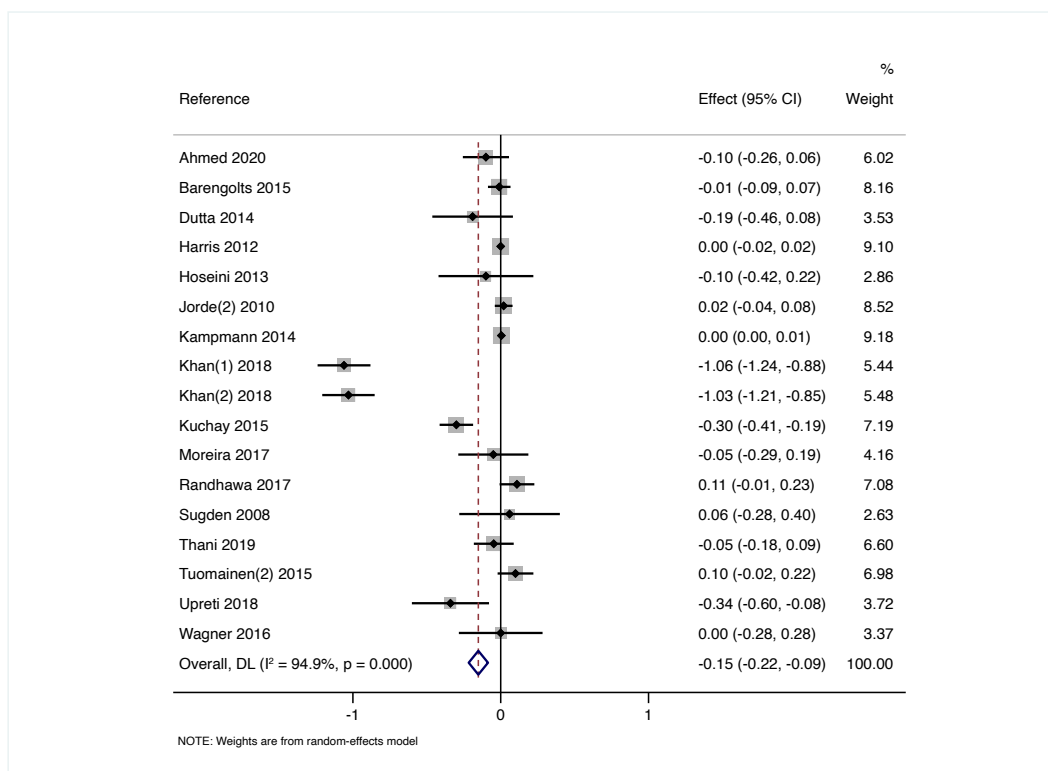


Figure S1-9-9 Forest plot of RCTs investigating the effect of vitamin D supplementation on A1c in participants with vitamin D supplementation dose ≥ 3320IU.

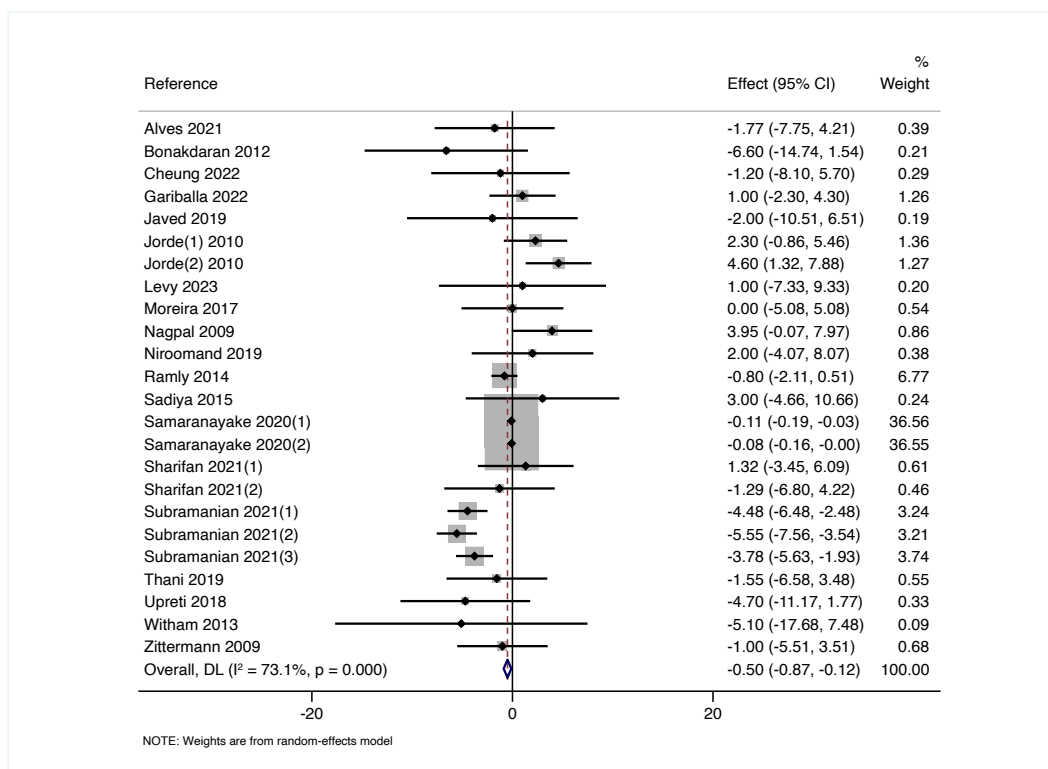


Figure S1-10-1 Forest plot of RCTs investigating the effect of vitamin D supplementation on SBP in participants aged < 50.

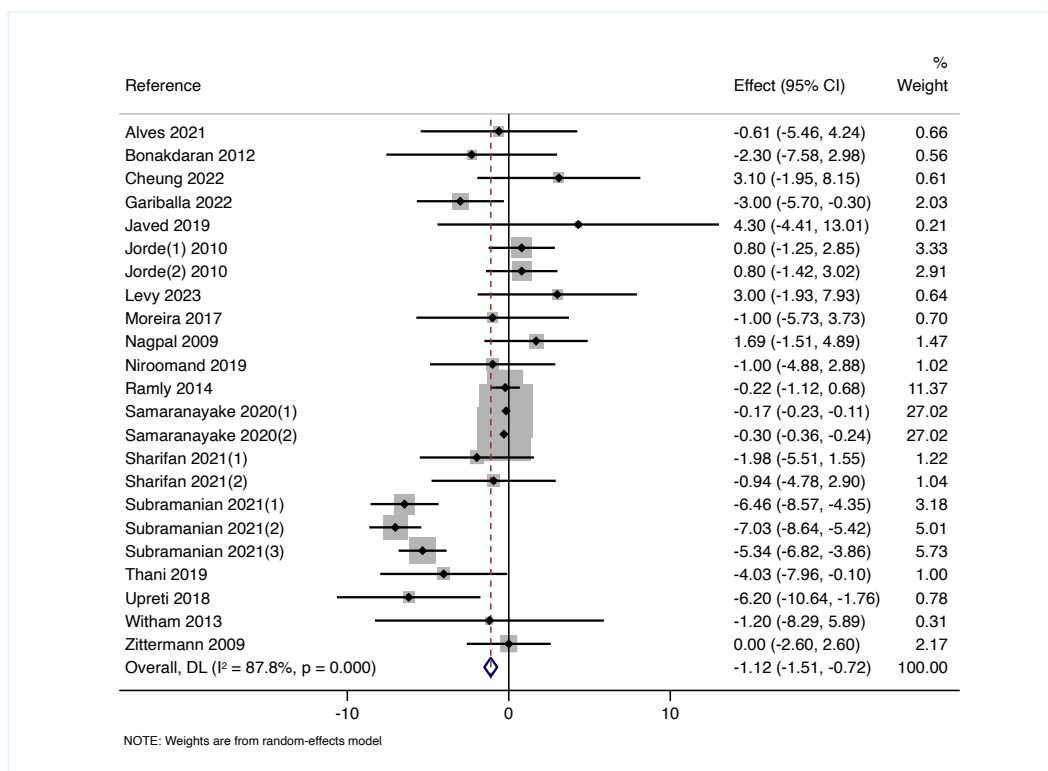


Figure S1-10-2 Forest plot of RCTs investigating the effect of vitamin D supplementation on DBP in participants aged < 50.

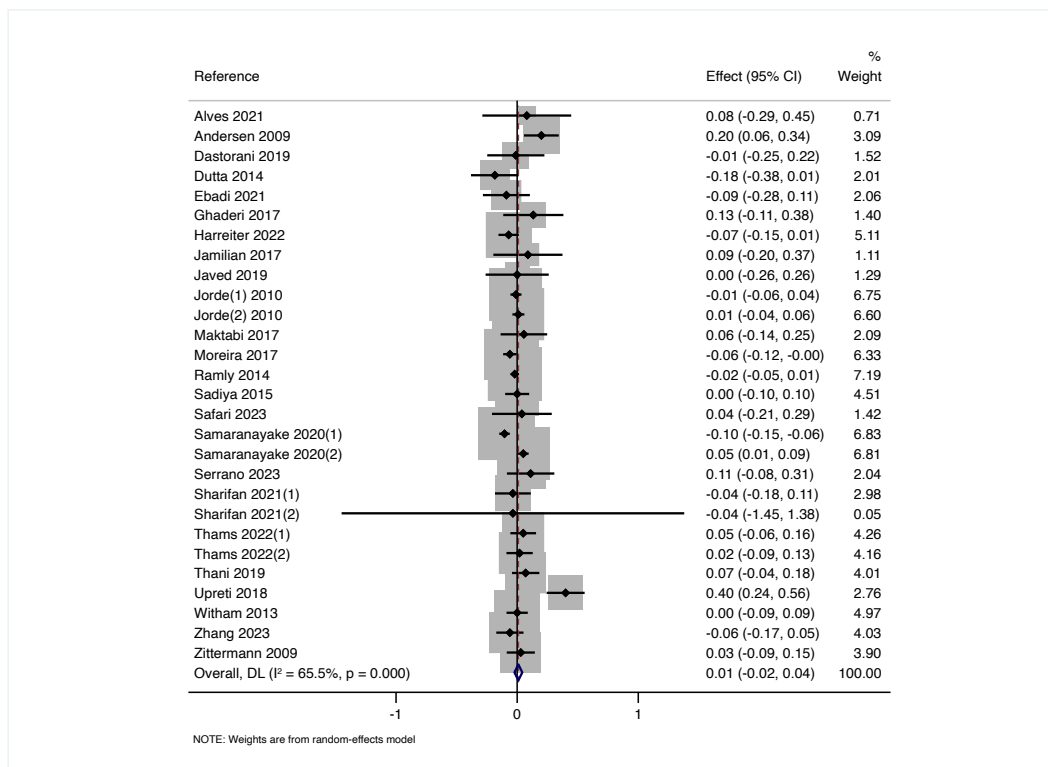


Figure S1-10-3 Forest plot of RCTs investigating the effect of vitamin D supplementation on HDL-C in participants aged < 50.

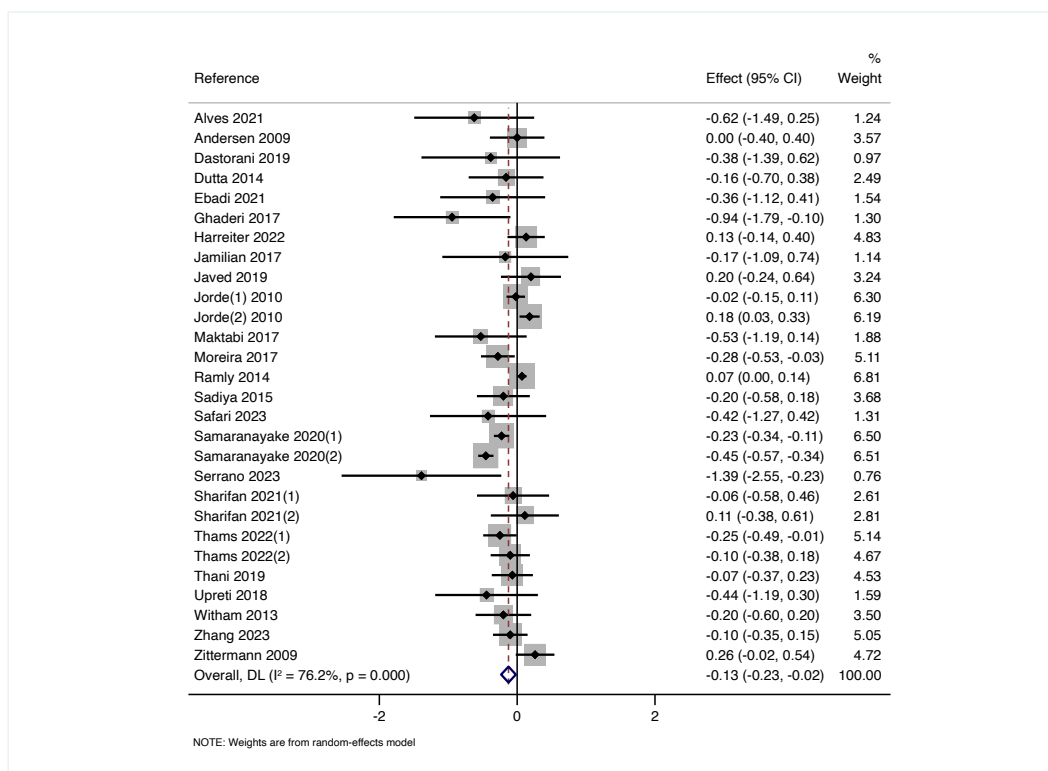


Figure S1-10-4 Forest plot of RCTs investigating the effect of vitamin D supplementation on LDL-C in participants aged < 50.

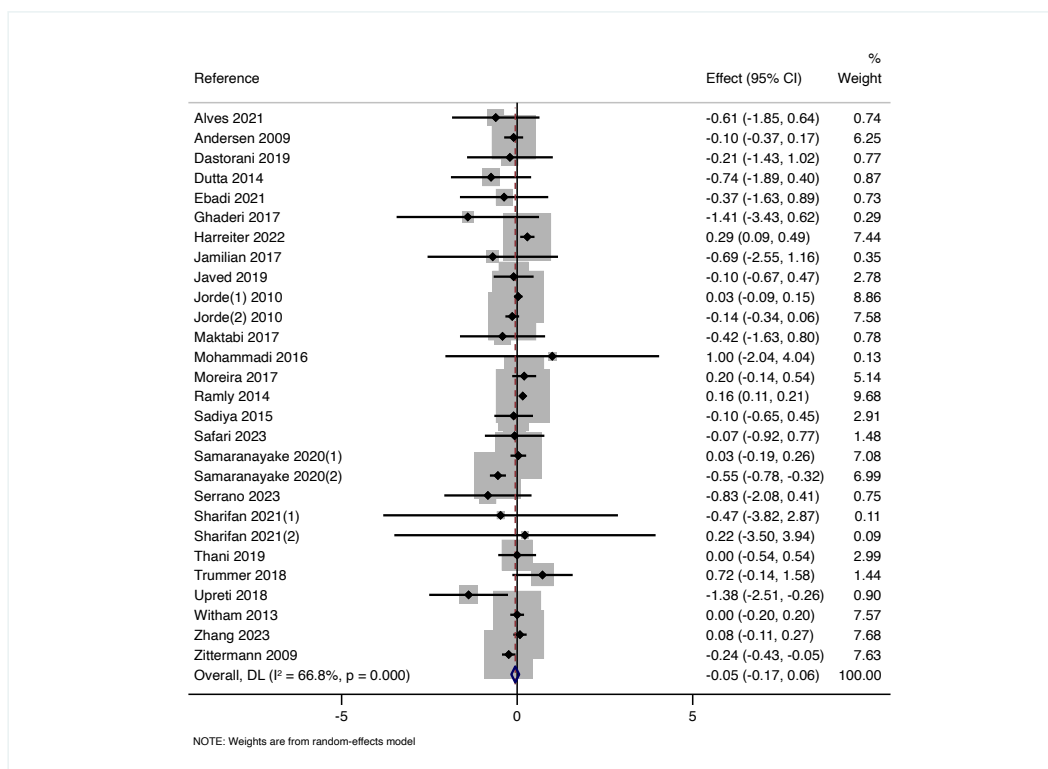


Figure S1-10-5 Forest plot of RCTs investigating the effect of vitamin D supplementation on TG in participants aged < 50.

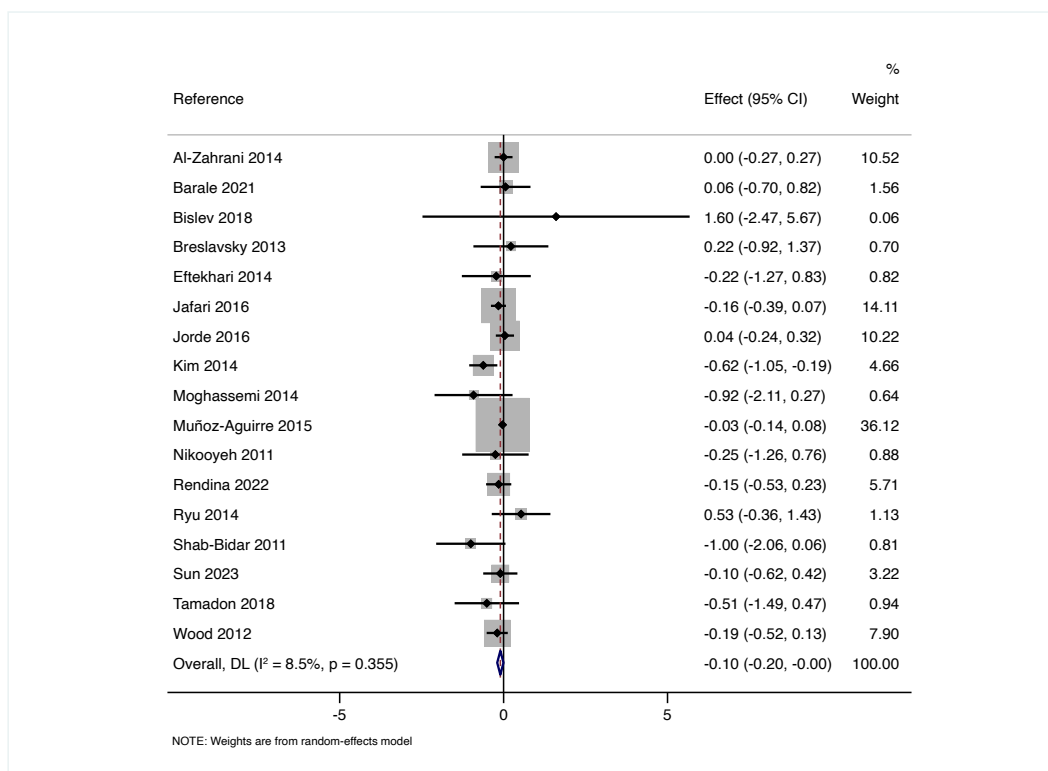


Figure S1-10-6 Forest plot of RCTs investigating the effect of vitamin D supplementation on TC in participants aged < 50.

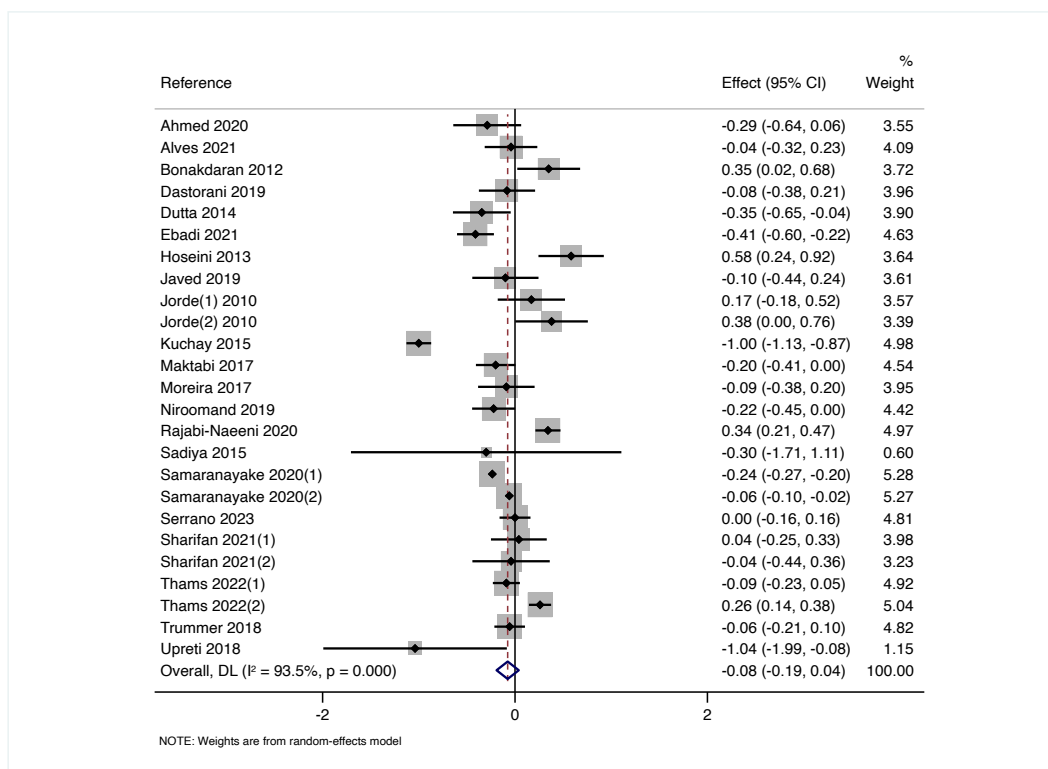


Figure S1-10-7 Forest plot of RCTs investigating the effect of vitamin D supplementation on FBG in participants aged < 50.

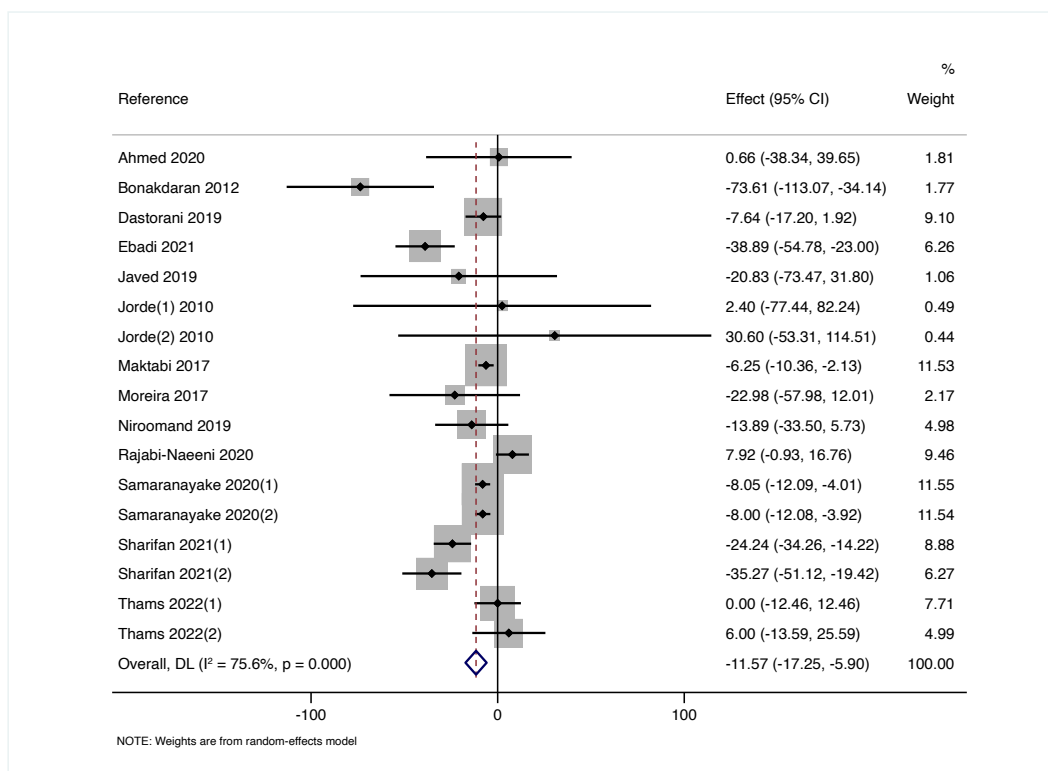


Figure S1-10-8 Forest plot of RCTs investigating the effect of vitamin D supplementation on FBI in participants aged < 50.

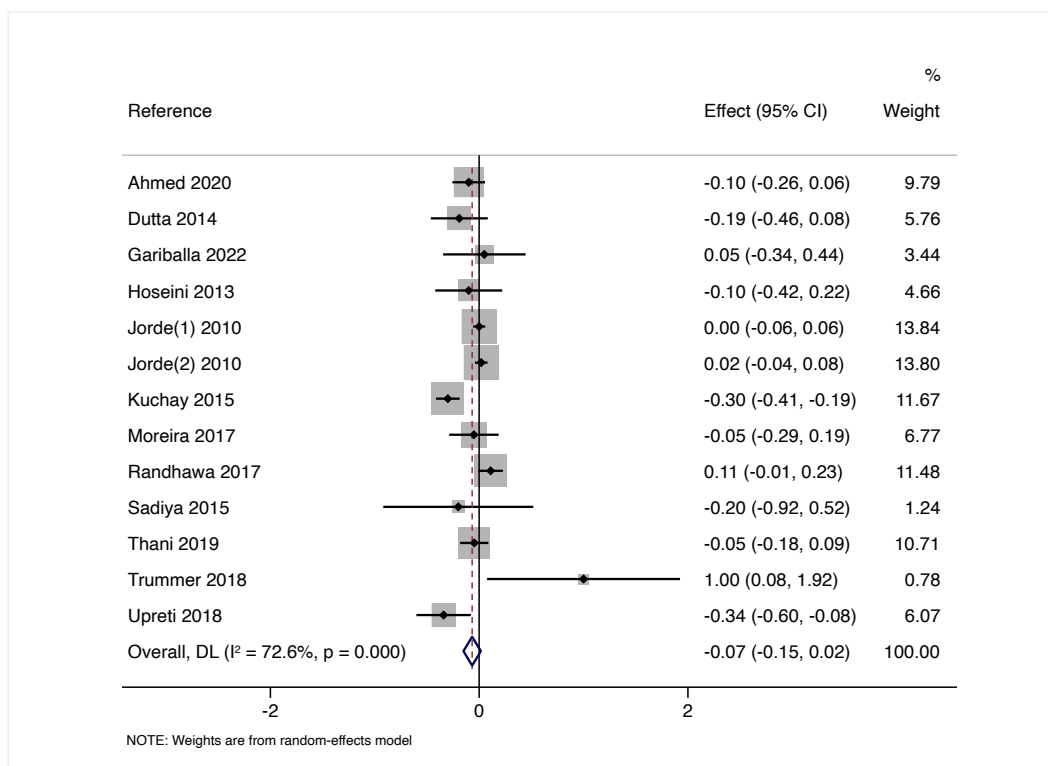


Figure S1-10-9 Forest plot of RCTs investigating the effect of vitamin D supplementation on A1c in participants aged < 50.

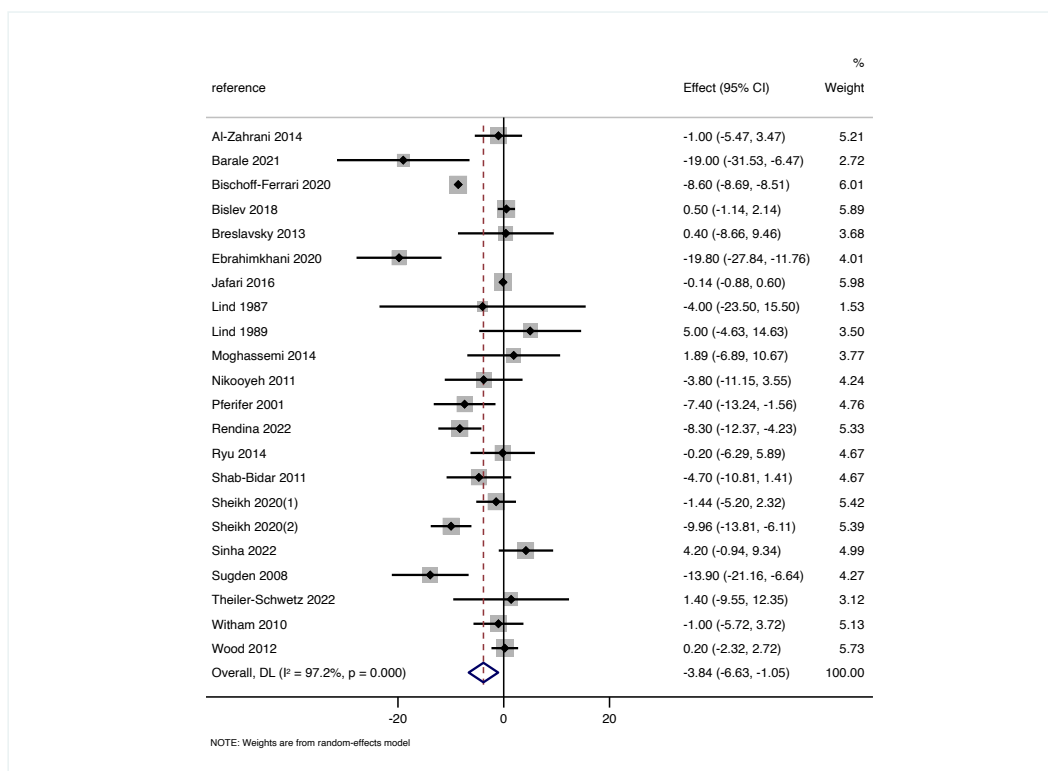


Figure S1-11-1 Forest plot of RCTs investigating the effect of vitamin D supplementation on SBP in participants aged ≥ 50.

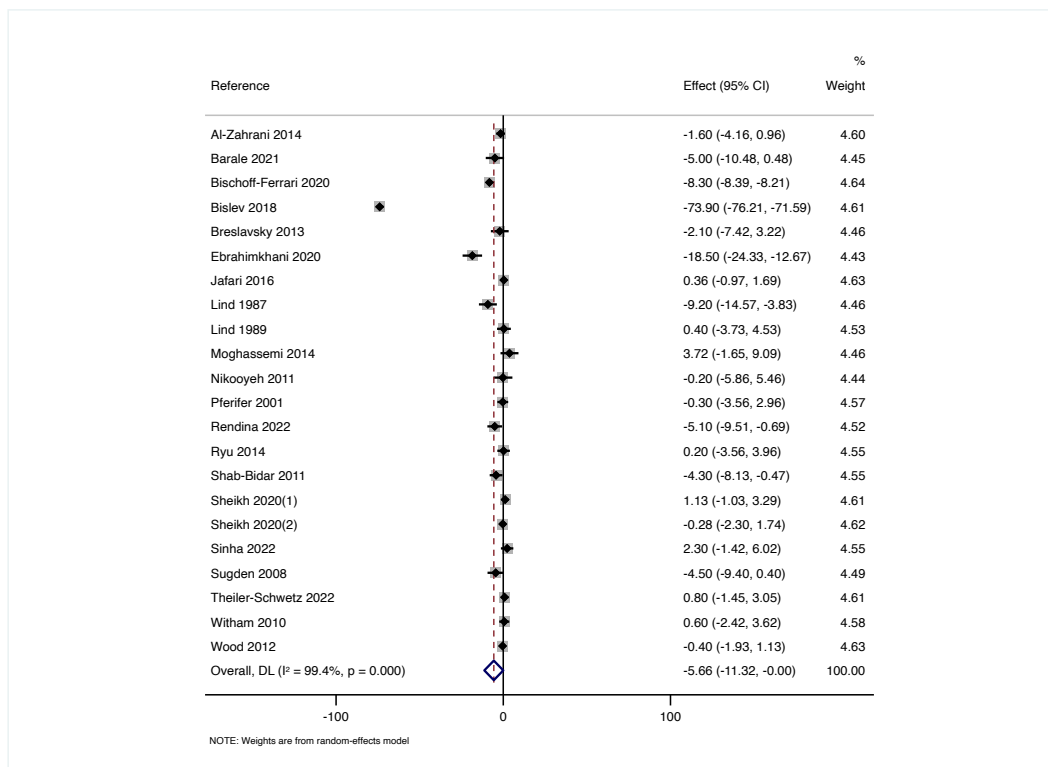


Figure S1-11-2 Forest plot of RCTs investigating the effect of vitamin D supplementation on DBP in participants aged ≥ 50.

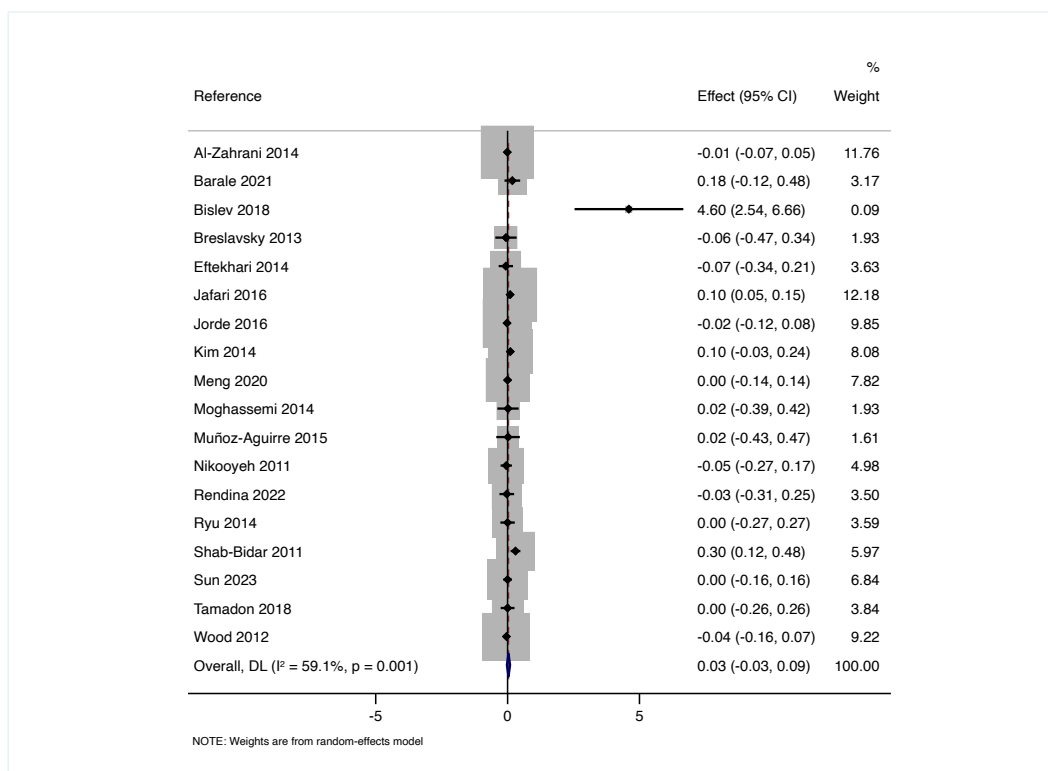


Figure S1-11-3 Forest plot of RCTs investigating the effect of vitamin D supplementation on HDL-C in participants aged ≥ 50.

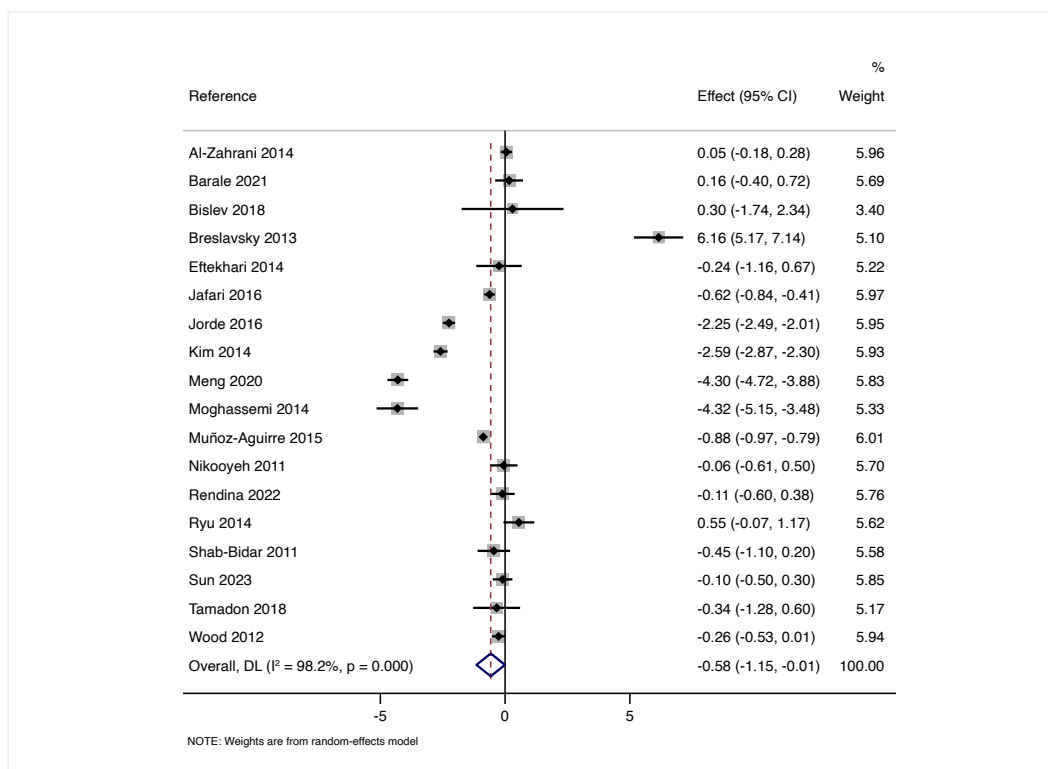


Figure S1-11-4 Forest plot of RCTs investigating the effect of vitamin D supplementation on LDL-C in participants aged ≥ 50.

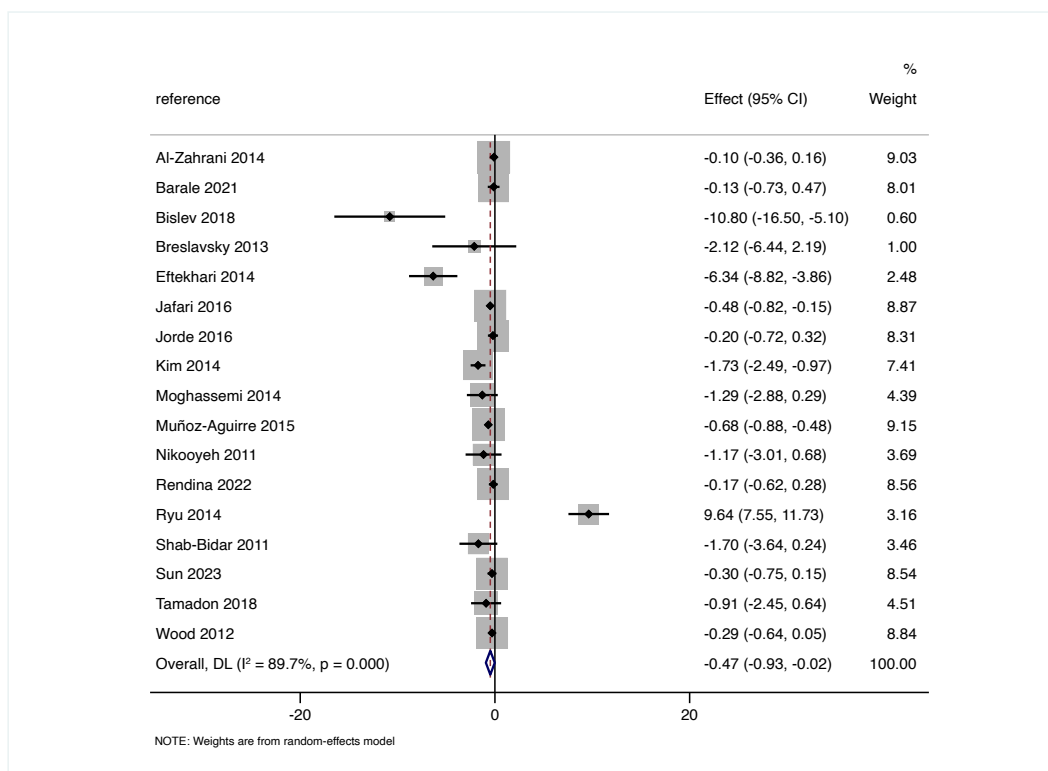


Figure S1-11-5 Forest plot of RCTs investigating the effect of vitamin D supplementation on TG in participants aged ≥ 50 .

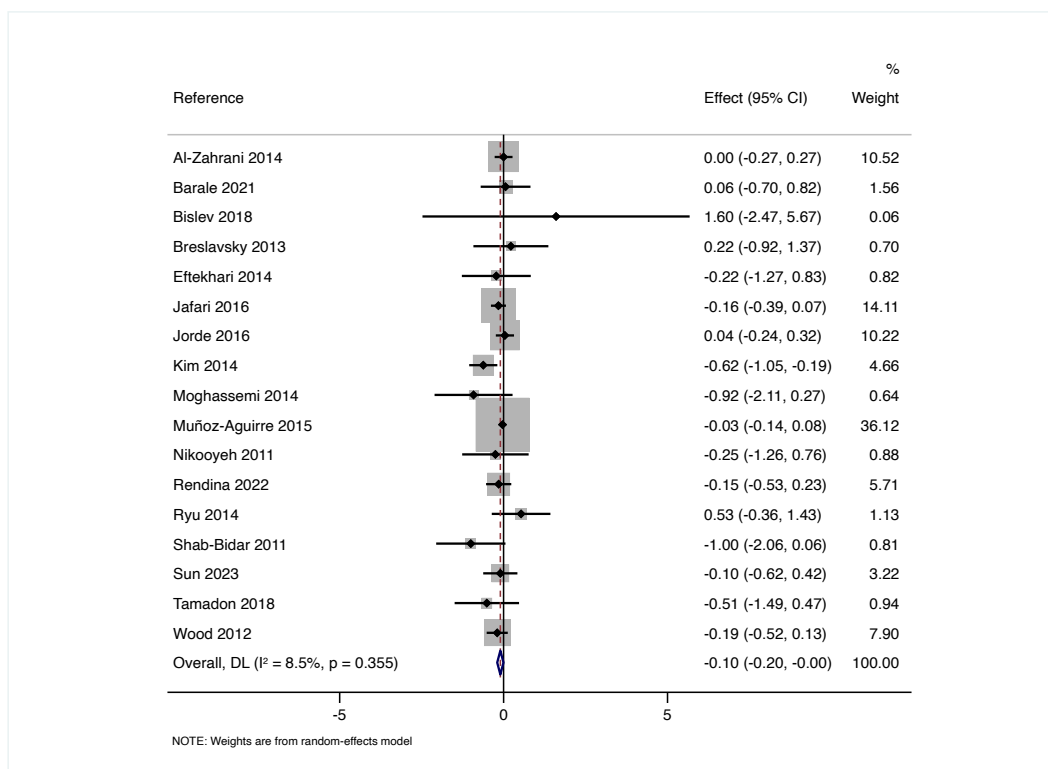


Figure S1-11-6 Forest plot of RCTs investigating the effect of vitamin D supplementation on TC in participants aged ≥ 50 .

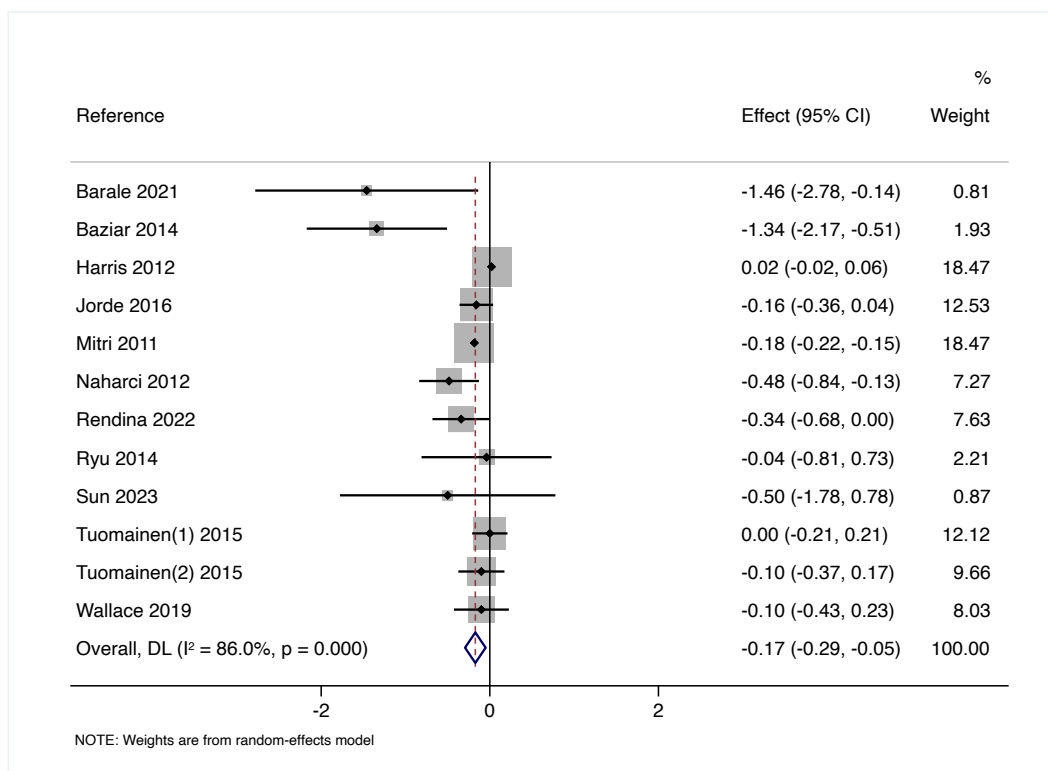


Figure S1-11-7 Forest plot of RCTs investigating the effect of vitamin D supplementation on FBG in participants aged ≥ 50 .

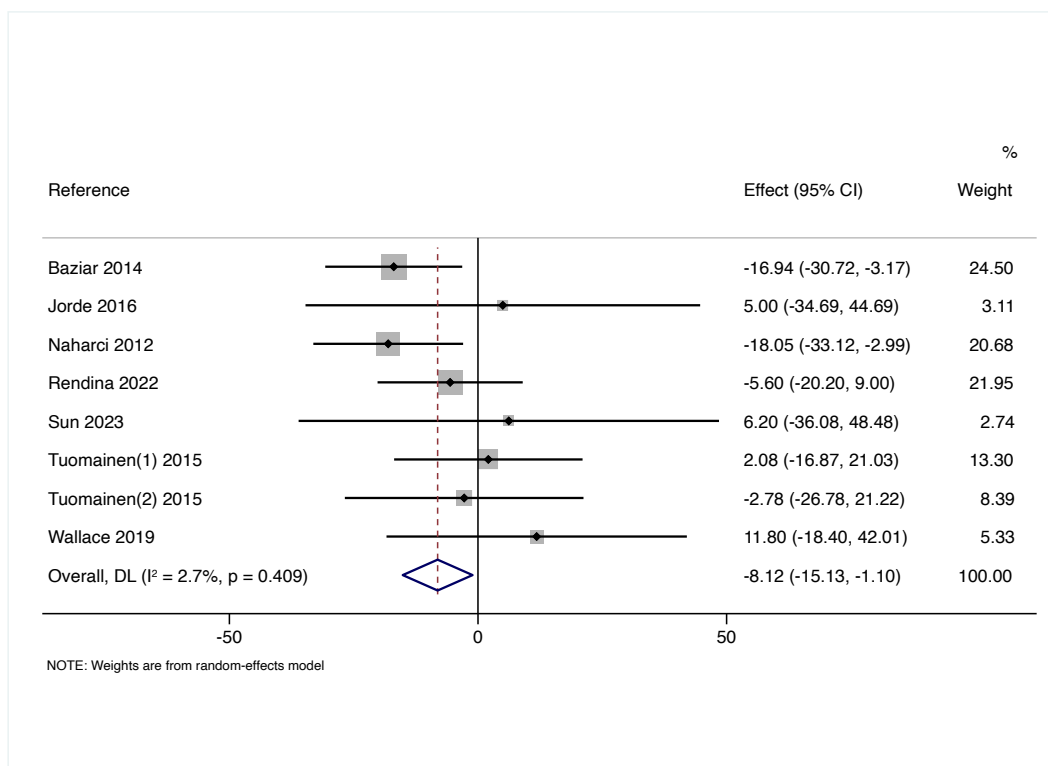


Figure S1-11-8 Forest plot of RCTs investigating the effect of vitamin D supplementation on FBI in participants aged ≥ 50 .

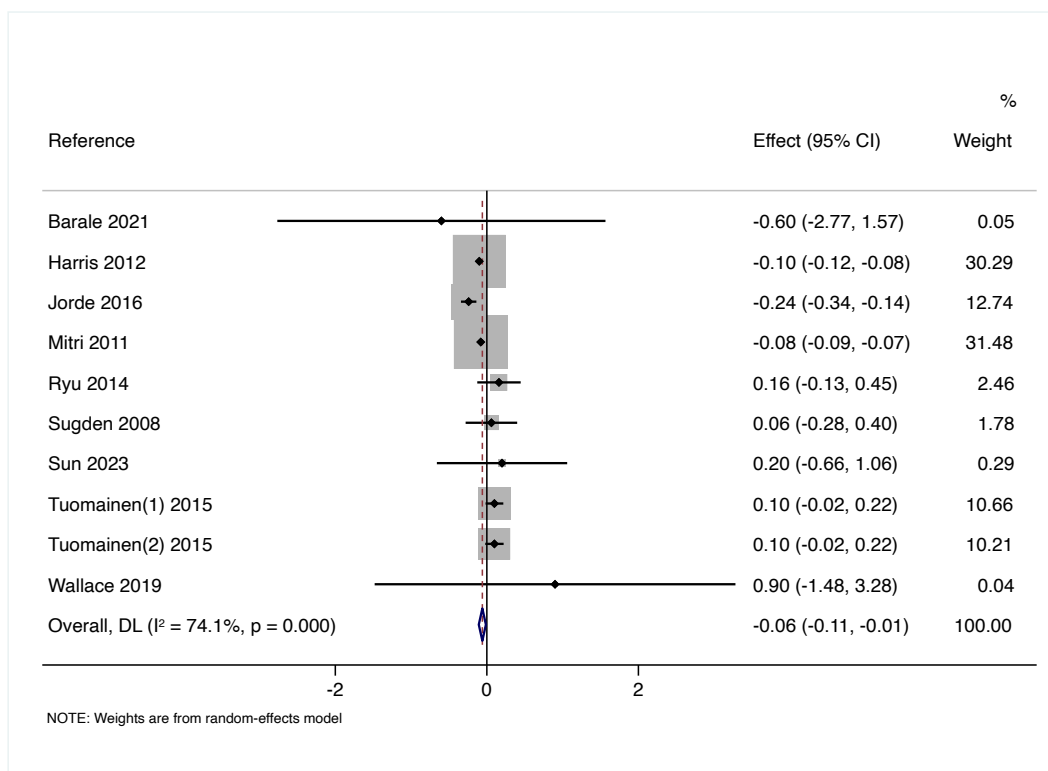


Figure S1-11-9 Forest plot of RCTs investigating the effect of vitamin D supplementation on A1c in participants aged ≥ 50 .

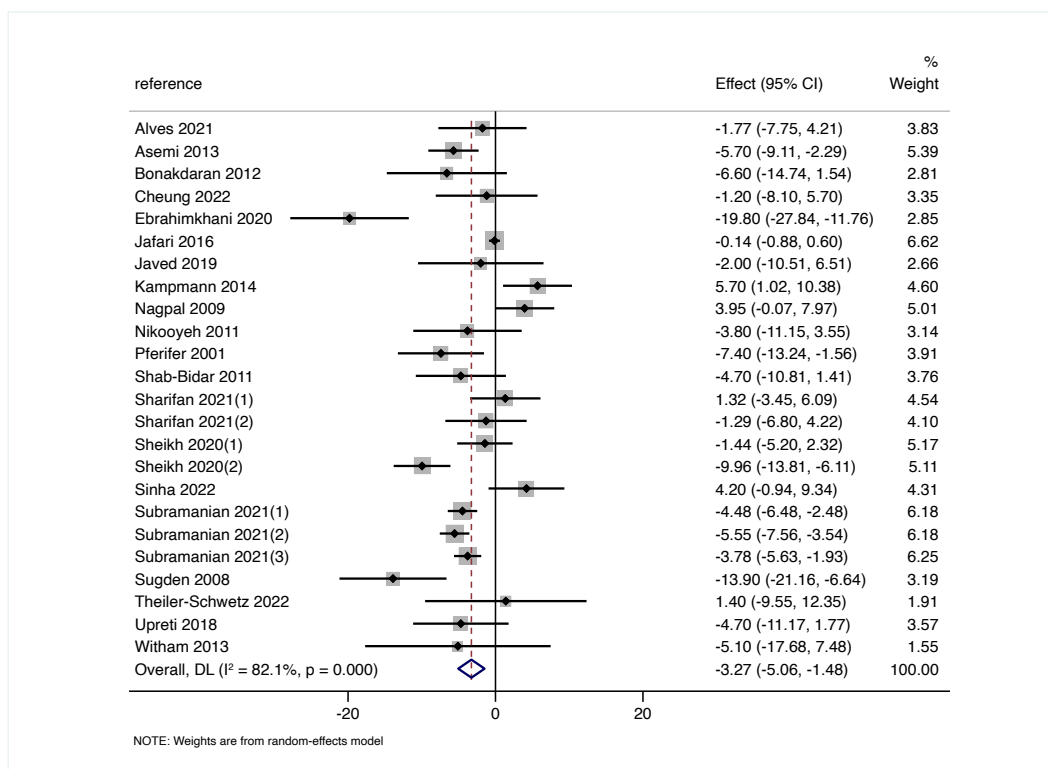


Figure S1-12-1 Forest plot of RCTs investigating the effect of vitamin D supplementation on SBP in participants with intervention duration < 3 months.

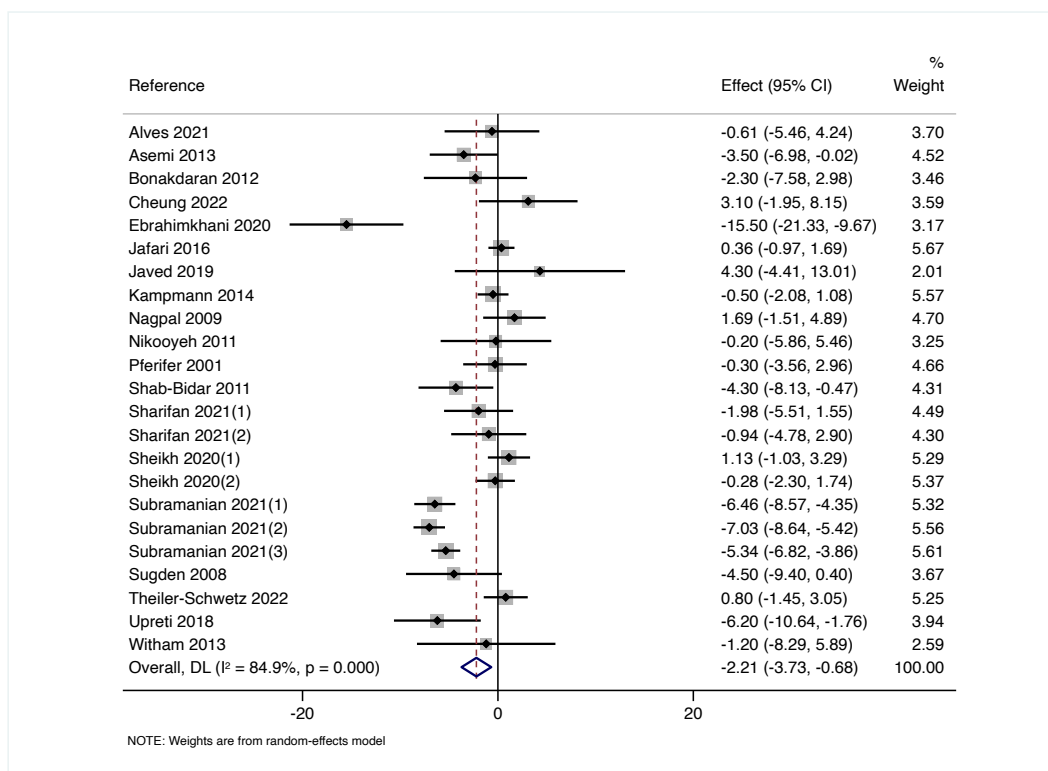


Figure S1-12-2 Forest plot of RCTs investigating the effect of vitamin D supplementation on DBP in participants with intervention duration < 3 months.

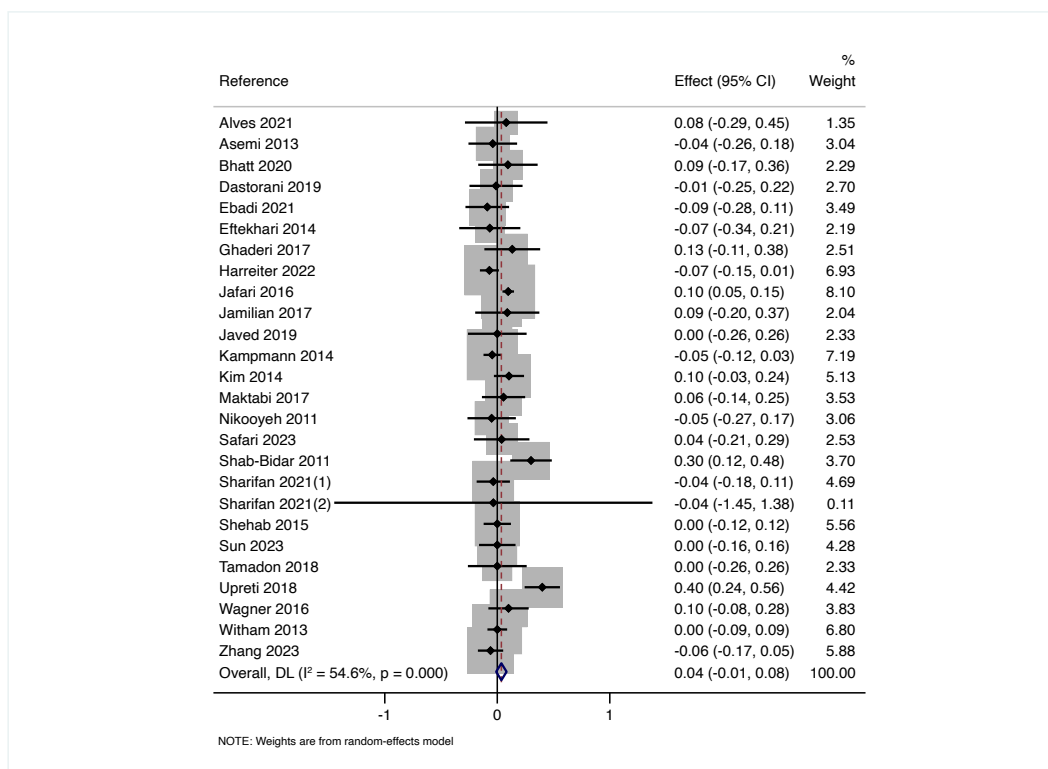


Figure S1-12-3 Forest plot of RCTs investigating the effect of vitamin D supplementation on HDL-C in participants with intervention duration < 3 months.

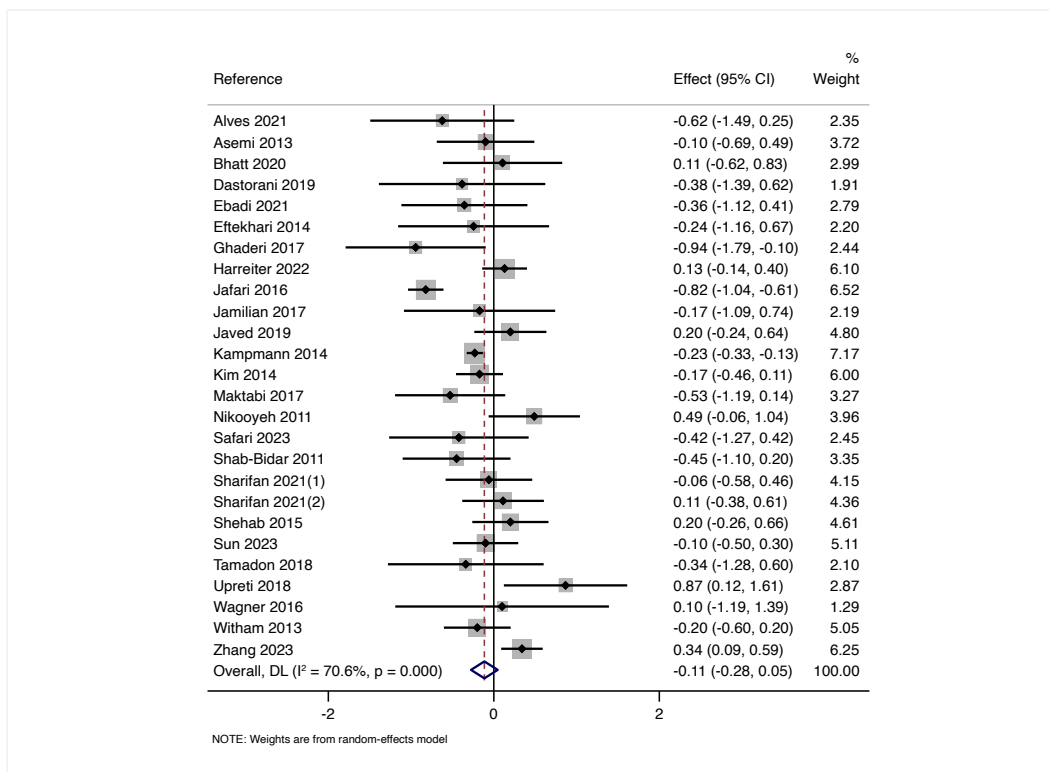


Figure S1-12-4 Forest plot of RCTs investigating the effect of vitamin D supplementation on LDL-C in participants with intervention duration < 3 months.

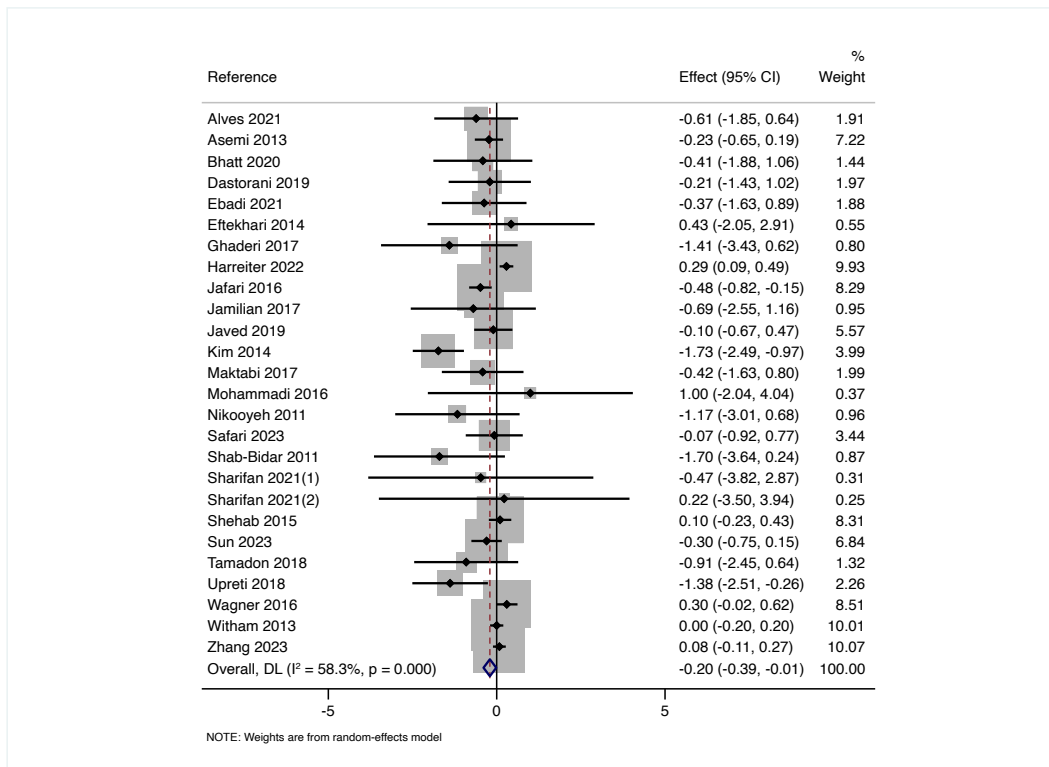


Figure S1-12-5 Forest plot of RCTs investigating the effect of vitamin D supplementation on TG in participants with intervention duration < 3 months.

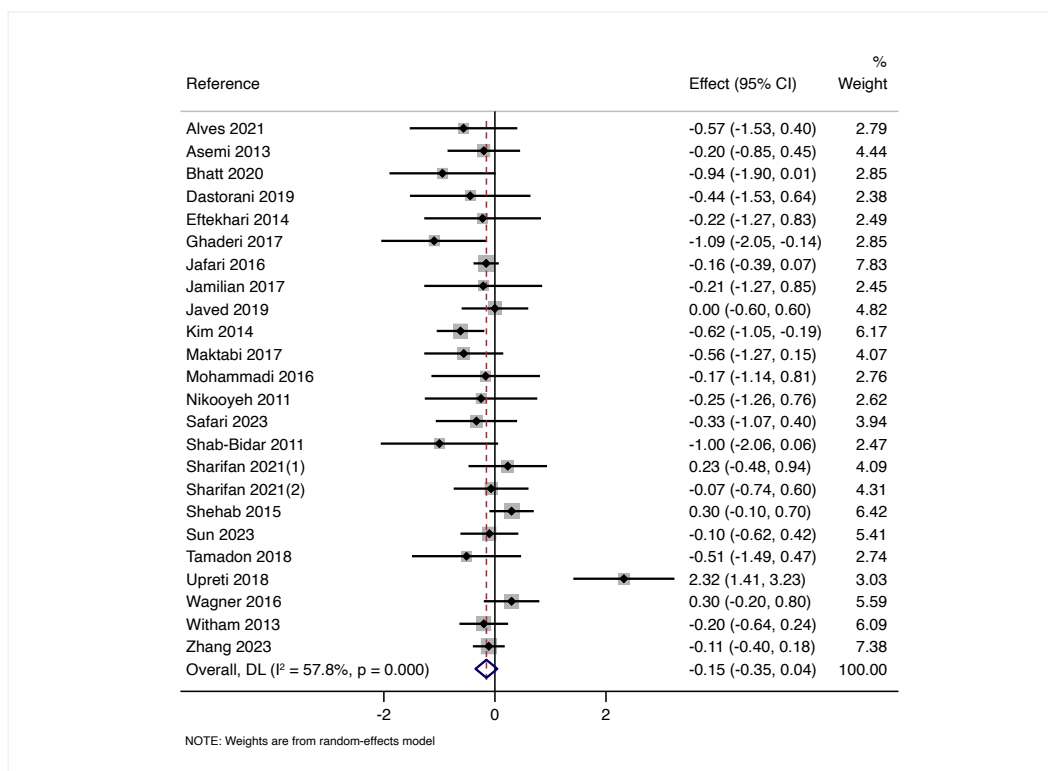


Figure S1-12-6 Forest plot of RCTs investigating the effect of vitamin D supplementation on TC in participants with intervention duration < 3 months.

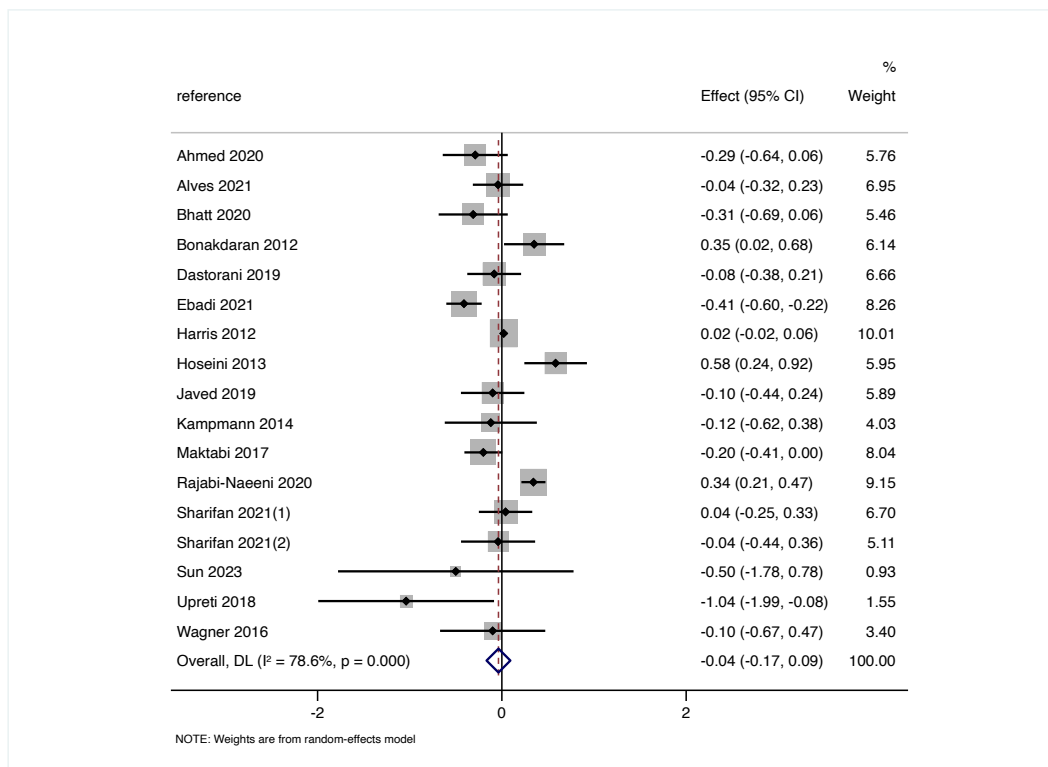


Figure S1-12-7 Forest plot of RCTs investigating the effect of vitamin D supplementation on FBG in participants with intervention duration < 3 months.

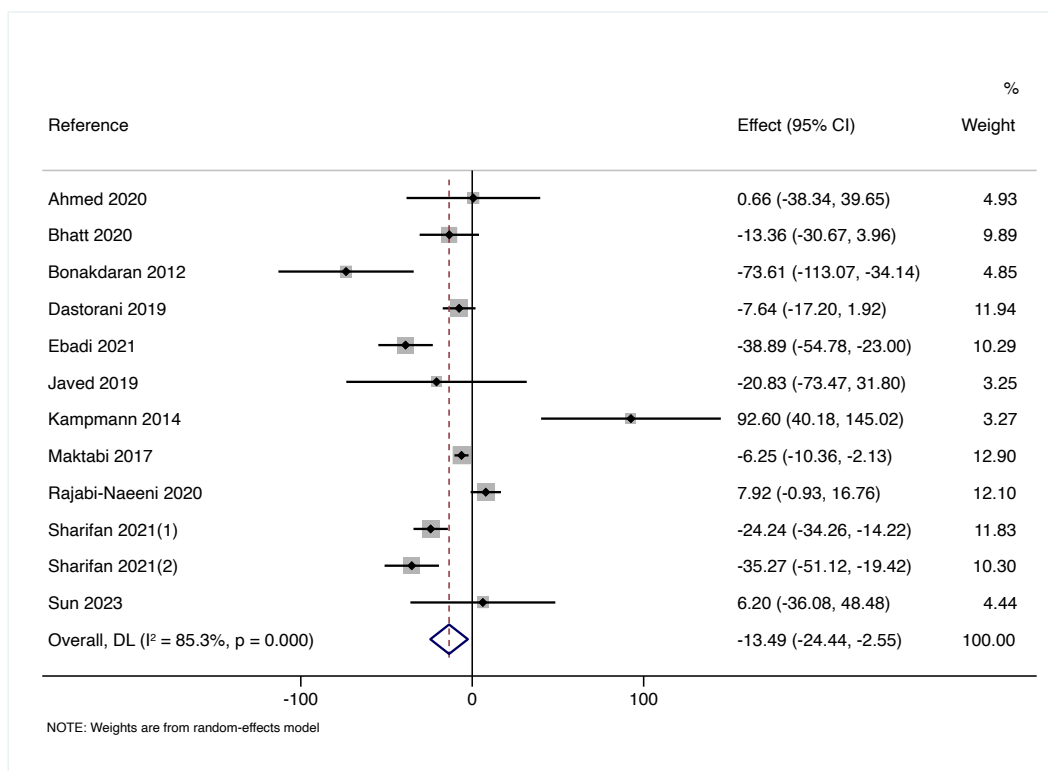


Figure S1-12-8 Forest plot of RCTs investigating the effect of vitamin D supplementation on FBI in participants with intervention duration < 3 months.

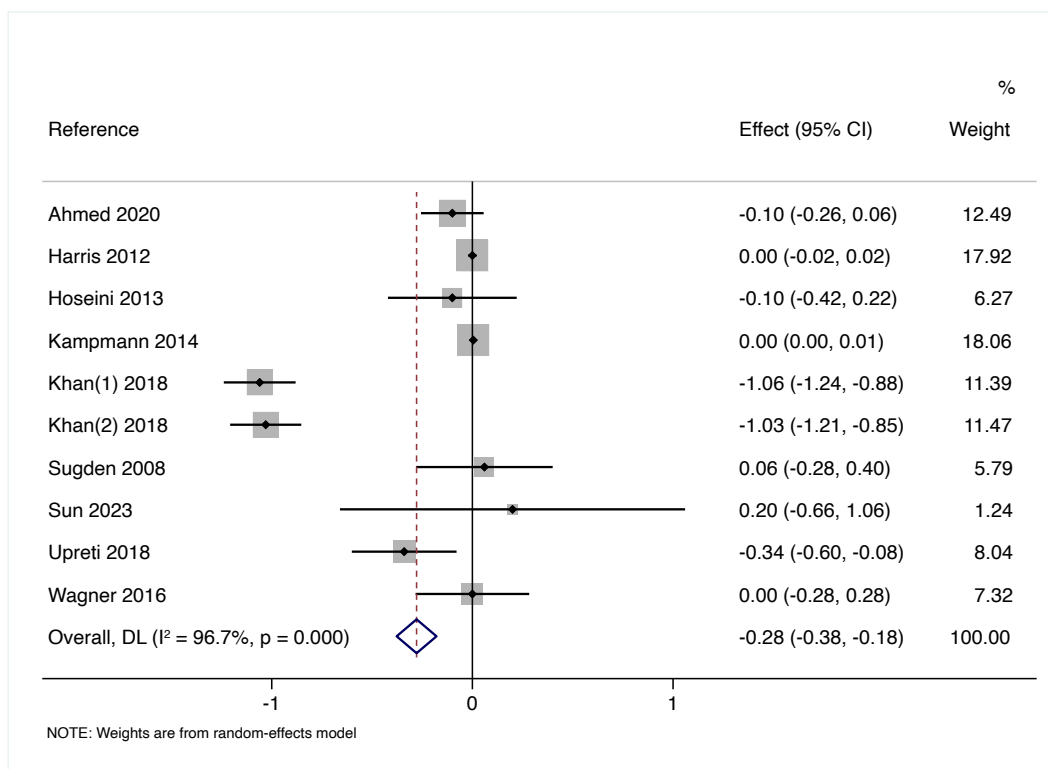


Figure S1-12-9 Forest plot of RCTs investigating the effect of vitamin D supplementation on A1c in participants with intervention duration < 3 months.

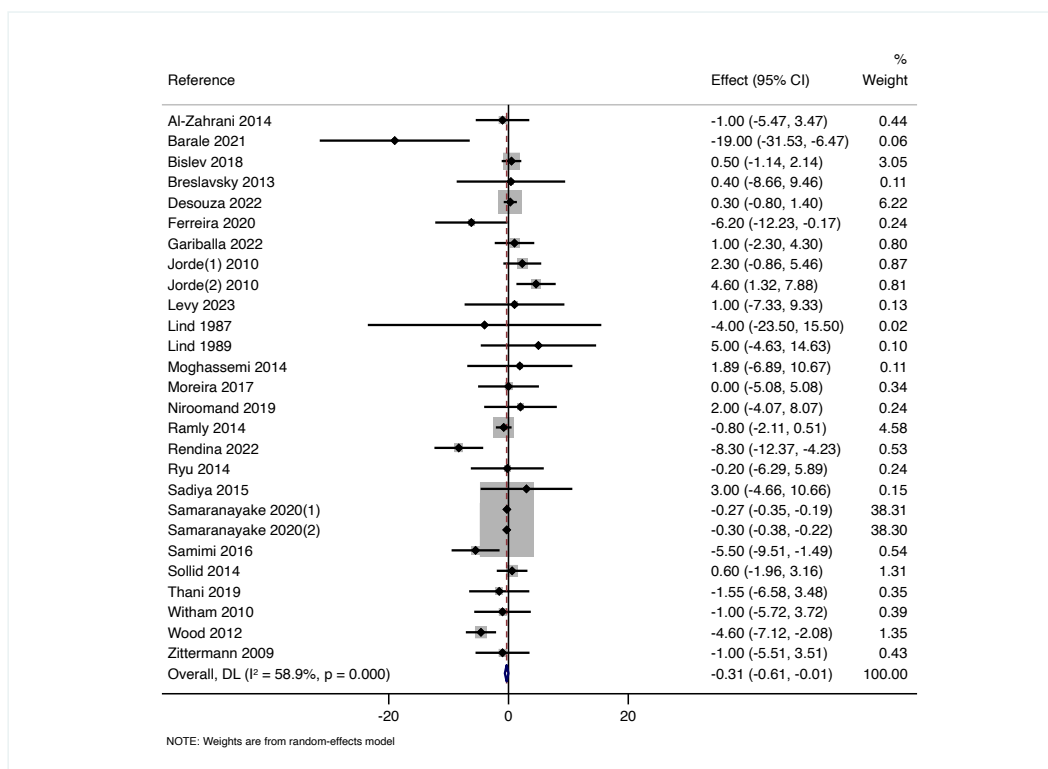


Figure S1-13-1 Forest plot of RCTs investigating the effect of vitamin D supplementation on SBP in participants with intervention duration ≥ 3 months.

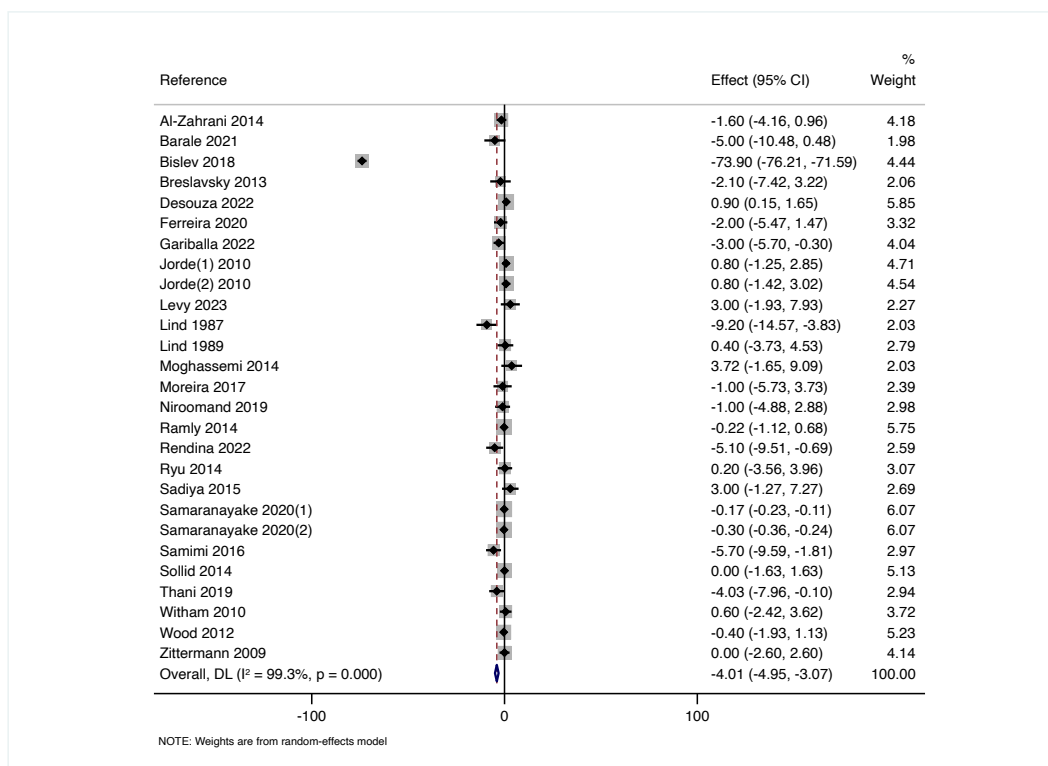


Figure S1-13-2 Forest plot of RCTs investigating the effect of vitamin D supplementation on DBP in participants with intervention duration ≥ 3 months.

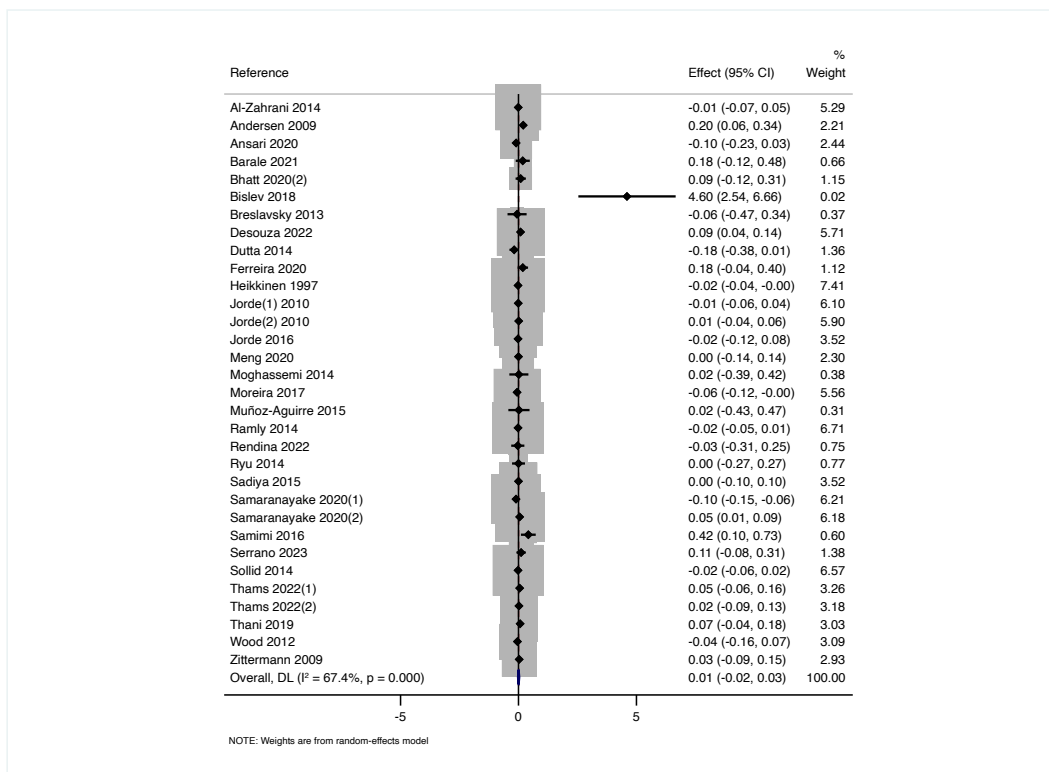


Figure S1-13-3 Forest plot of RCTs investigating the effect of vitamin D supplementation on HDL-C in participants with intervention duration \geq 3 months.

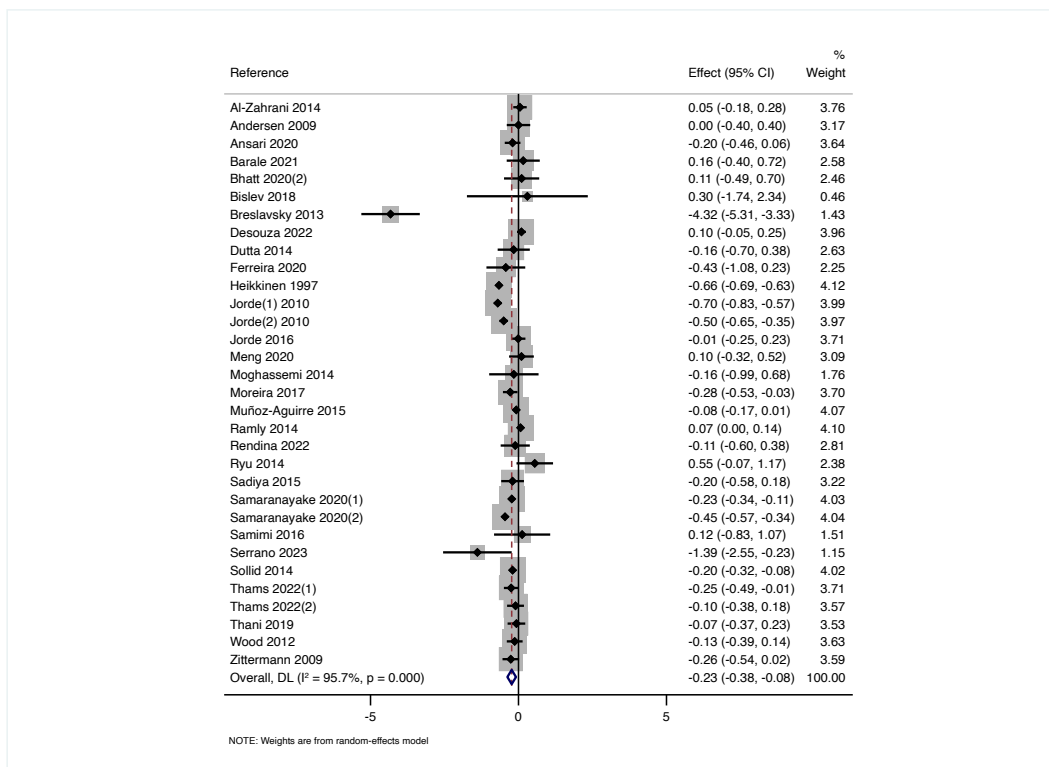


Figure S1-13-4 Forest plot of RCTs investigating the effect of vitamin D supplementation on LDL-C in participants with intervention duration \geq 3 months.

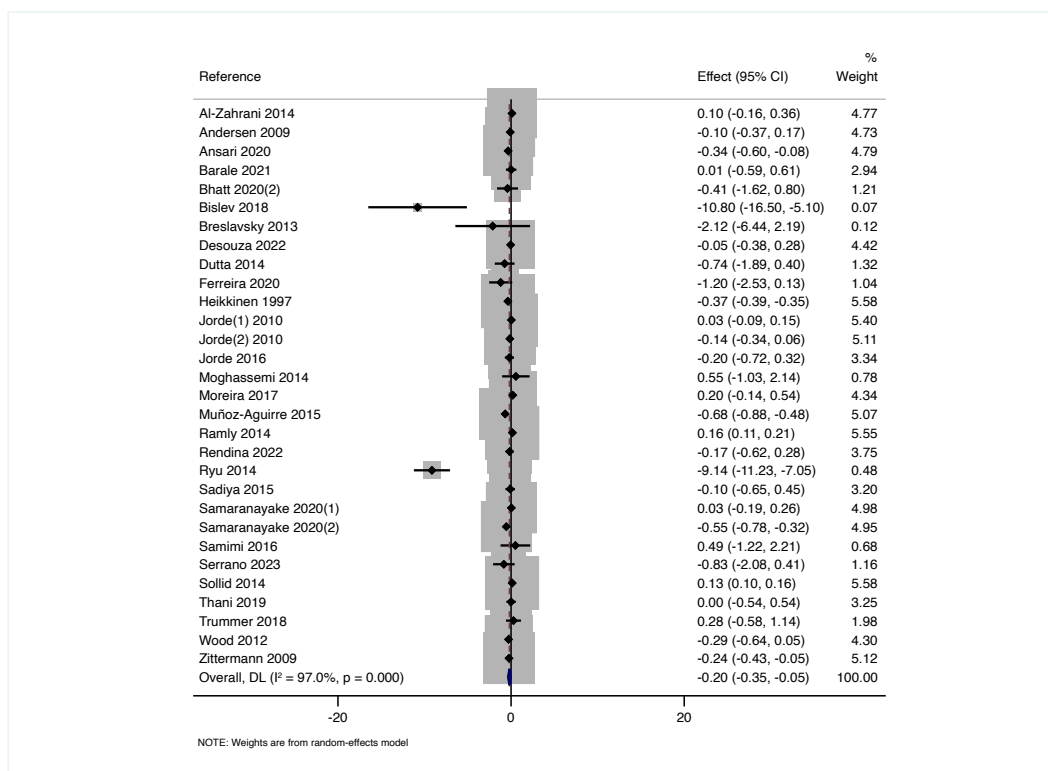


Figure S1-13-5 Forest plot of RCTs investigating the effect of vitamin D supplementation on TG in participants with intervention duration ≥ 3 months.

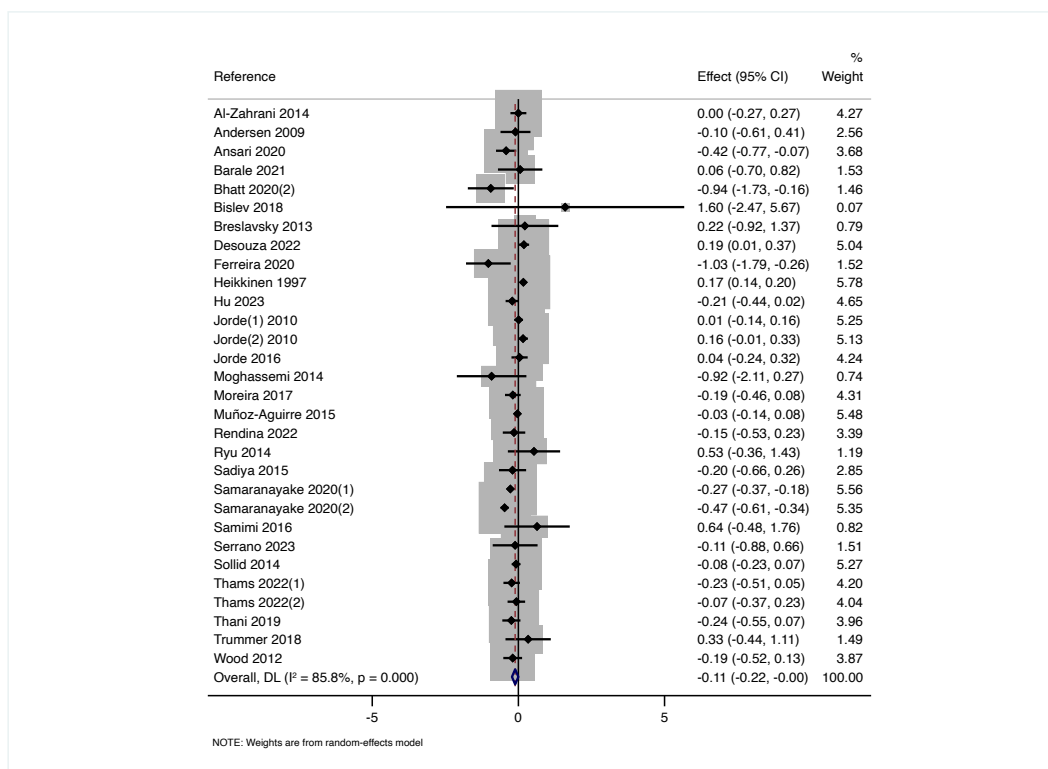


Figure S1-13-6 Forest plot of RCTs investigating the effect of vitamin D supplementation on TC in participants with intervention duration ≥ 3 months.

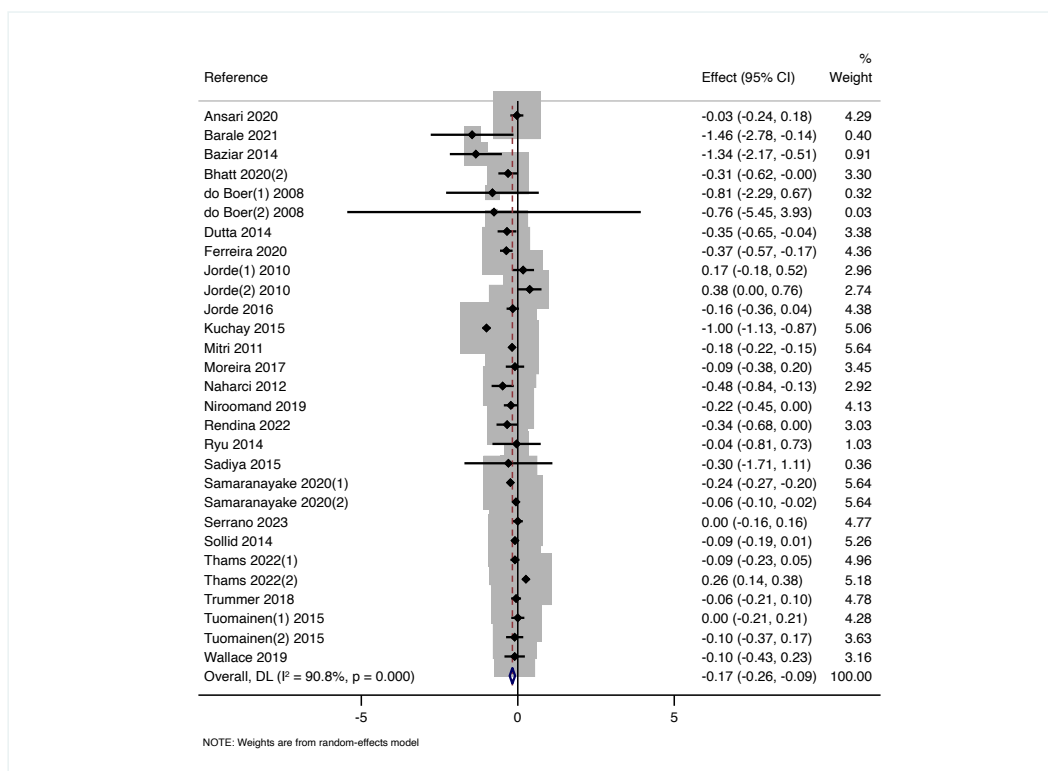


Figure S1-13-7 Forest plot of RCTs investigating the effect of vitamin D supplementation on FBG in participants with intervention duration ≥ 3 months.

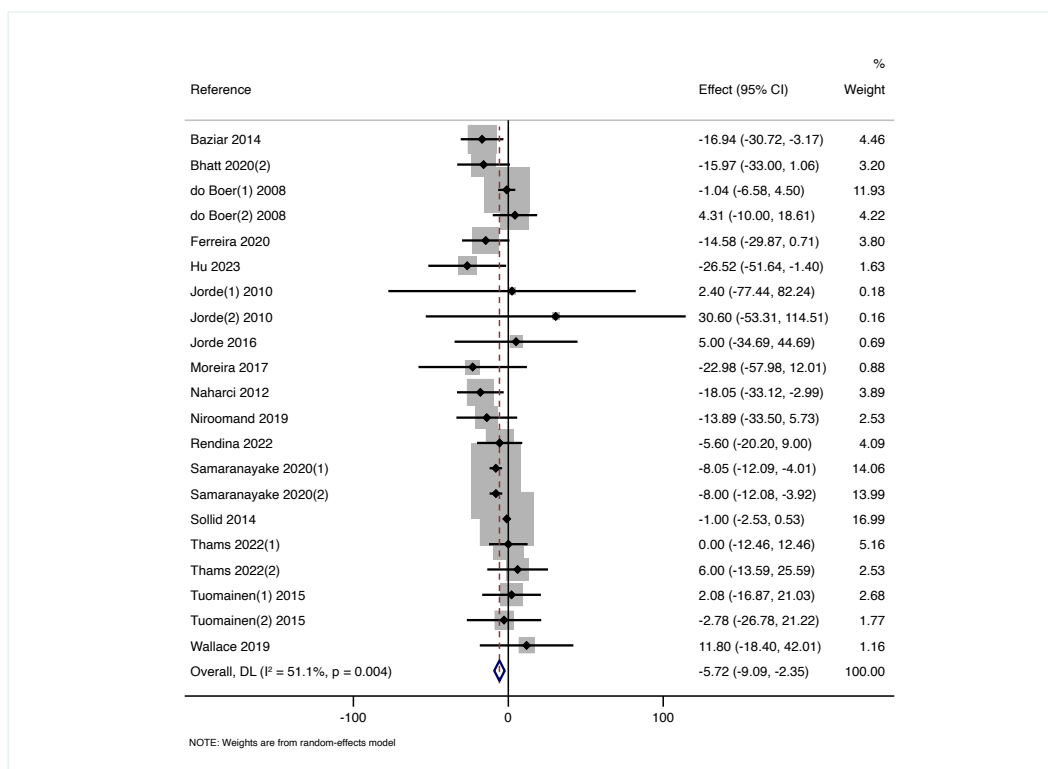


Figure S1-13-8 Forest plot of RCTs investigating the effect of vitamin D supplementation on FBI in participants with intervention duration ≥ 3 months.

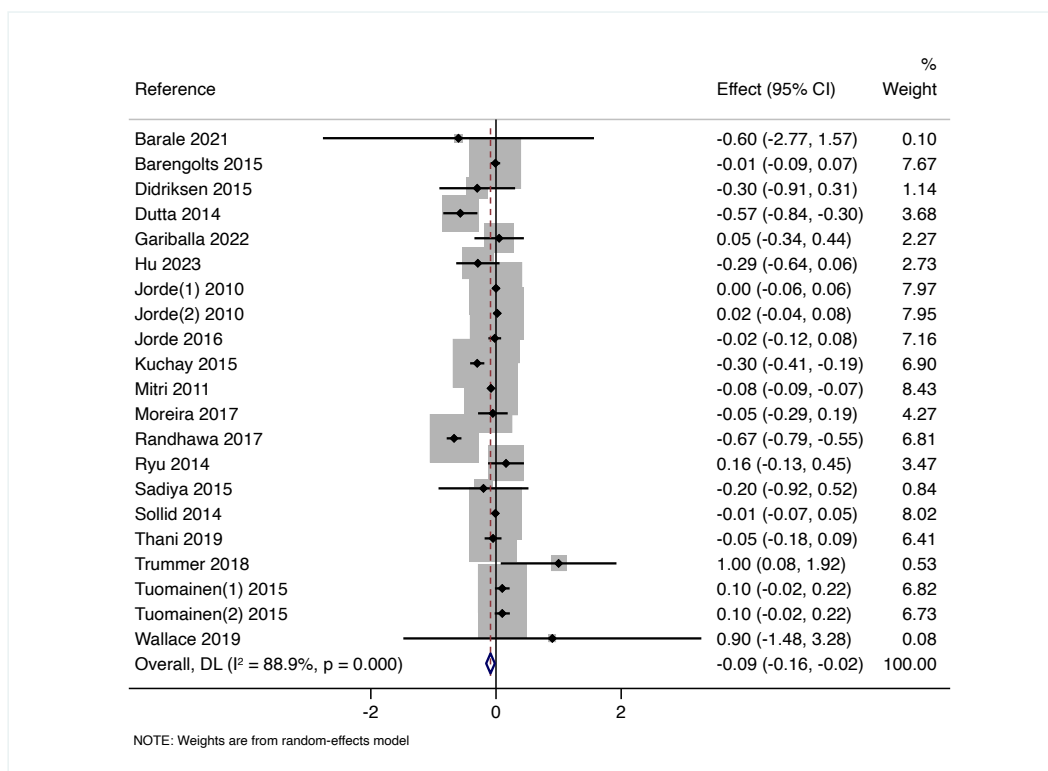


Figure S1-13-9 Forest plot of RCTs investigating the effect of vitamin D supplementation on A1c in participants with intervention duration ≥ 3 months.

Appendix 4 - Funnel plot

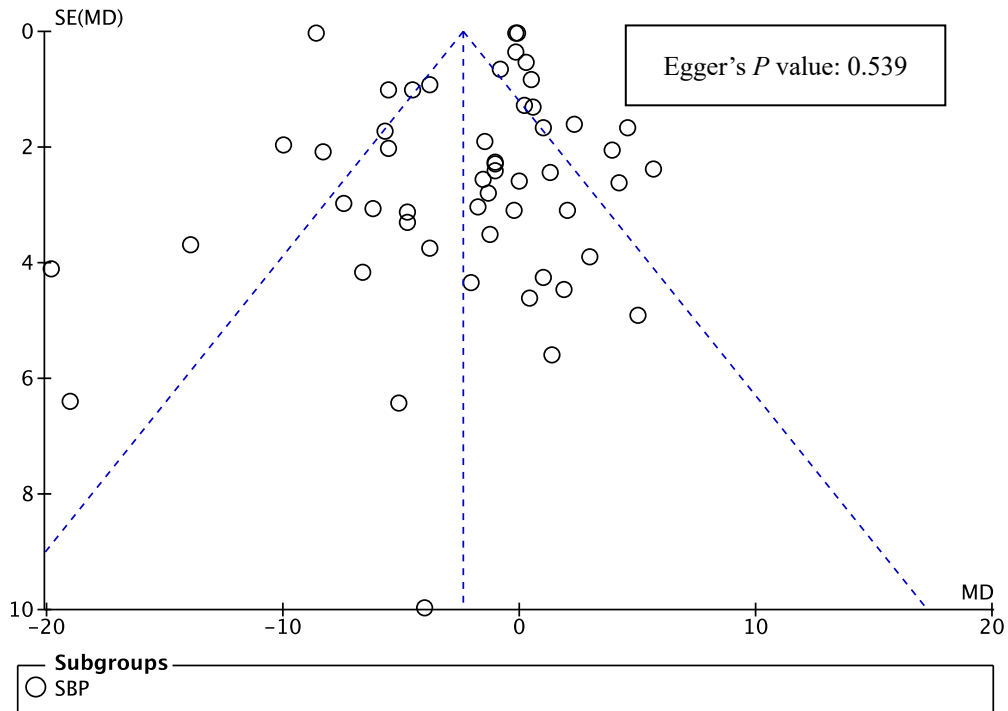


Figure S3-1-1. Funnel plot of RCTs investigating the effect of vitamin D supplementation on SBP (mmHg).

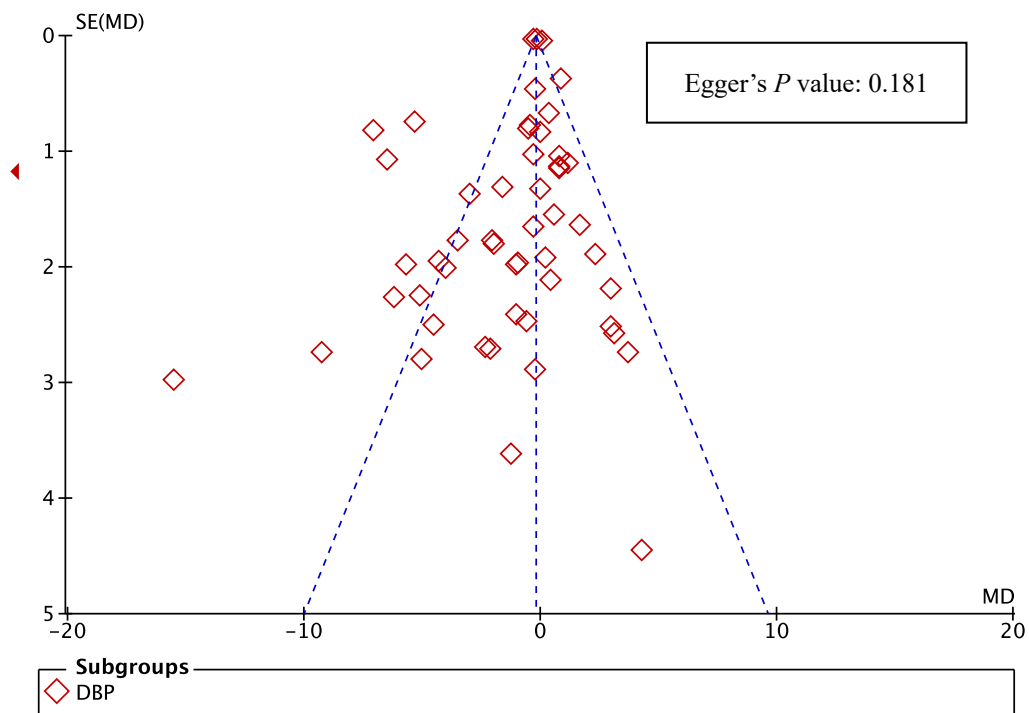


Figure S3-1-2. Funnel plot of RCTs investigating the effect of vitamin D supplementation on DBP (mmHg).

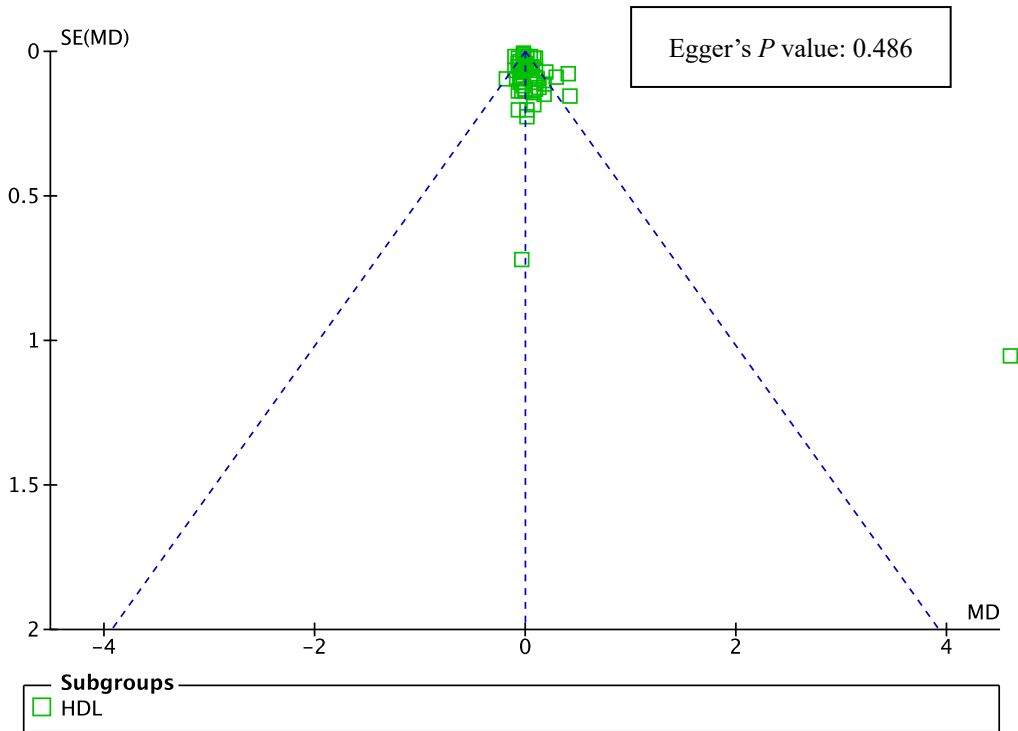


Figure S3-1-3. Funnel plot of RCTs investigating the effect of vitamin D supplementation on HDL-C (mmol/L).

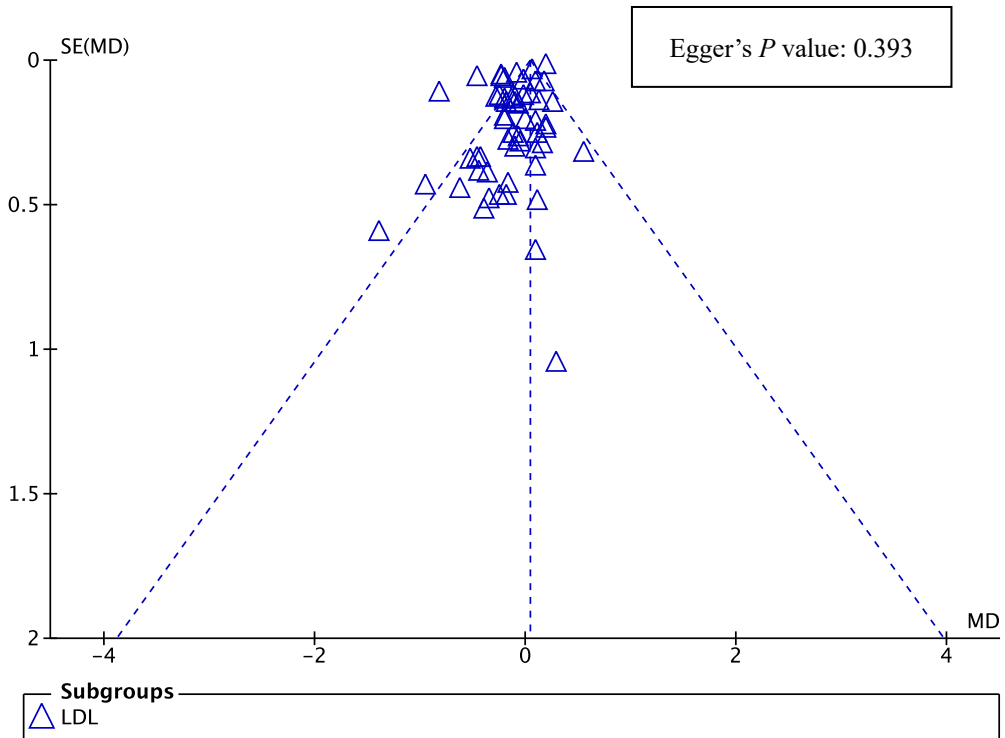


Figure S3-1-4. Funnel plot of RCTs investigating the effect of vitamin D supplementation on LDL-C (mmol/L).

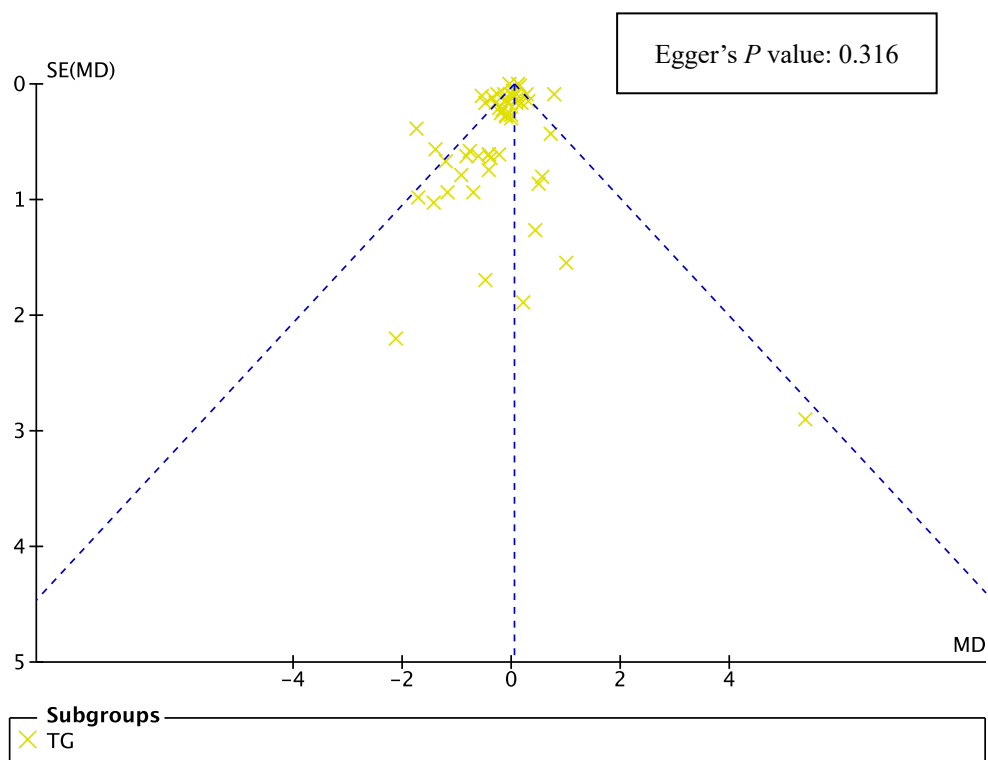


Figure S3-1-5. Funnel plot of RCTs investigating the effect of vitamin D supplementation on TG (mmol/L).

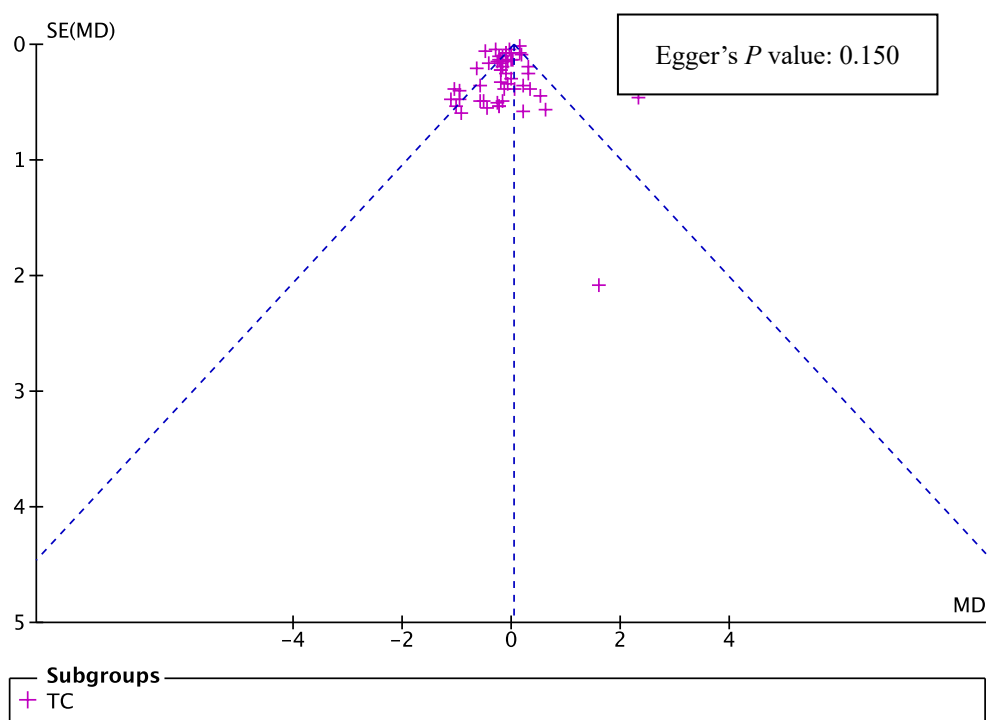


Figure S3-1-6. Funnel plot of RCTs investigating the effect of vitamin D supplementation on TC (mmol/L).

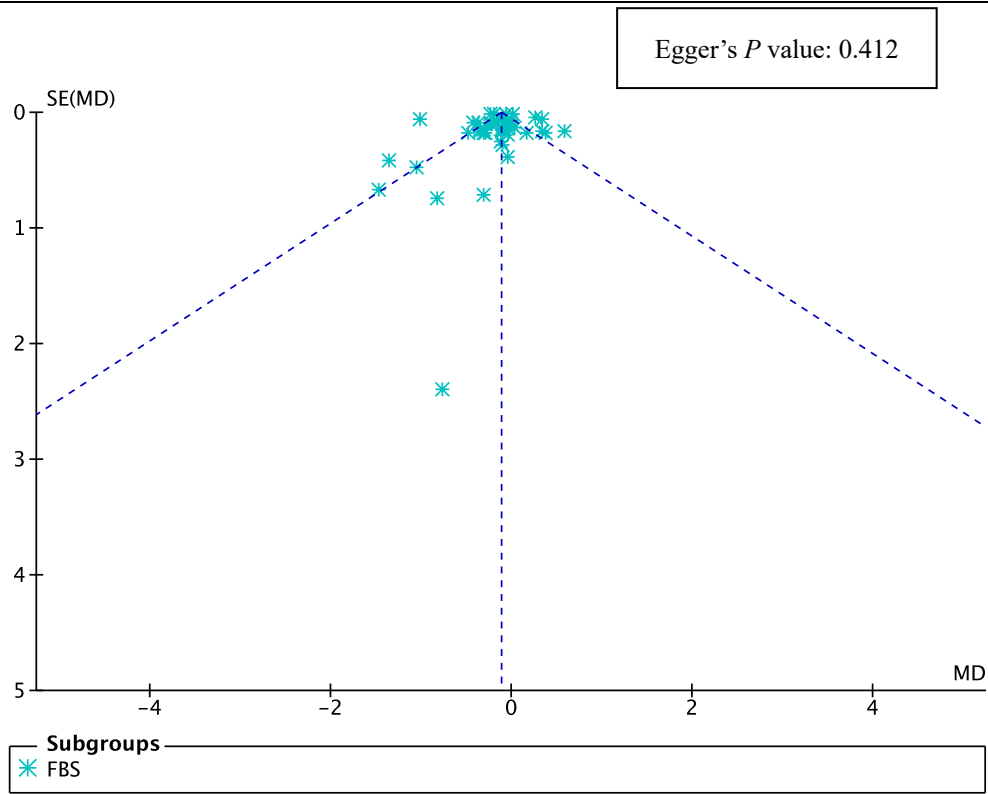


Figure S3-1-7. Funnel plot of RCTs investigating the effect of vitamin D supplementation on FBS (mmol/L).

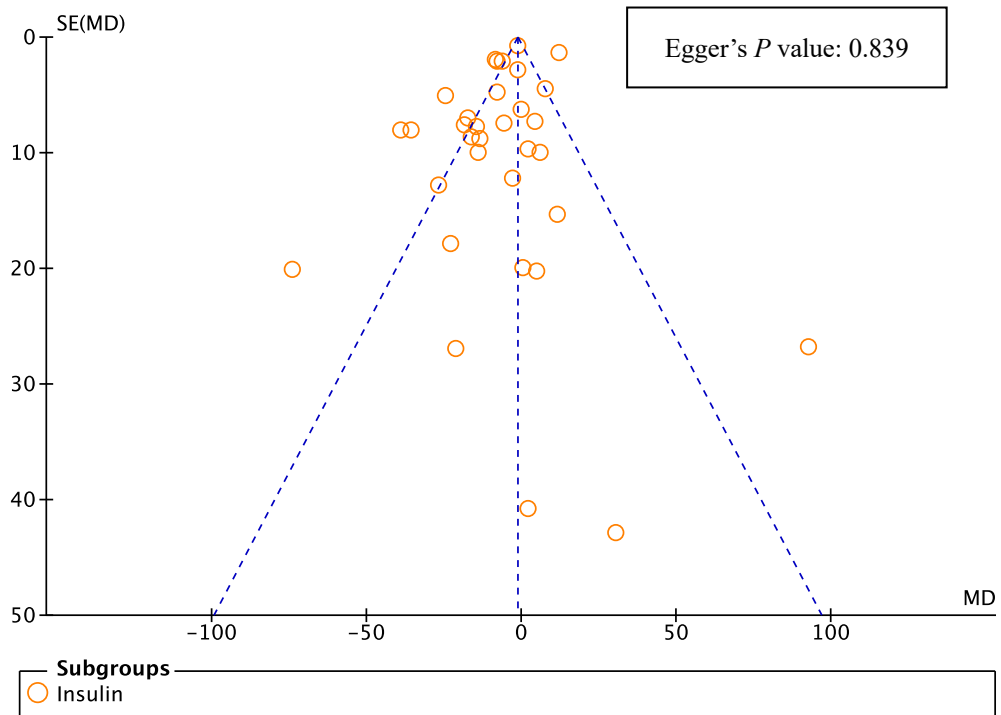


Figure S3-1-8. Funnel plot of RCTs investigating the effect of vitamin D supplementation on FBI (pmol/L).

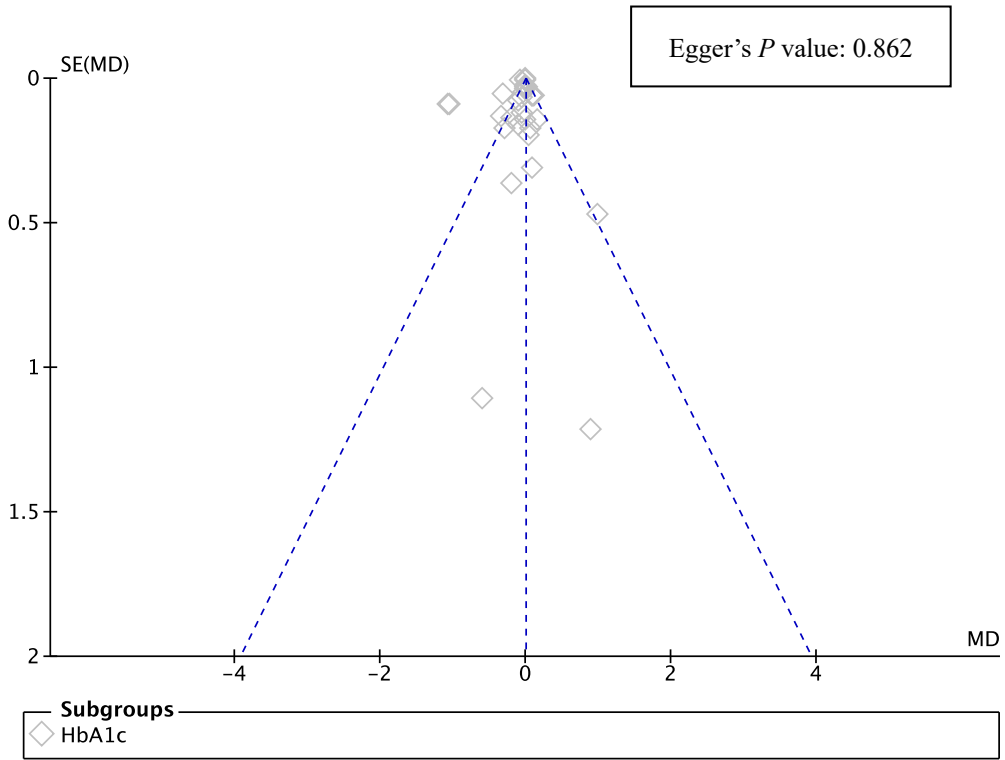


Figure S3-1-9. Funnel plot of RCTs investigating the effect of vitamin D supplementation on A1C (%).

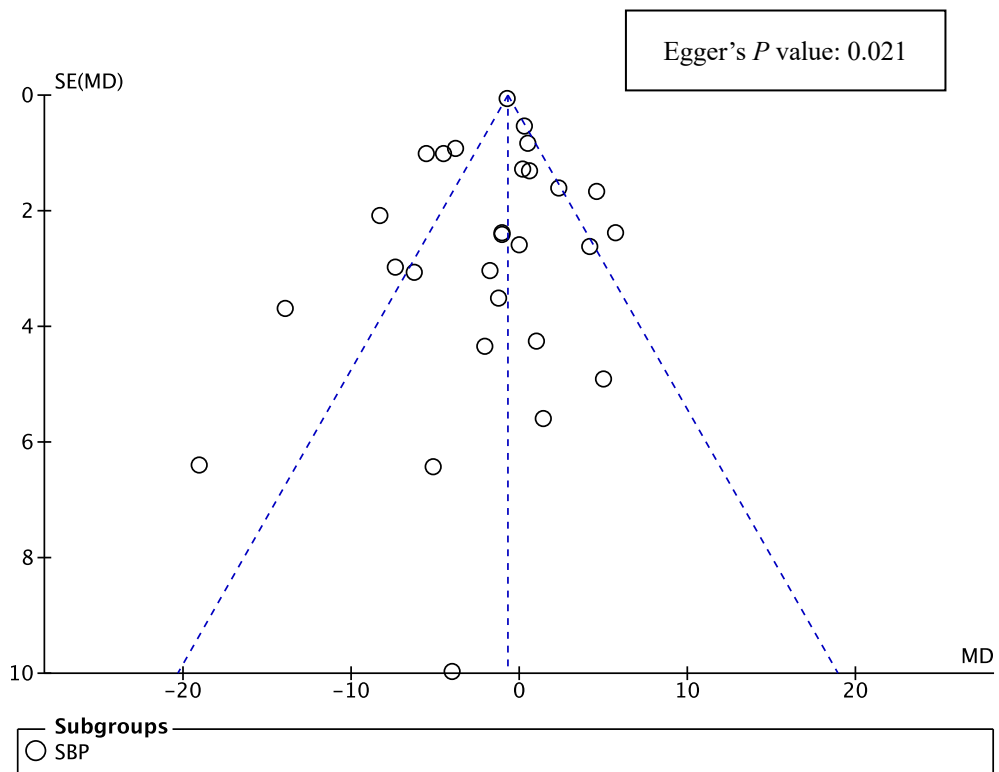


Figure S3-2-1. Funnel plot of RCTs investigating the effect of vitamin D supplementation on SBP in participants from Western countries.

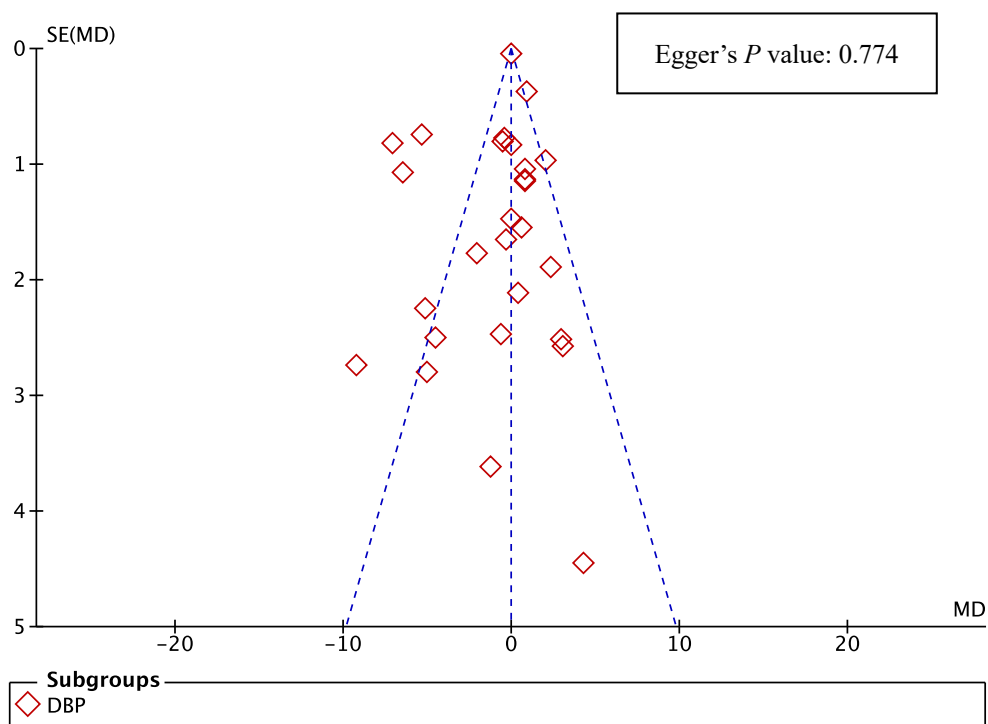


Figure S3-2-2. Funnel plot of RCTs investigating the effect of vitamin D supplementation on DBP in participants from Western countries.

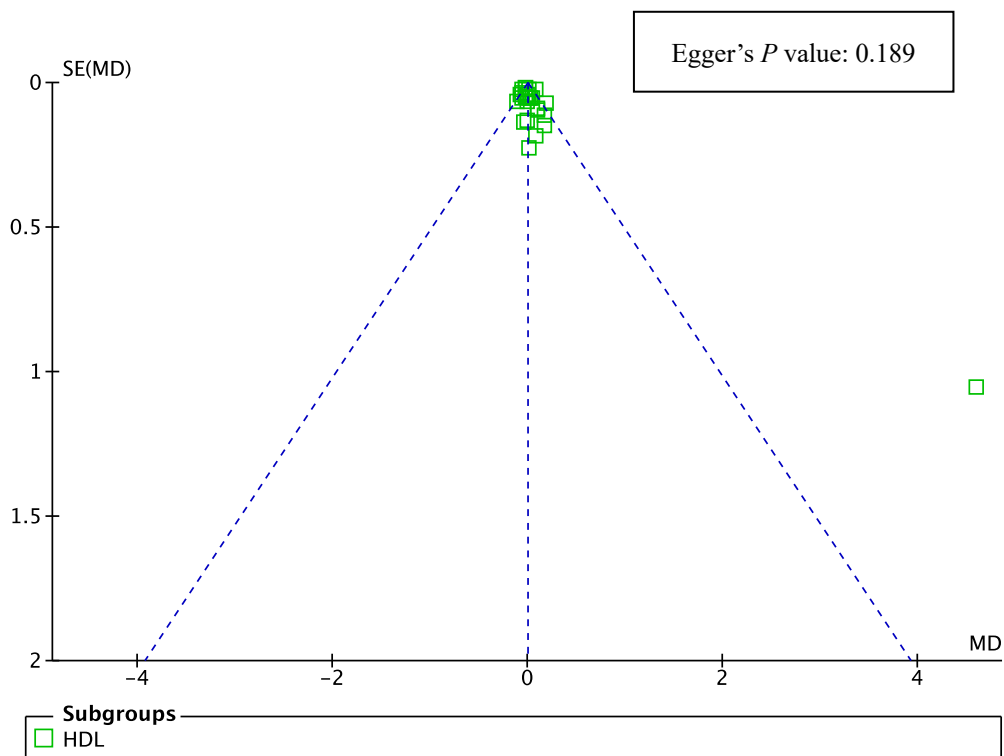


Figure S3-2-3. Funnel plot of RCTs investigating the effect of vitamin D supplementation on HDL-C in participants from Western countries.

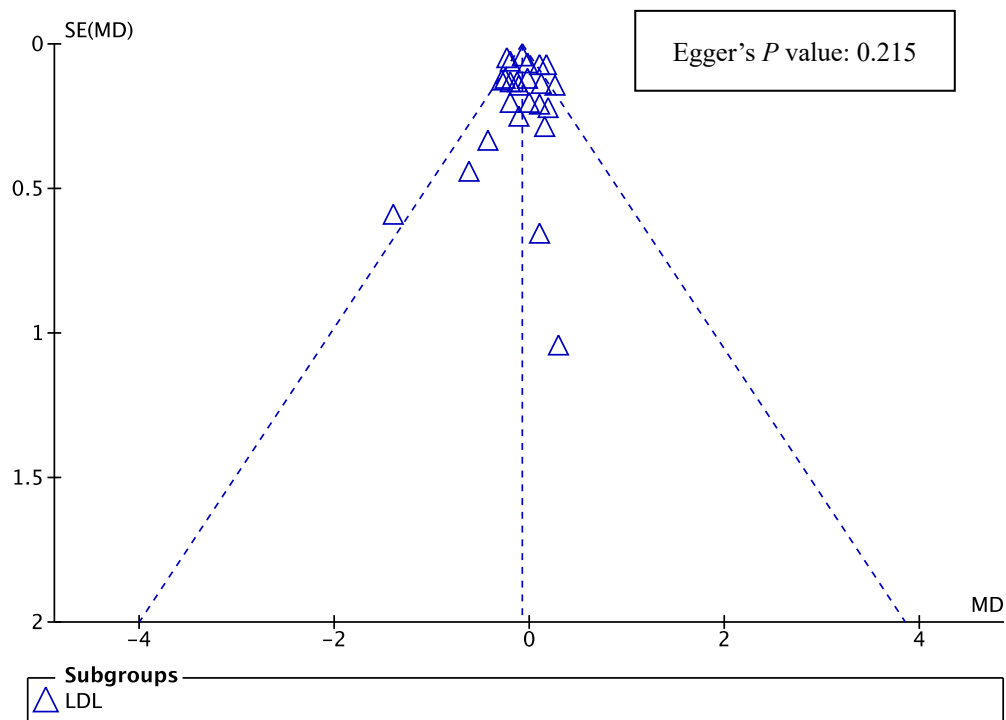


Figure S3-2-4. Funnel plot of RCTs investigating the effect of vitamin D supplementation on LDL-C in participants from Western countries.

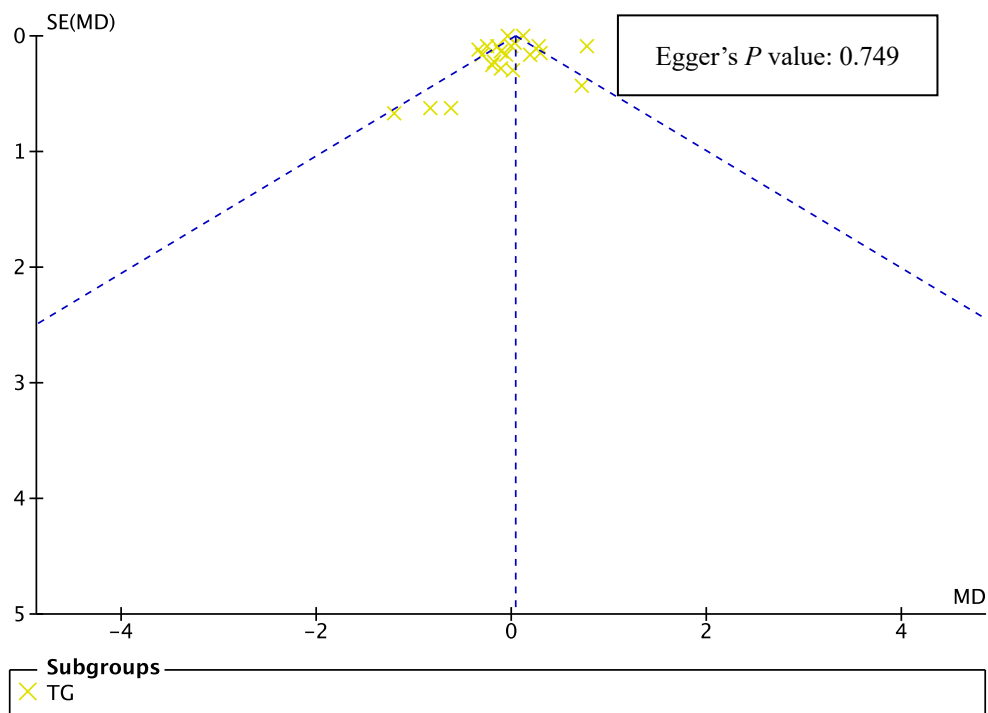


Figure S3-2-5. Funnel plot of RCTs investigating the effect of vitamin D supplementation on TG in participants from Western countries.

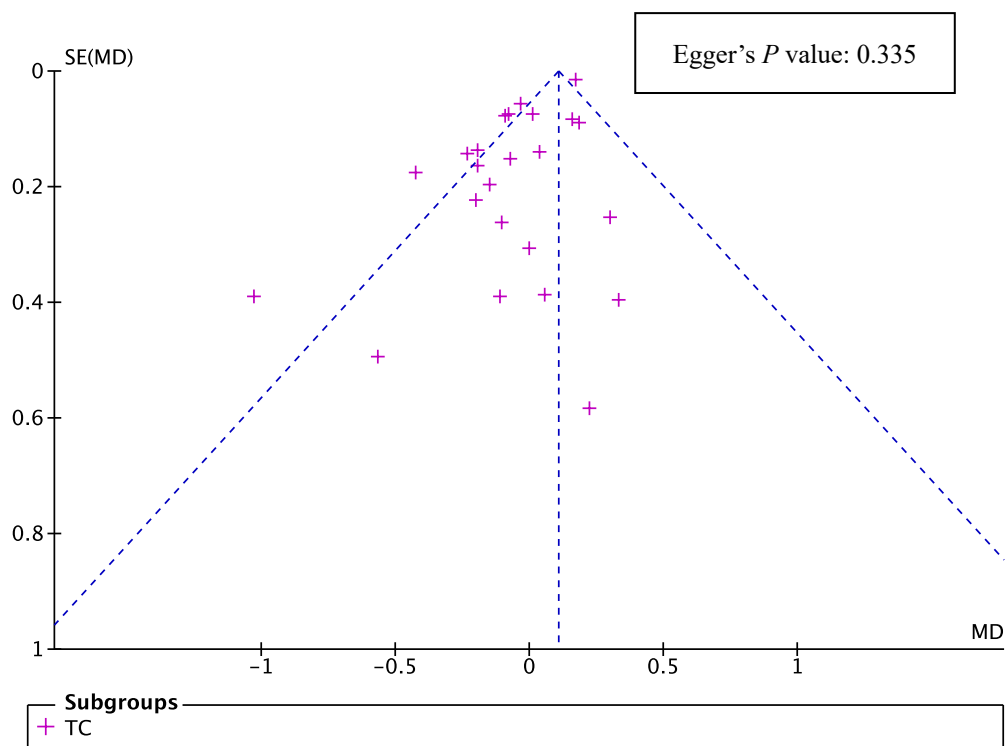


Figure S3-2-6. Funnel plot of RCTs investigating the effect of vitamin D supplementation on TC in participants from Western countries.

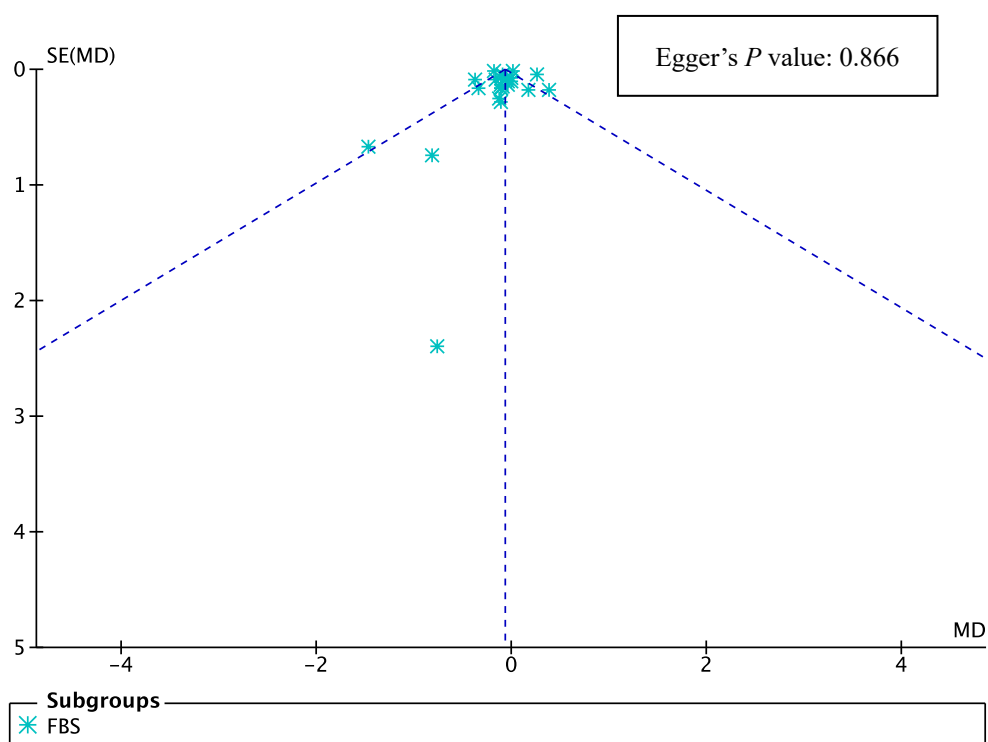


Figure S3-2-7. Funnel plot of RCTs investigating the effect of vitamin D supplementation on FBS in participants from Western countries.

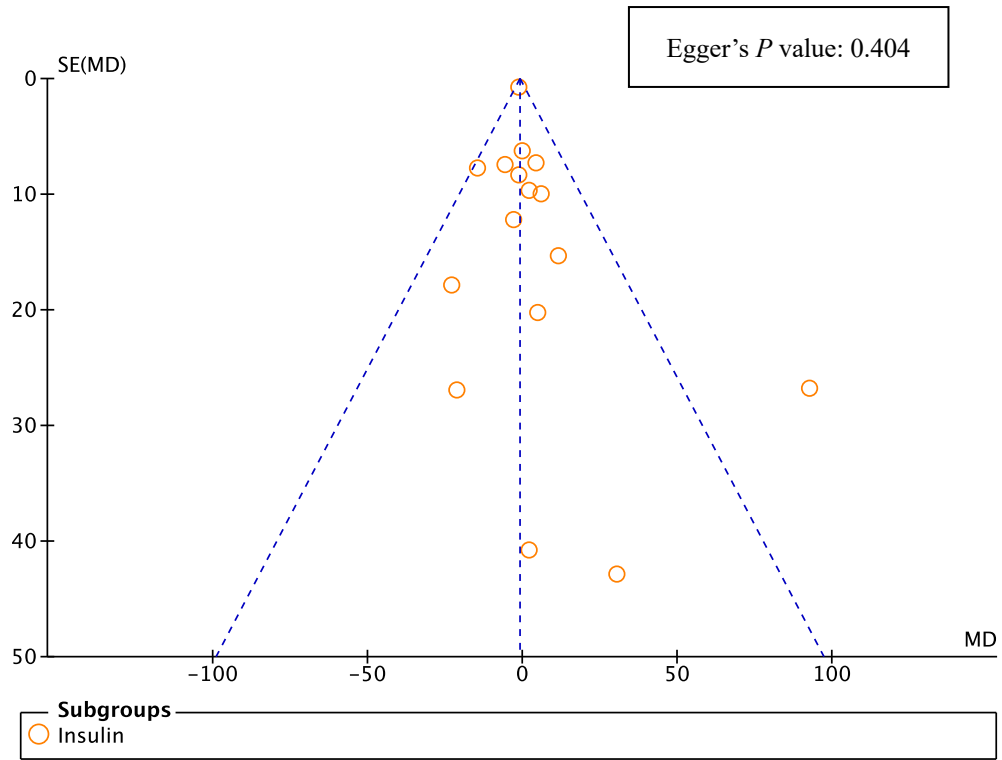


Figure S3-2-8. Funnel plot of RCTs investigating the effect of vitamin D supplementation on FBI in participants from Western countries.

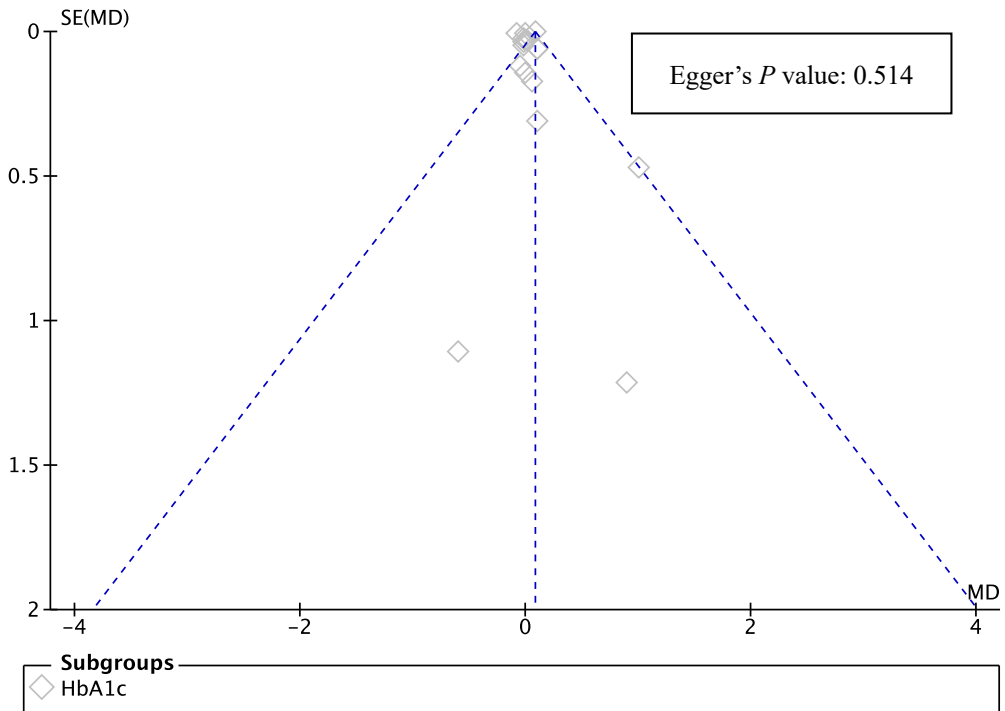


Figure S3-2-9. Funnel plot of RCTs investigating the effect of vitamin D supplementation on A1C in participants from Western countries.

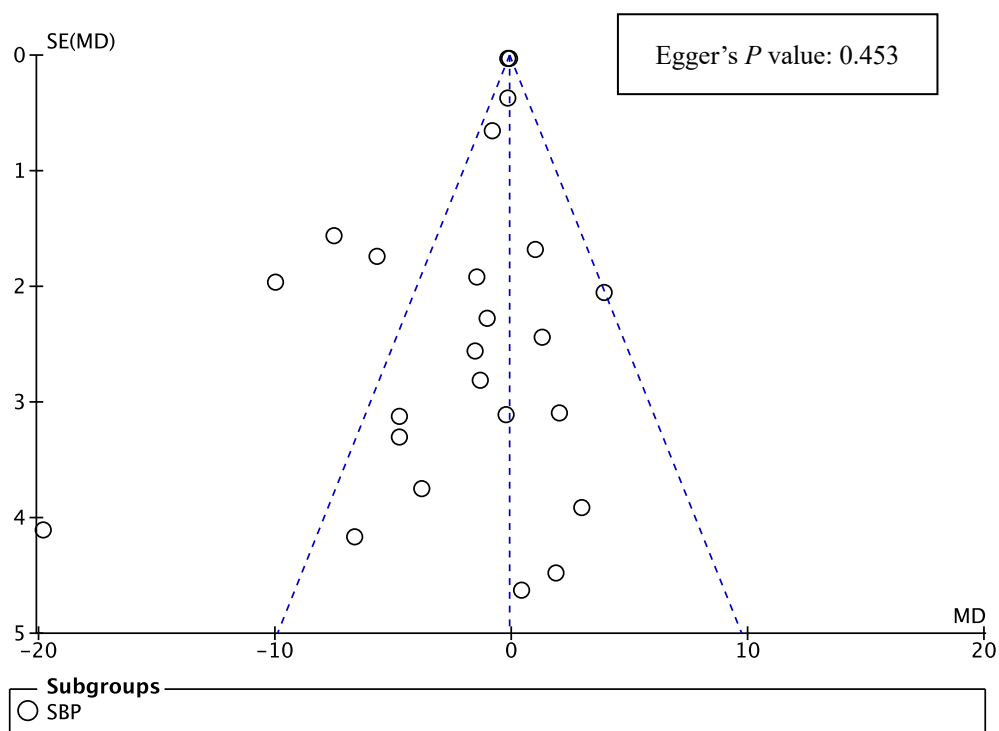


Figure S3-3-1. Funnel plot of RCTs investigating the effect of vitamin D supplementation on SBP in participants from non-Western countries.

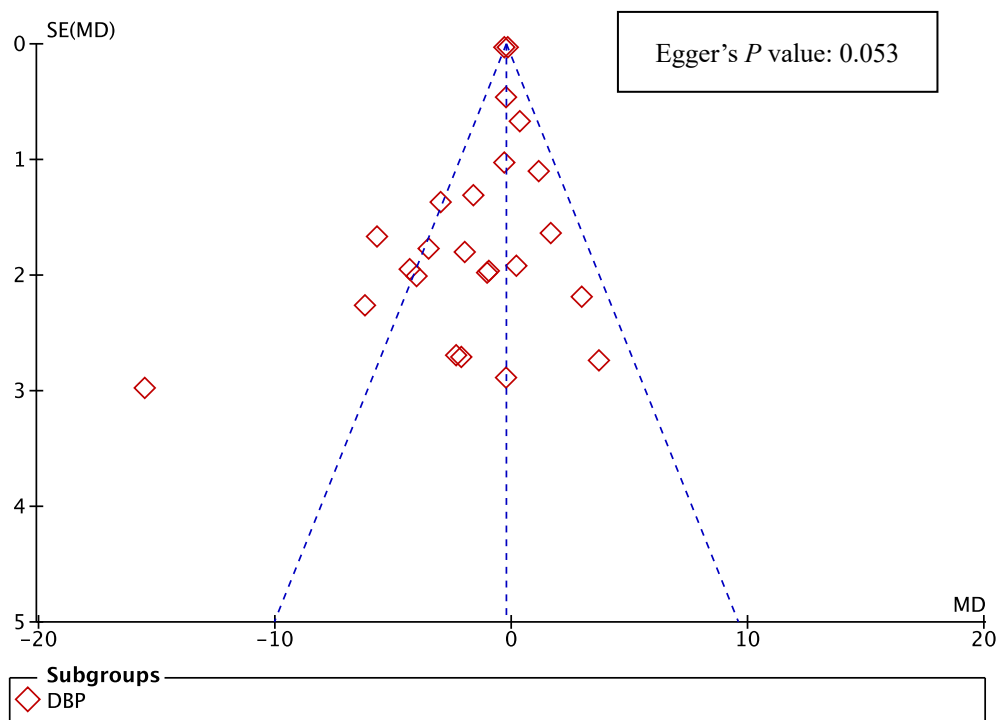


Figure S3-3-2. Funnel plot of RCTs investigating the effect of vitamin D supplementation on DBP in participants from non-Western countries.

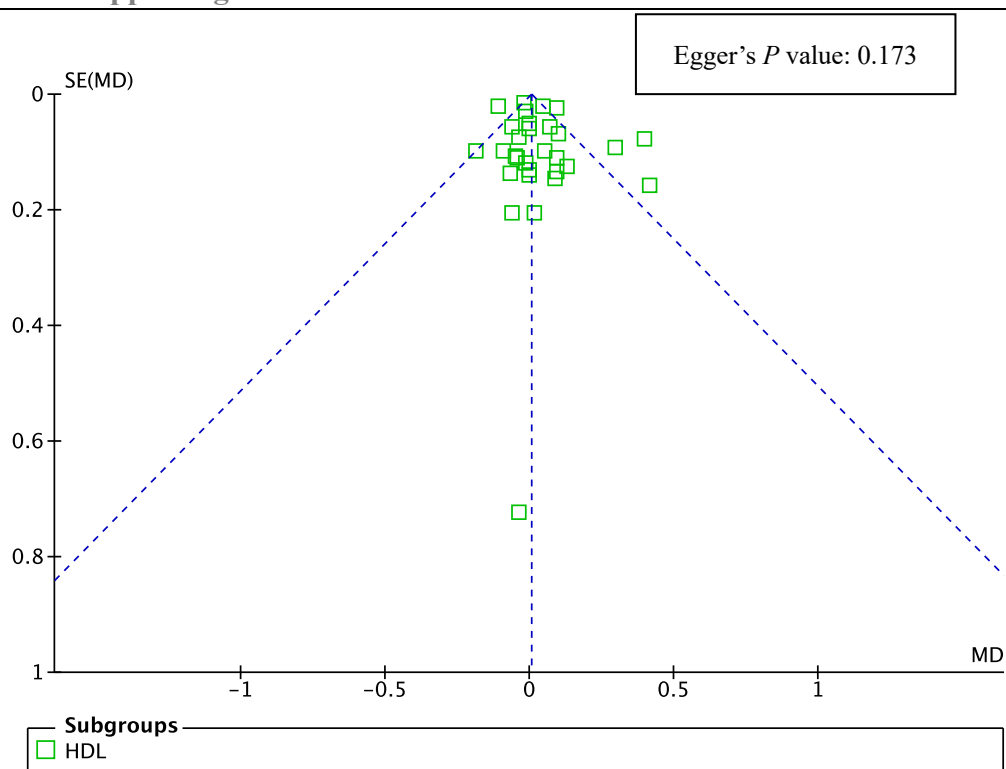


Figure S3-3-3. Funnel plot of RCTs investigating the effect of vitamin D supplementation on HDL-C in participants from non-Western countries.

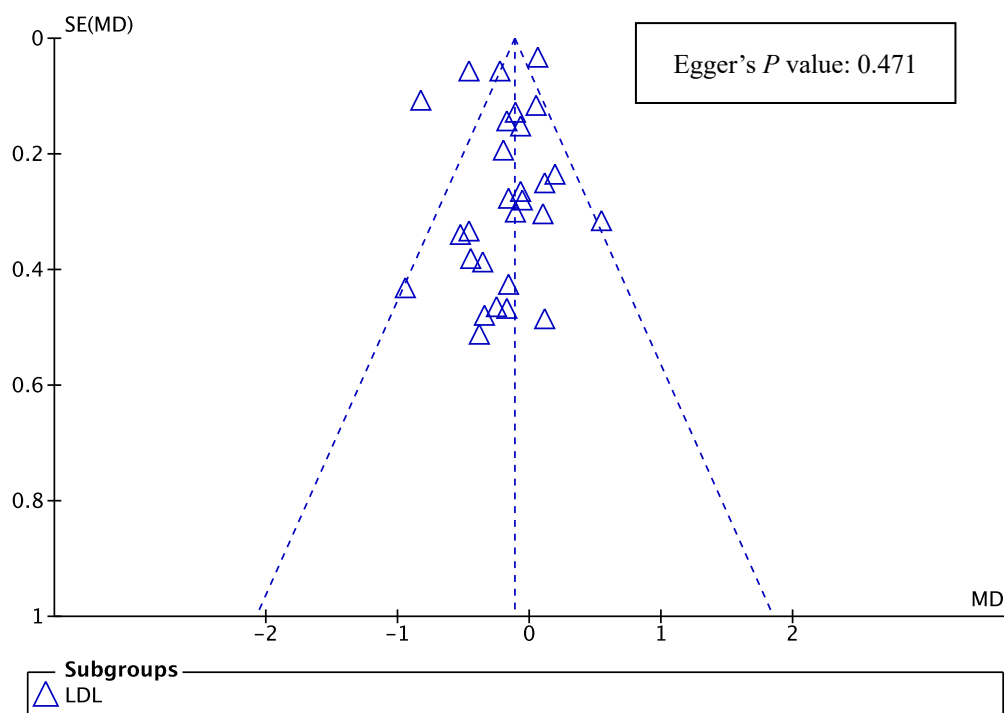


Figure S3-3-4. Funnel plot of RCTs investigating the effect of vitamin D supplementation on LDL-C in participants from non-Western countries.

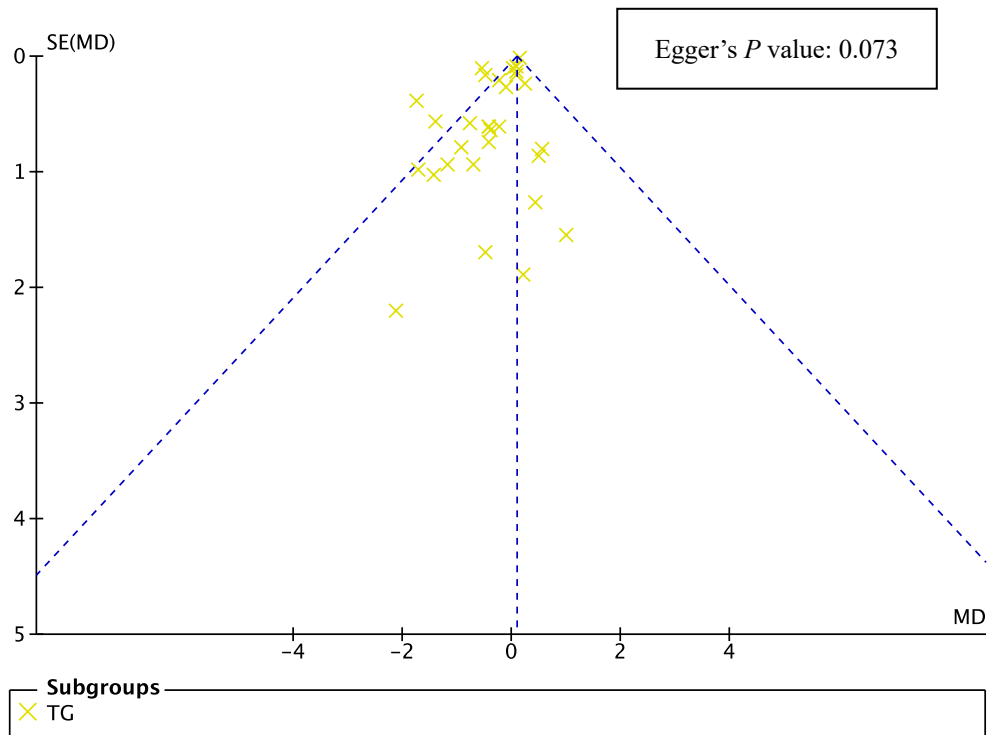


Figure S3-3-5. Funnel plot of RCTs investigating the effect of vitamin D supplementation on TG in participants from non-Western countries.

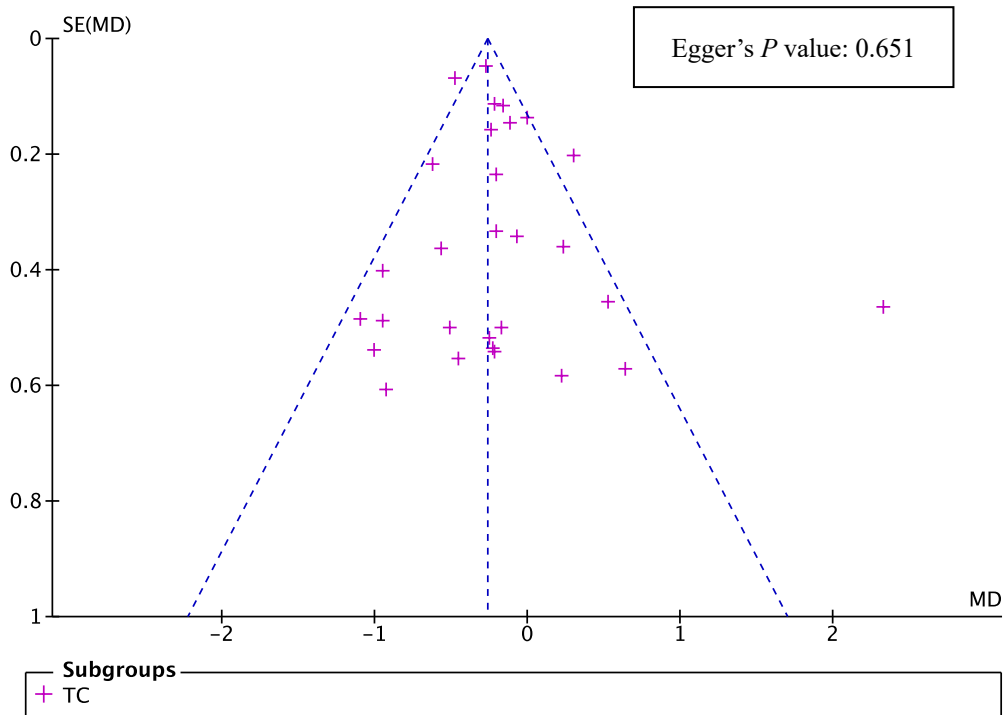


Figure S3-3-6. Funnel plot of RCTs investigating the effect of vitamin D supplementation on TC in participants from non-Western countries.

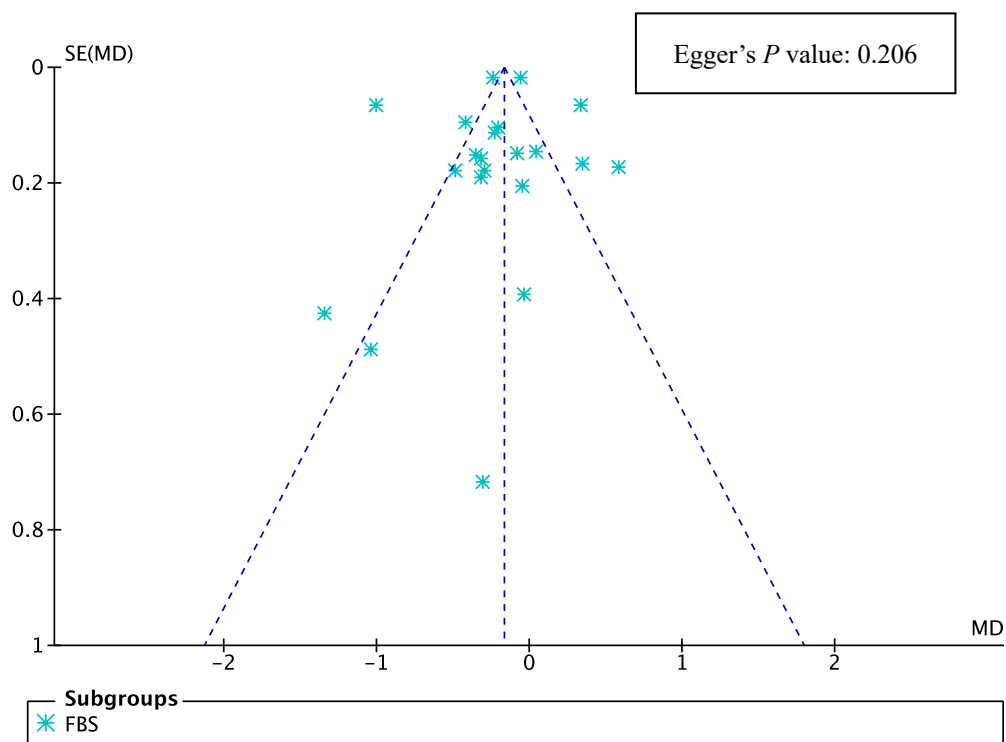


Figure S3-3-7. Funnel plot of RCTs investigating the effect of vitamin D supplementation on FBS in participants from non-Western countries.

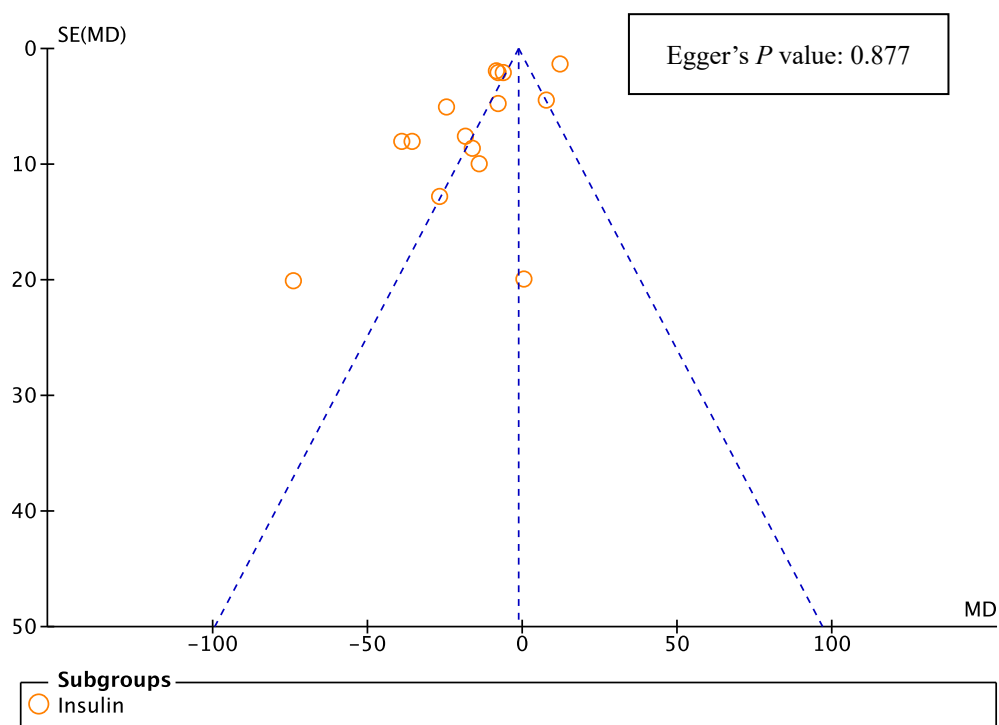


Figure S3-3-8. Funnel plot of RCTs investigating the effect of vitamin D supplementation on FBI in participants from non-Western countries.

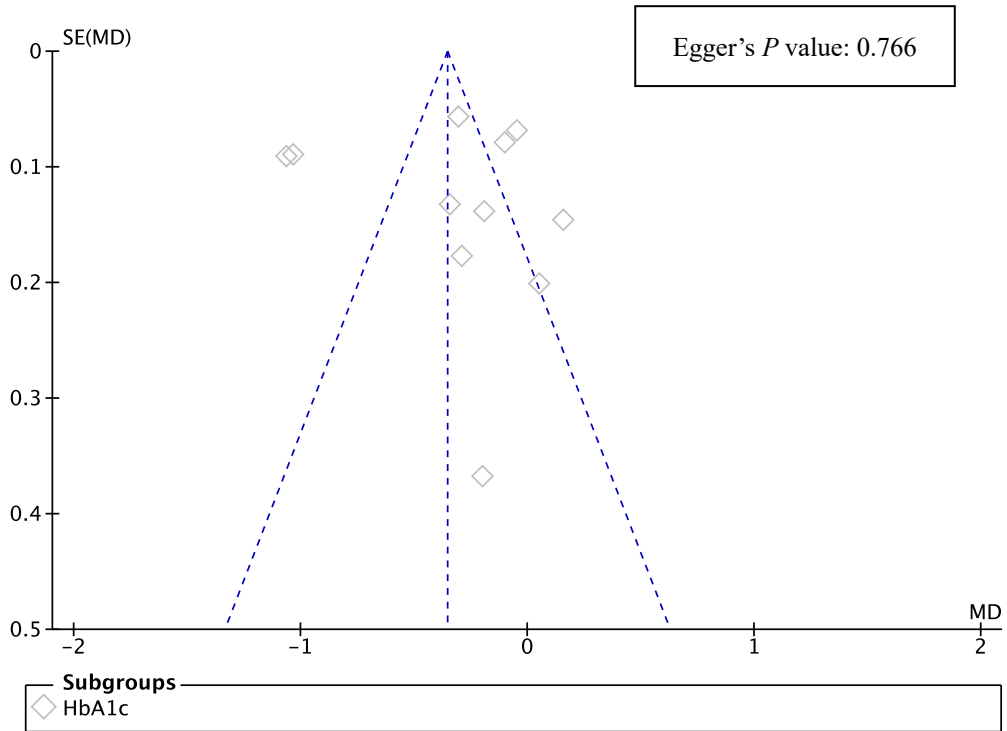


Figure S3-3-9. Funnel plot of RCTs investigating the effect of vitamin D supplementation on A1C in participants from non-Western countries.

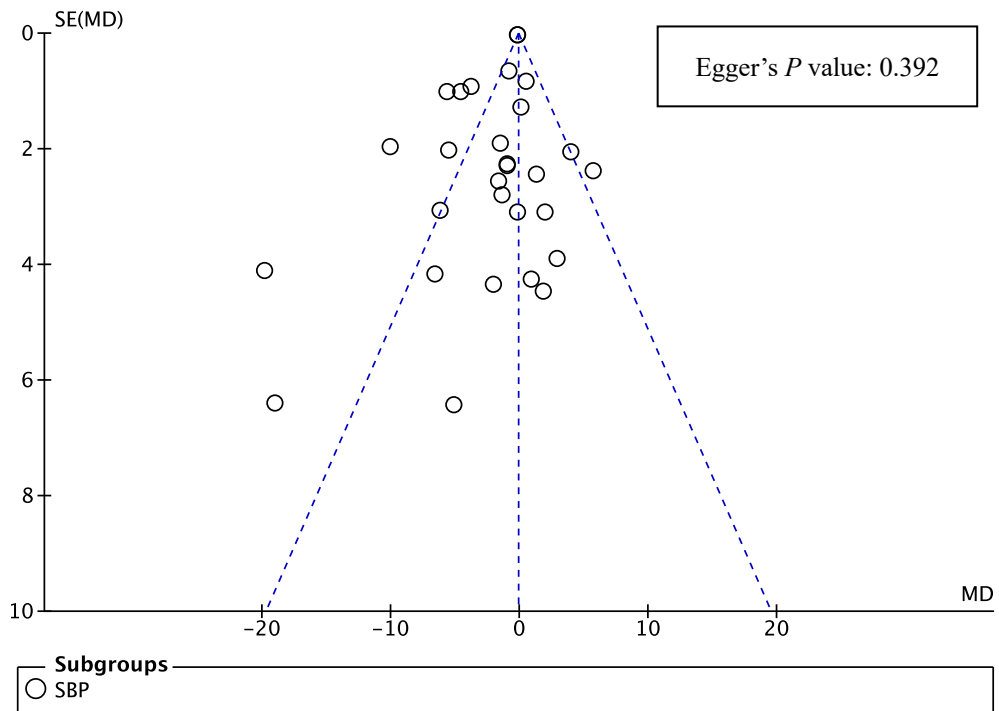


Figure S3-4-1. Funnel plot of RCTs investigating the effect of vitamin D supplementation on SBP in participants with baseline 25-hydroxyvitamin D < 15.0 ng/mL.

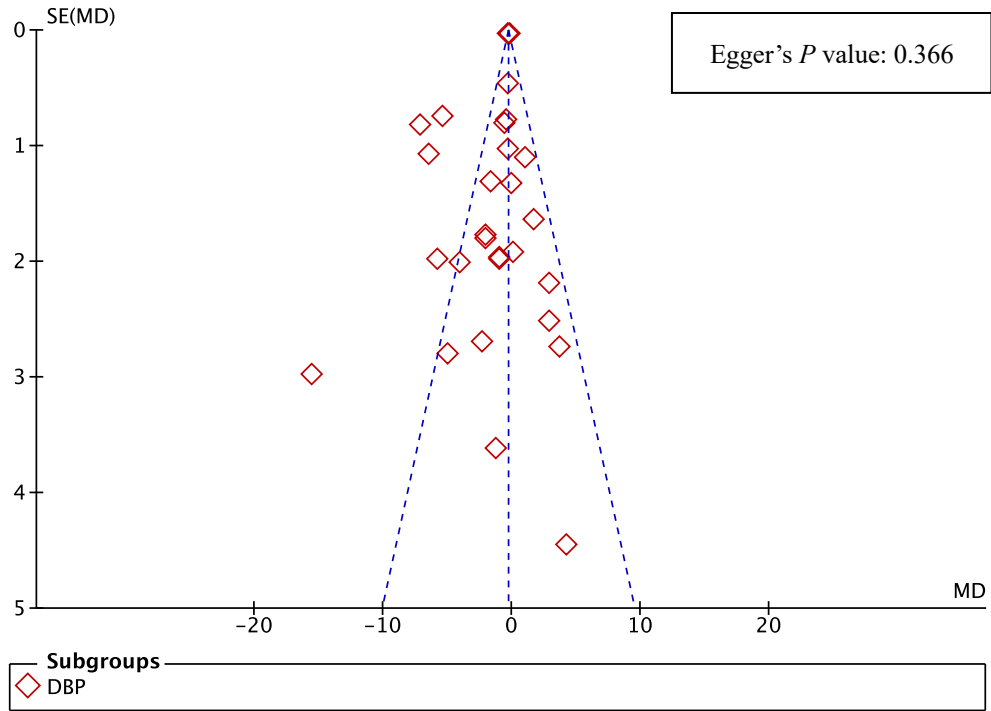


Figure S3-4-2 Funnel plot of RCTs investigating the effect of vitamin D supplementation on DBP in participants with baseline 25-hydroxyvitamin D < 15.0 ng/mL.

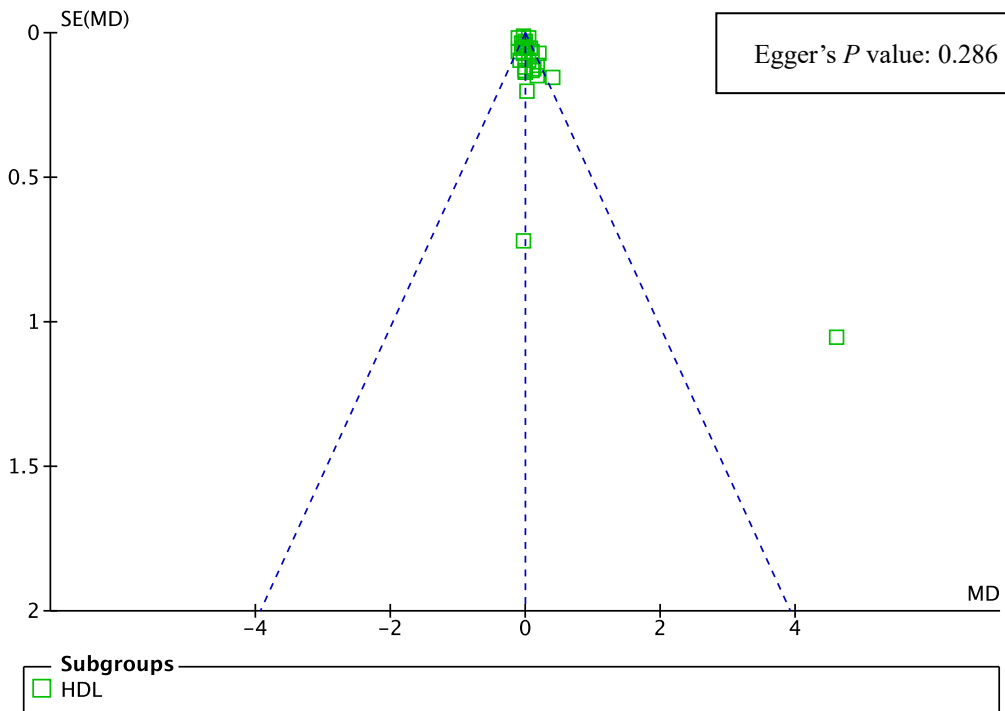


Figure S3-4-3. Funnel plot of RCTs investigating the effect of vitamin D supplementation on HDL-C in participants with baseline 25-hydroxyvitamin D < 15.0 ng/mL.

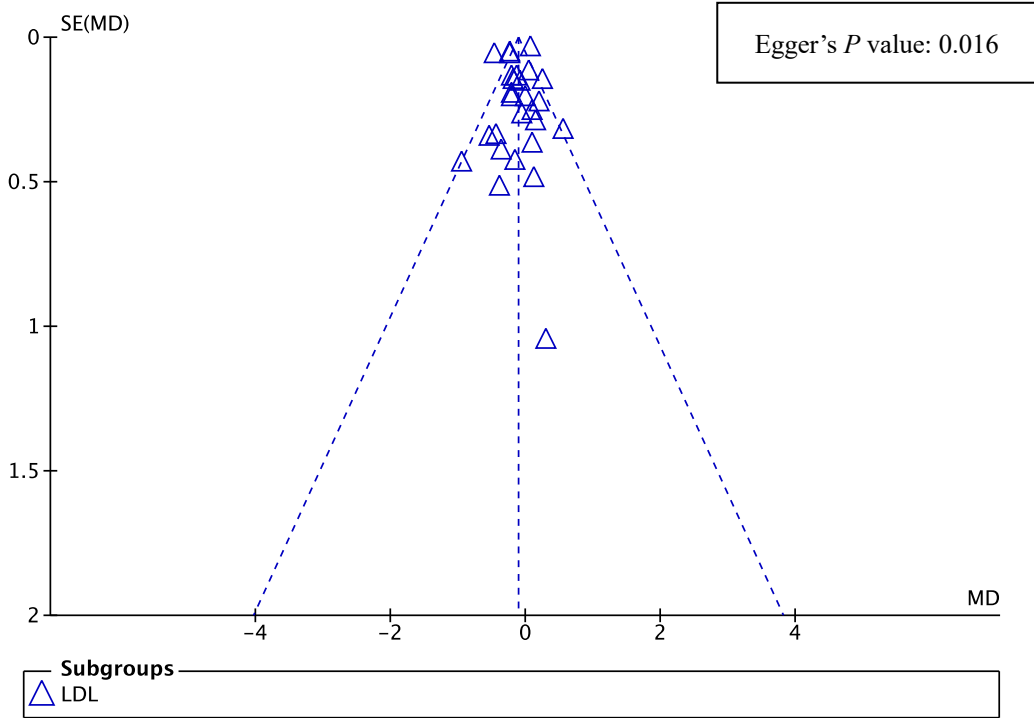


Figure S3-4-4. Funnel plot of RCTs investigating the effect of vitamin D supplementation on LDL-C in participants with baseline 25-hydroxyvitamin D < 15.0 ng/mL.

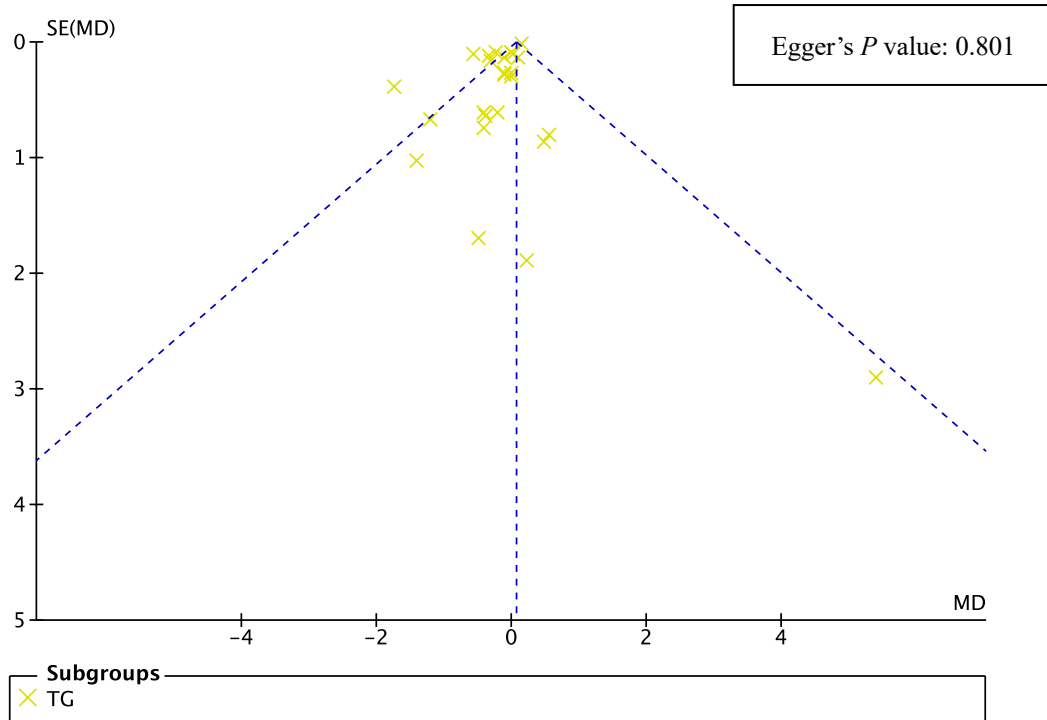


Figure S3-4-5. Funnel plot of RCTs investigating the effect of vitamin D supplementation on TG in participants with baseline 25-hydroxyvitamin D < 15.0 ng/mL.

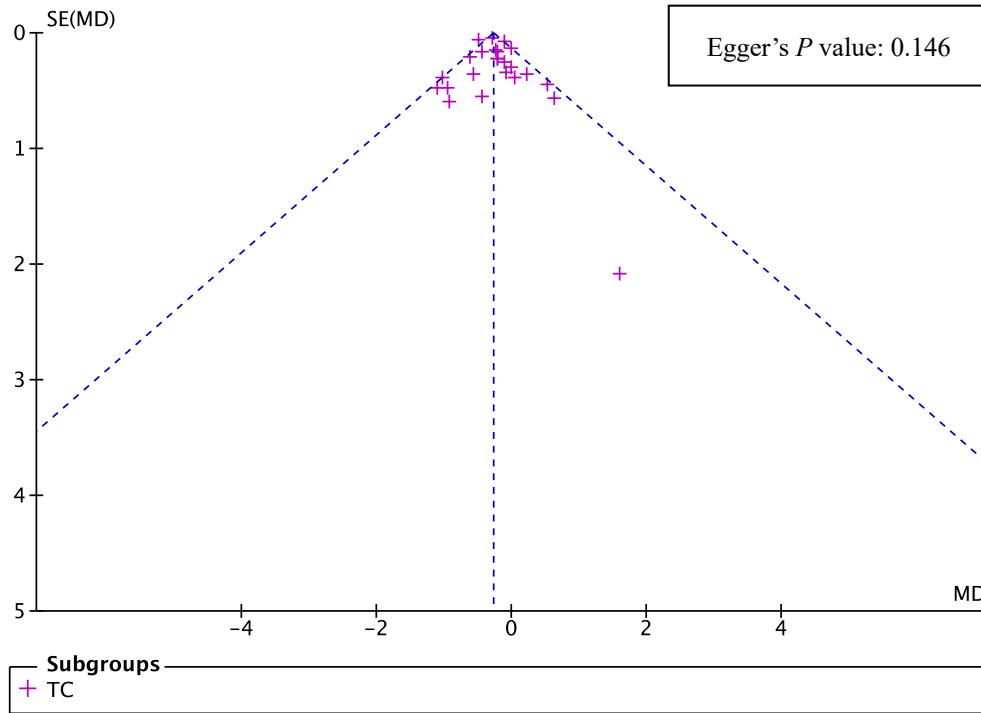


Figure S3-4-6. Funnel plot of RCTs investigating the effect of vitamin D supplementation on TC in participants with baseline 25-hydroxyvitamin D < 15.0 ng/mL.

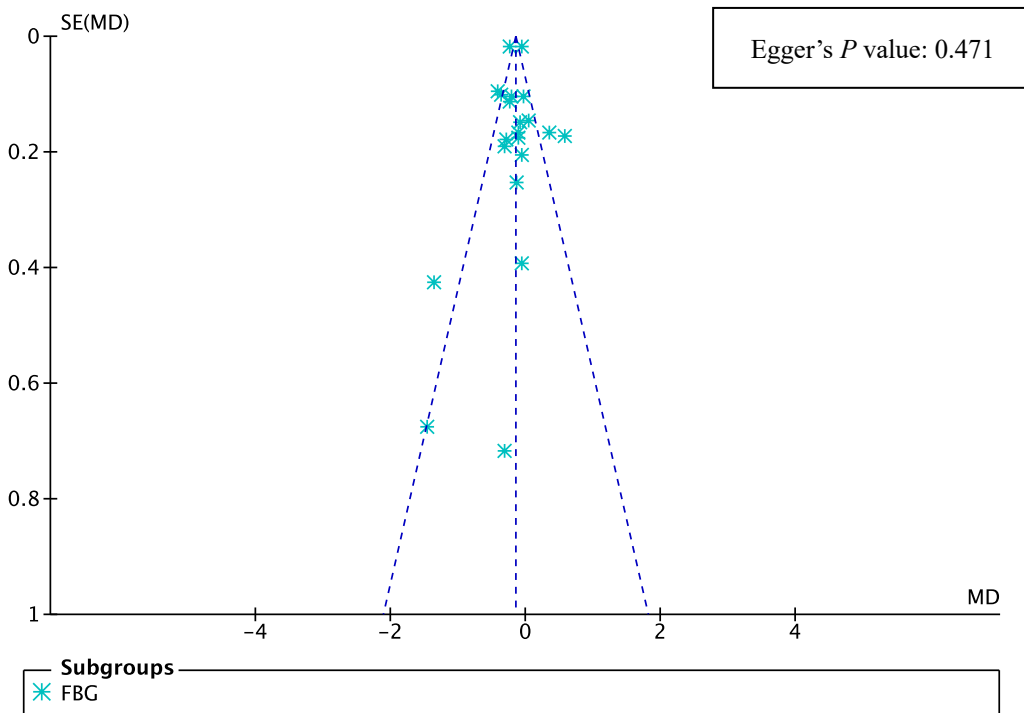


Figure S3-4-7. Funnel plot of RCTs investigating the effect of vitamin D supplementation on FBG in participants with baseline 25-hydroxyvitamin D < 15.0 ng/mL.

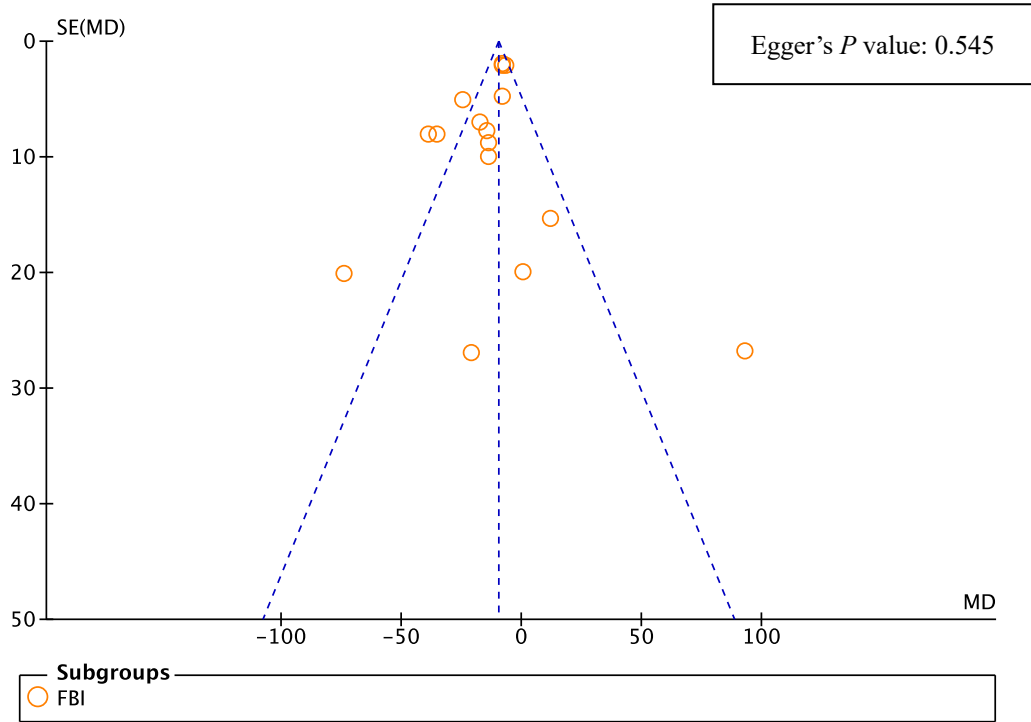


Figure S3-4-8. Funnel plot of RCTs investigating the effect of vitamin D supplementation on FBI in participants with baseline 25-hydroxyvitamin D < 15.0 ng/mL.

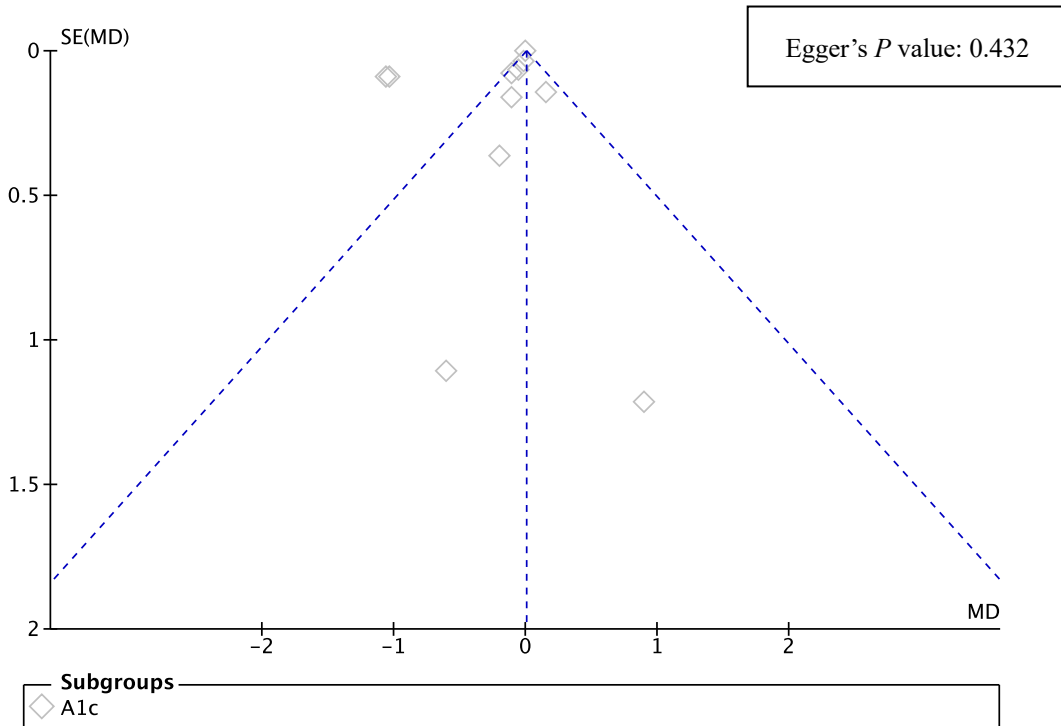


Figure S3-4-9. Funnel plot of RCTs investigating the effect of vitamin D supplementation on A1c in participants with baseline 25-hydroxyvitamin D < 15.0 ng/mL.

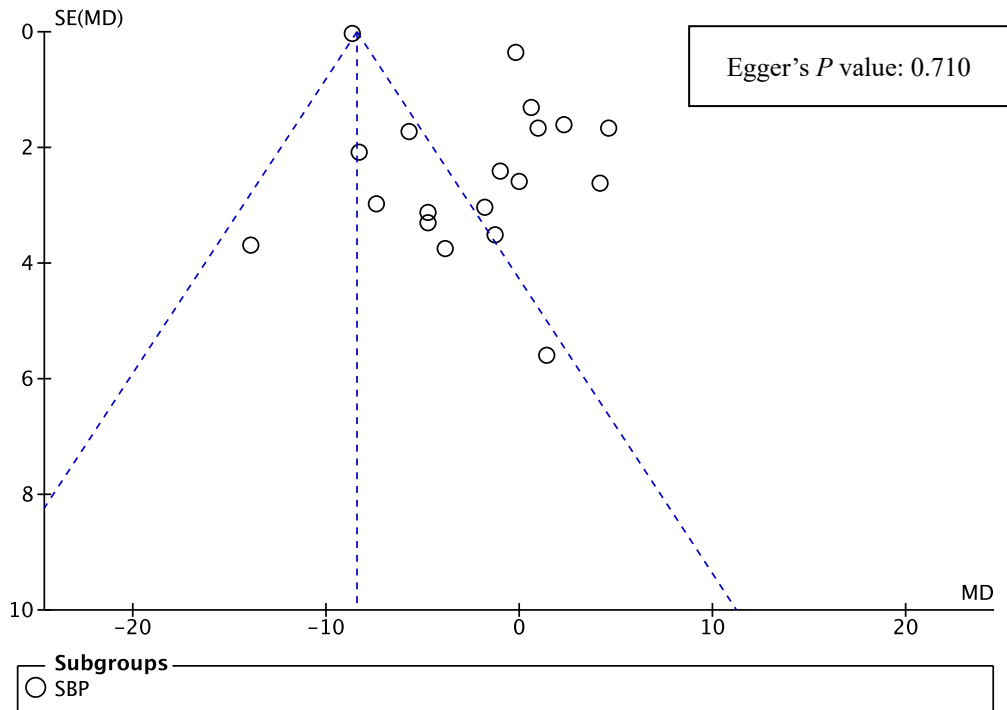


Figure S3-5-1. Funnel plot of RCTs investigating the effect of vitamin D supplementation on SBP in participants with baseline 25-hydroxyvitamin D \geq 15.0 ng/mL.

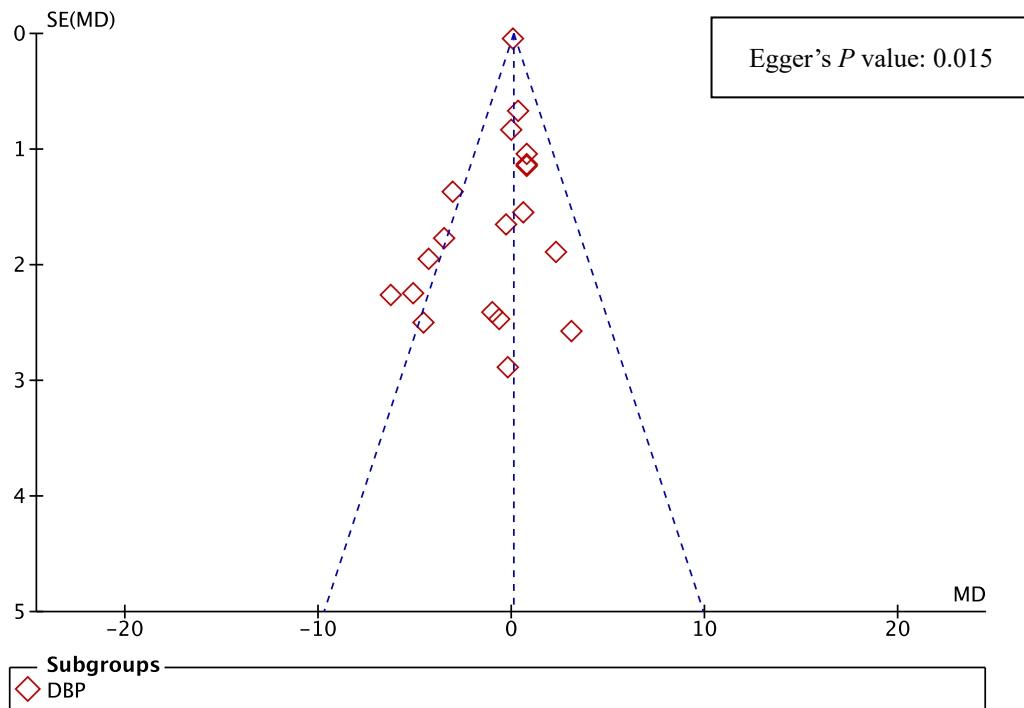


Figure S3-5-2 Funnel plot of RCTs investigating the effect of vitamin D supplementation on DBP in participants with baseline 25-hydroxyvitamin D \geq 15.0 ng/mL.

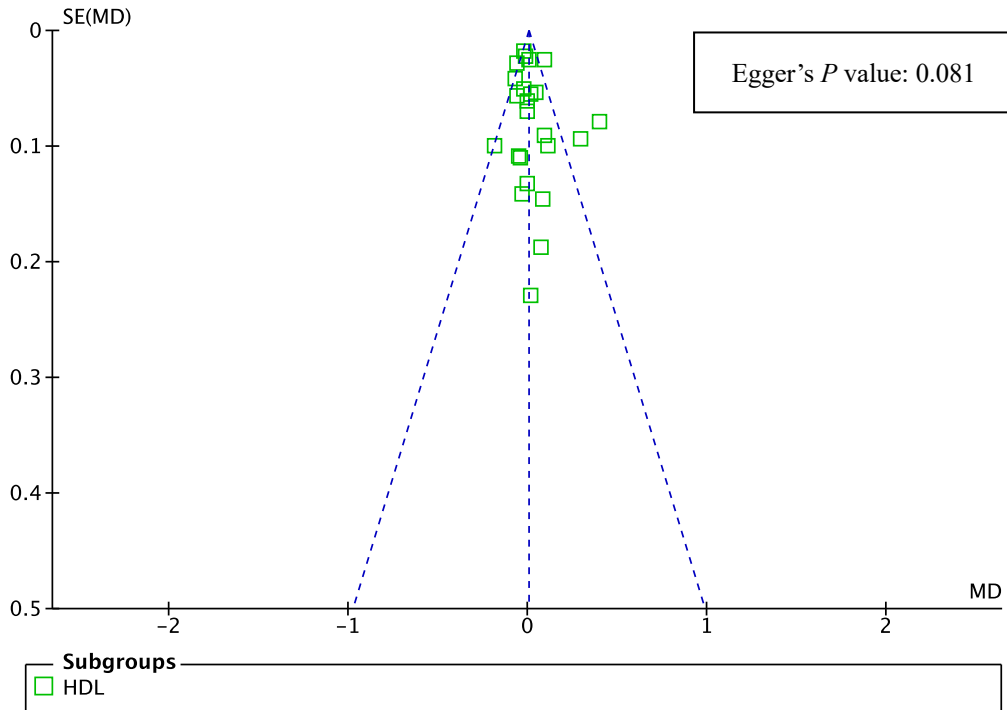


Figure S3-5-3. Funnel plot of RCTs investigating the effect of vitamin D supplementation on HDL-C in participants with baseline 25-hydroxyvitamin D \geq 15.0 ng/mL.

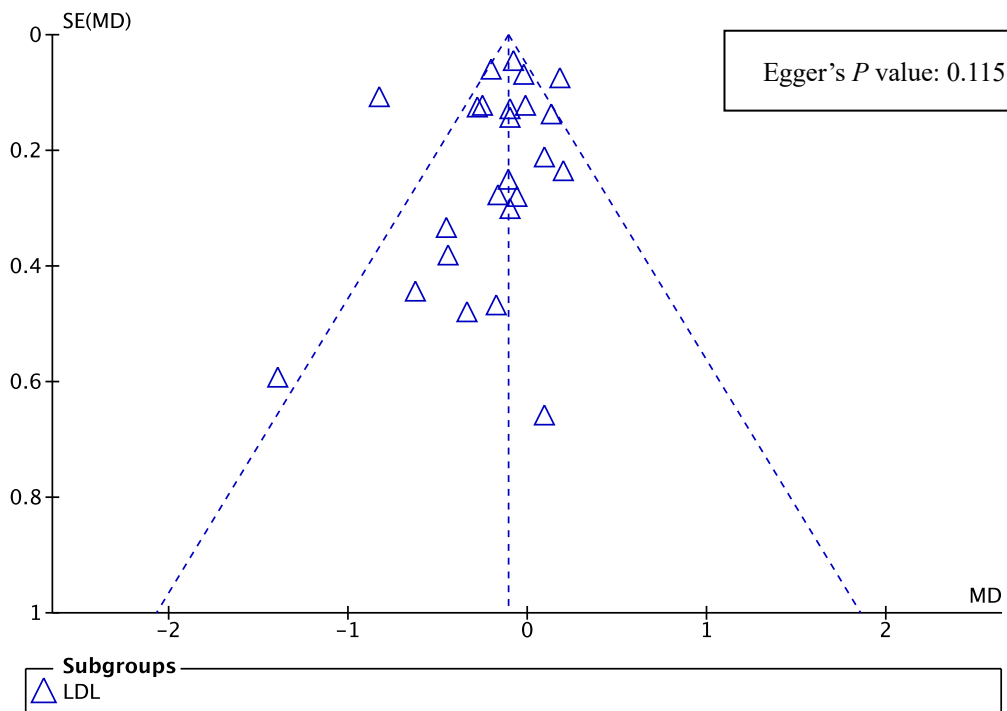


Figure S3-5-4. Funnel plot of RCTs investigating the effect of vitamin D supplementation on LDL-C in participants with baseline 25-hydroxyvitamin D \geq 15.0 ng/mL.

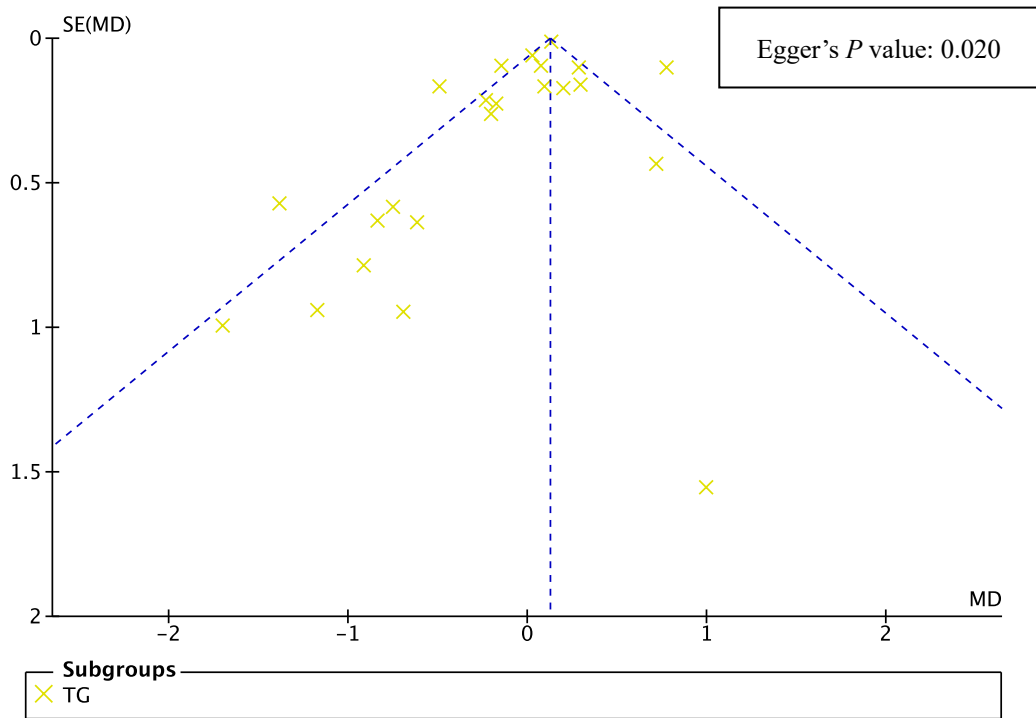


Figure S3-5-5. Funnel plot of RCTs investigating the effect of vitamin D supplementation on TG in participants with baseline 25-hydroxyvitamin D \geq 15.0 ng/mL.

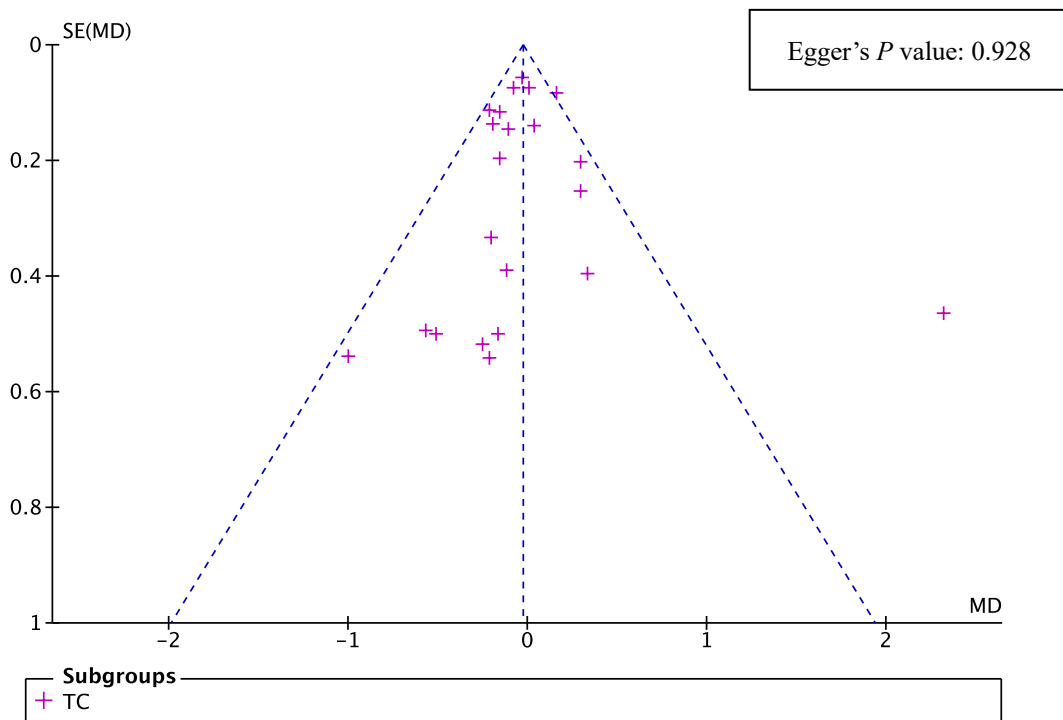


Figure S3-5-6. Funnel plot of RCTs investigating the effect of vitamin D supplementation on TC in participants with baseline 25-hydroxyvitamin D \geq 15.0 ng/mL.

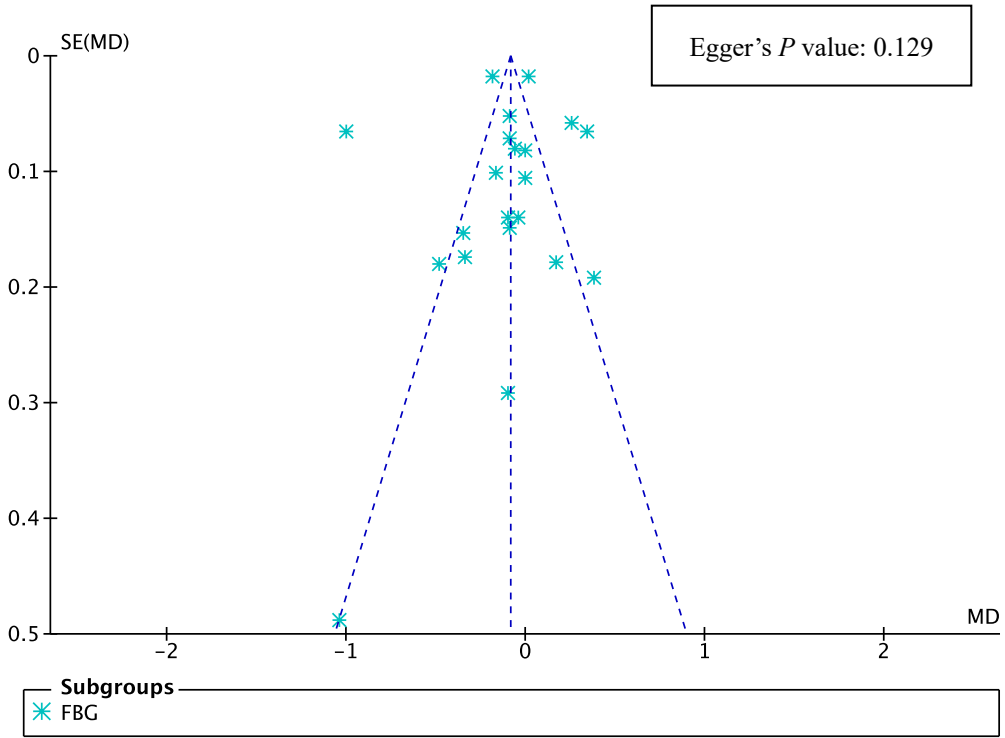


Figure S3-5-7. Funnel plot of RCTs investigating the effect of vitamin D supplementation on FBG in participants with baseline 25-hydroxyvitamin D \geq 15.0 ng/mL.

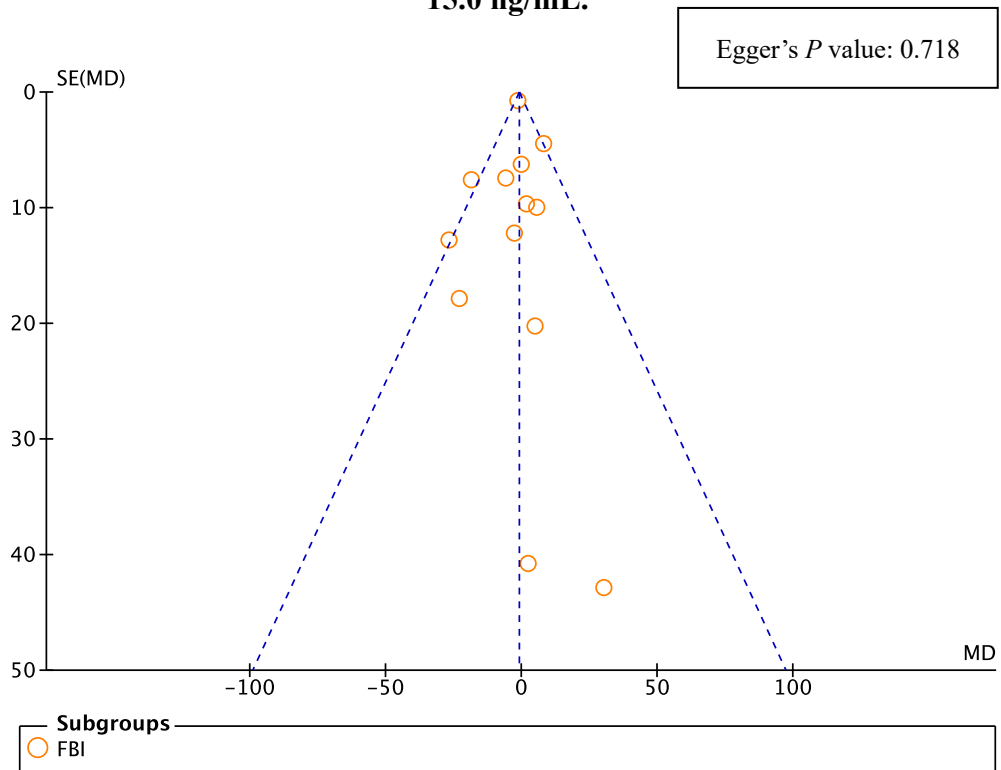


Figure S3-5-8. Funnel plot of RCTs investigating the effect of vitamin D supplementation on FBI in participants with baseline 25-hydroxyvitamin D \geq 15.0 ng/mL.

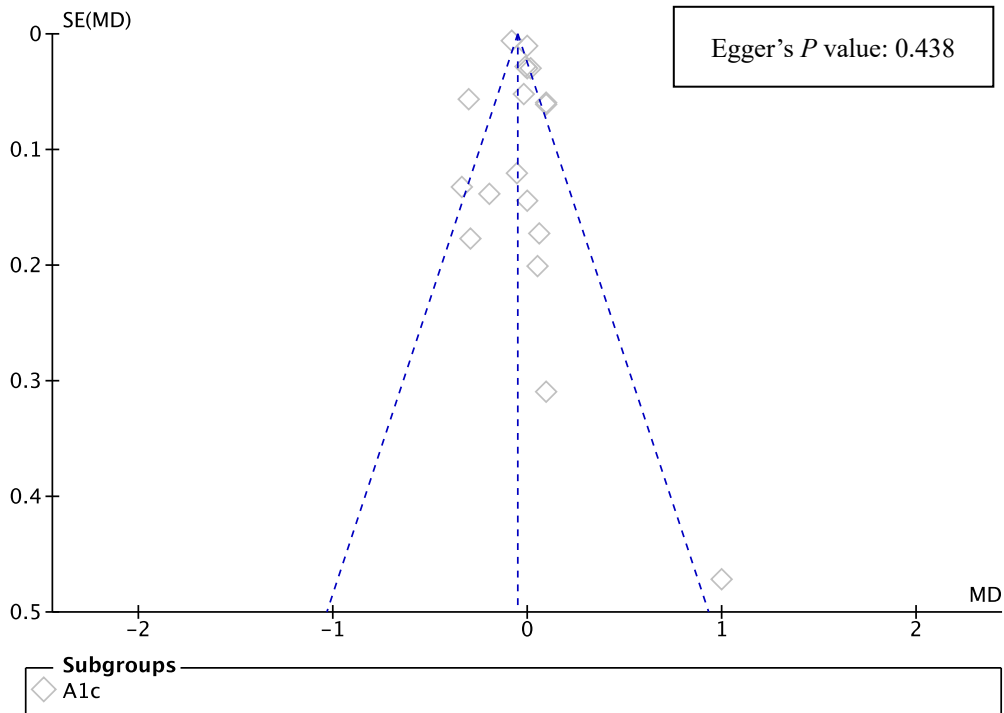


Figure S3-5-9. Funnel plot of RCTs investigating the effect of vitamin D supplementation on A1C in participants with baseline 25-hydroxyvitamin D \geq 15.0 ng/mL.

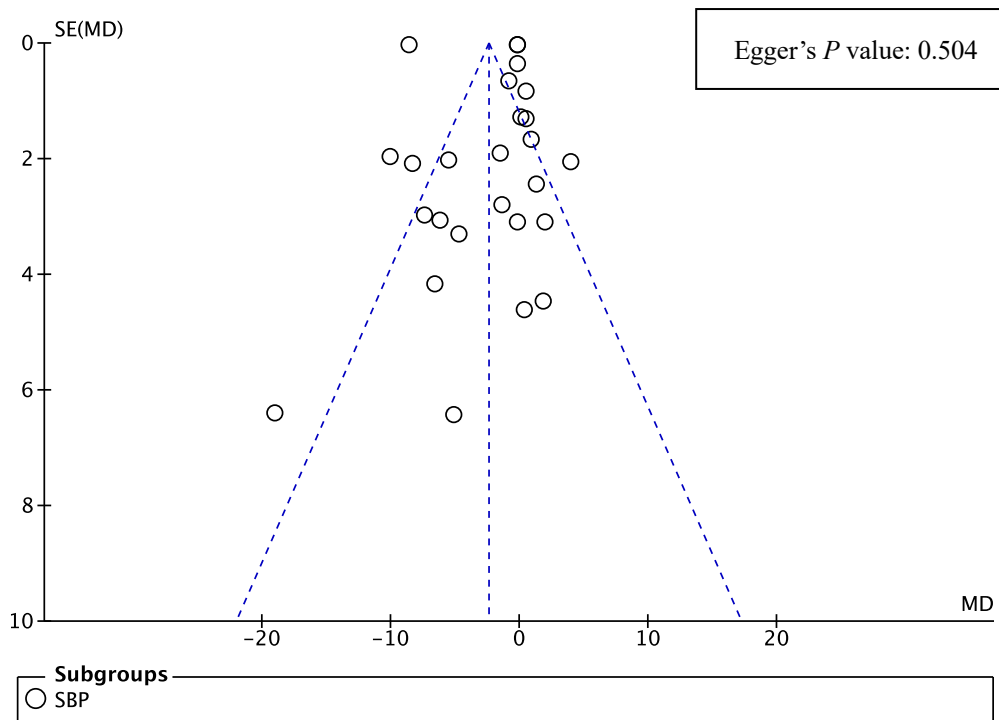


Figure S3-6-1. Funnel plot of RCTs investigating the effect of vitamin D supplementation on SBP in participants with BMI $<$ 30.0 kg/m².

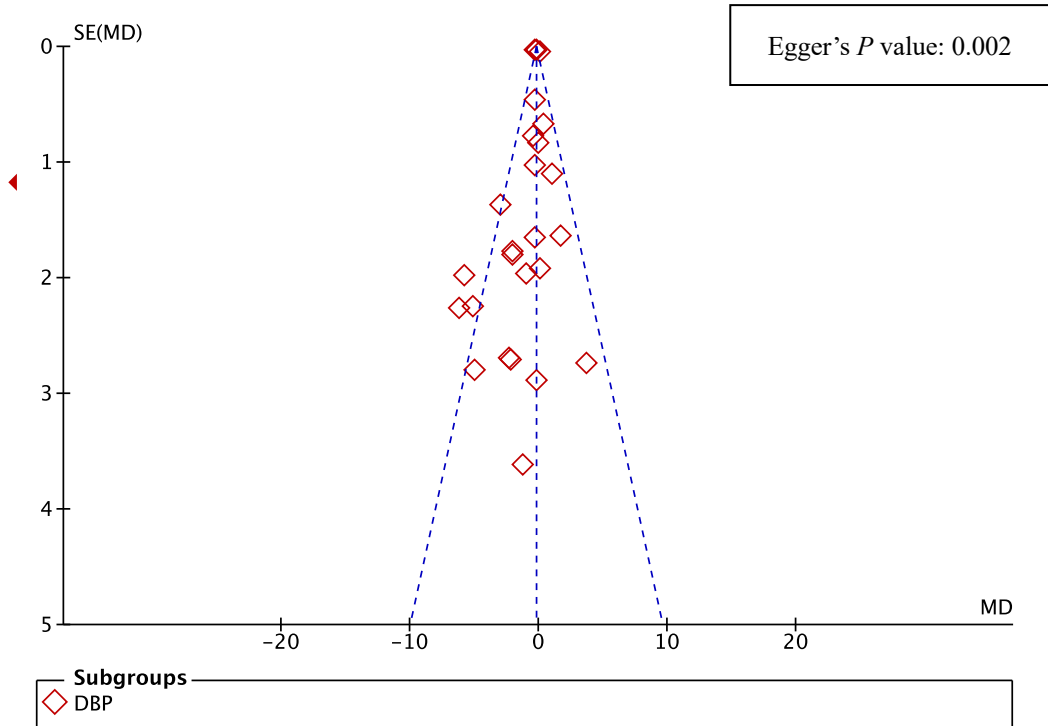


Figure S3-6-2 Funnel plot of RCTs investigating the effect of vitamin D supplementation on DBP in participants with BMI < 30.0 kg/m².

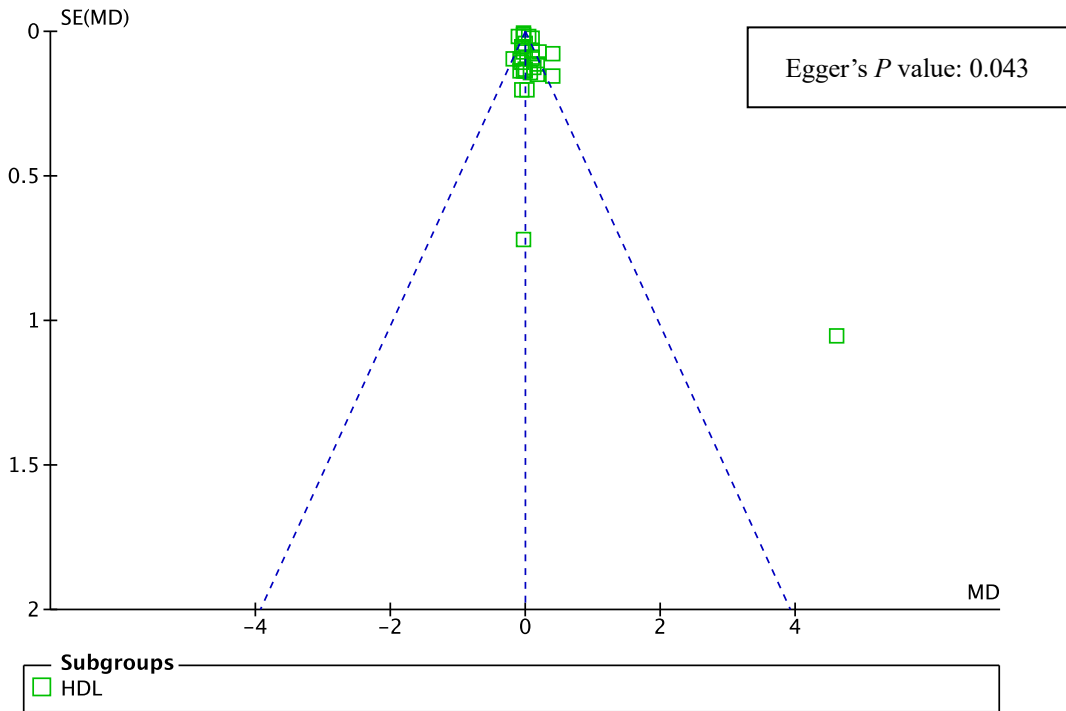


Figure S3-6-3. Funnel plot of RCTs investigating the effect of vitamin D supplementation on HDL-C in participants with BMI < 30.0 kg/m².

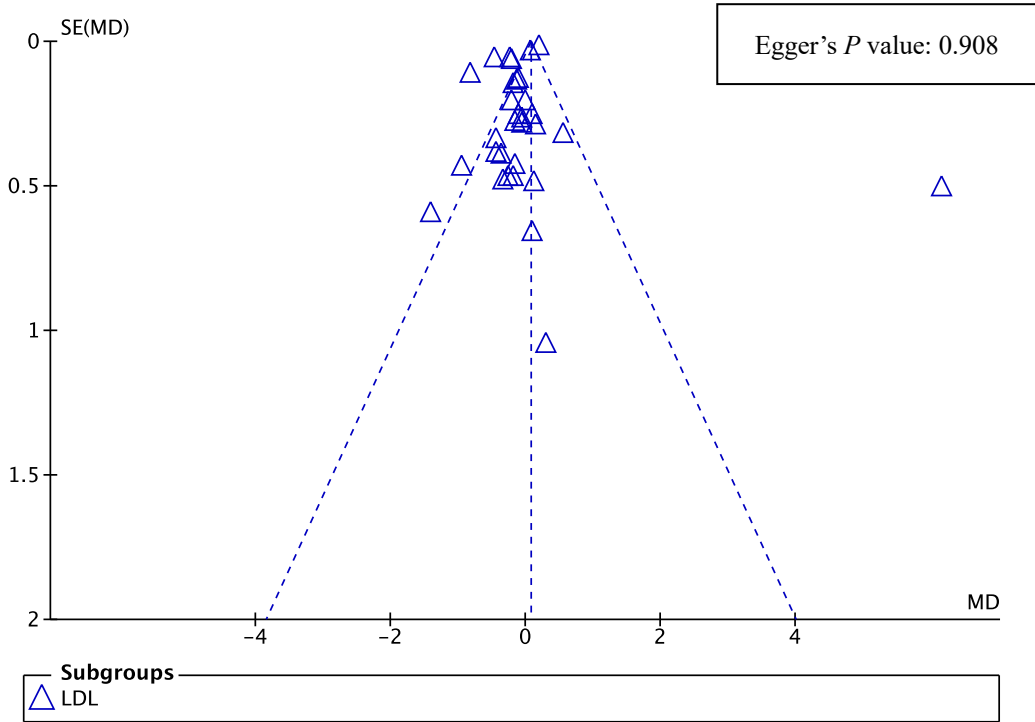


Figure S3-6-4. Funnel plot of RCTs investigating the effect of vitamin D supplementation on LDL-C in participants with BMI < 30.0 kg/m².

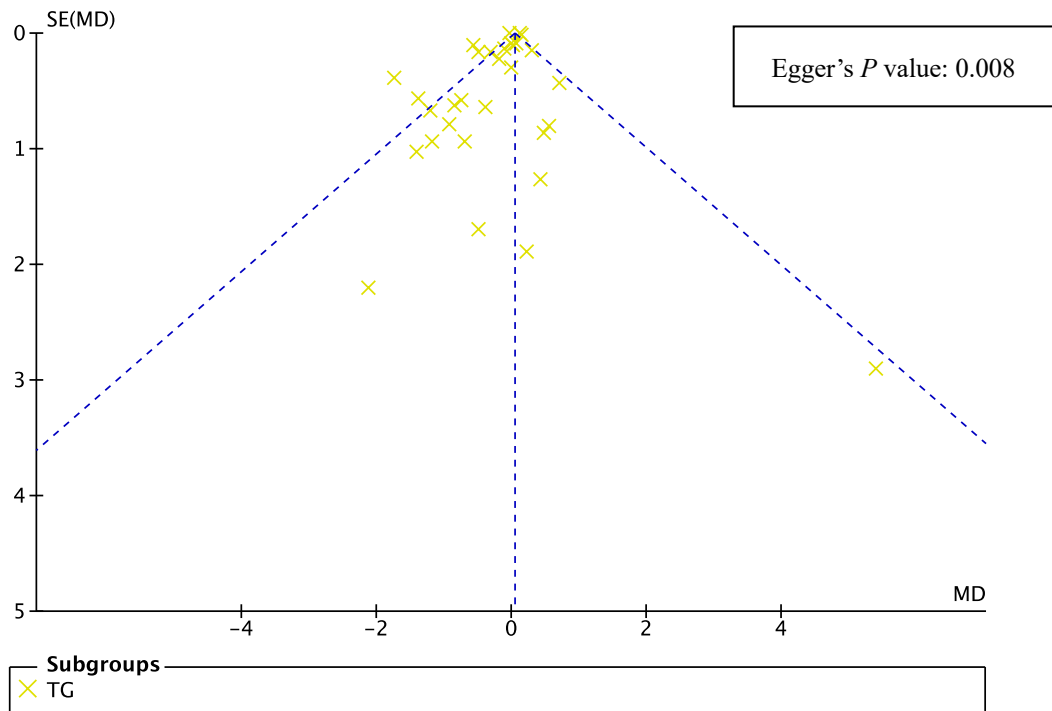


Figure S3-6-5. Funnel plot of RCTs investigating the effect of vitamin D supplementation on TG in participants with BMI < 30.0 kg/m².

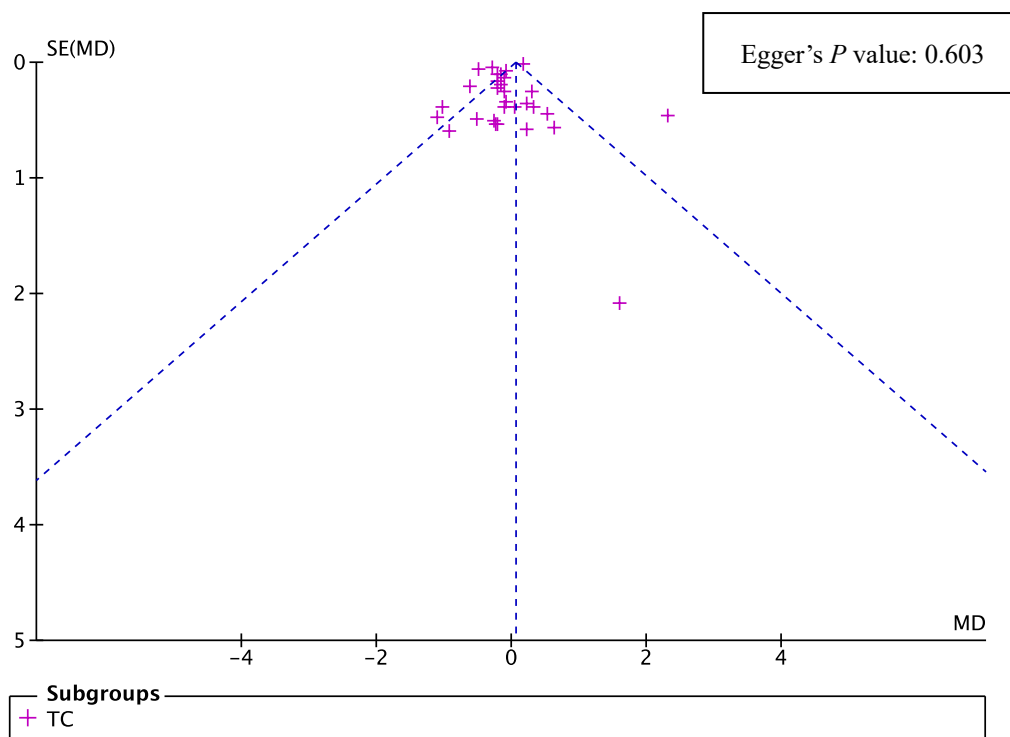


Figure S3-6-6. Funnel plot of RCTs investigating the effect of vitamin D supplementation on TC in participants with BMI < 30.0 kg/m².

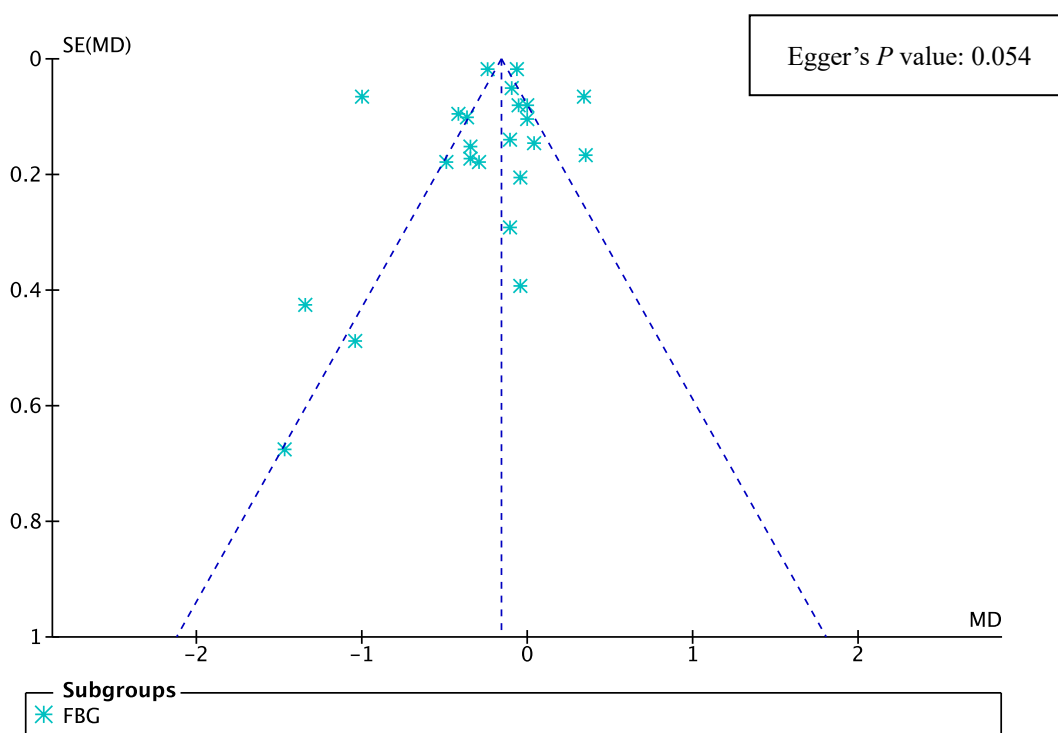


Figure S3-6-7. Funnel plot of RCTs investigating the effect of vitamin D supplementation on FBG in participants with BMI < 30.0 kg/m².

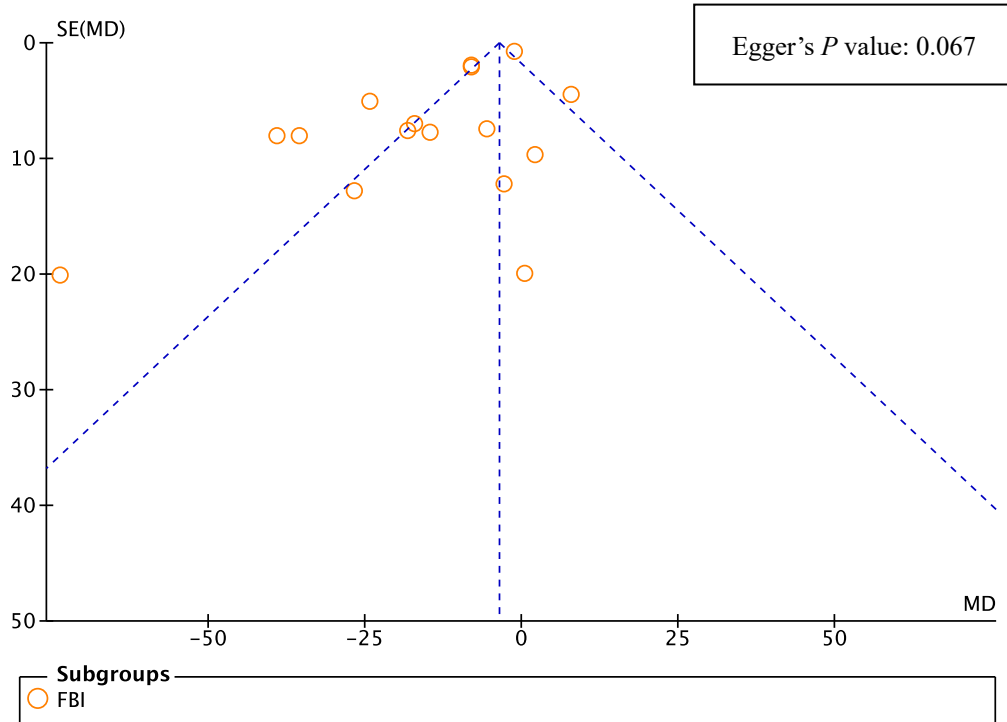


Figure S3-6-8. Funnel plot of RCTs investigating the effect of vitamin D supplementation on FBI in participants with BMI < 30.0 kg/m².

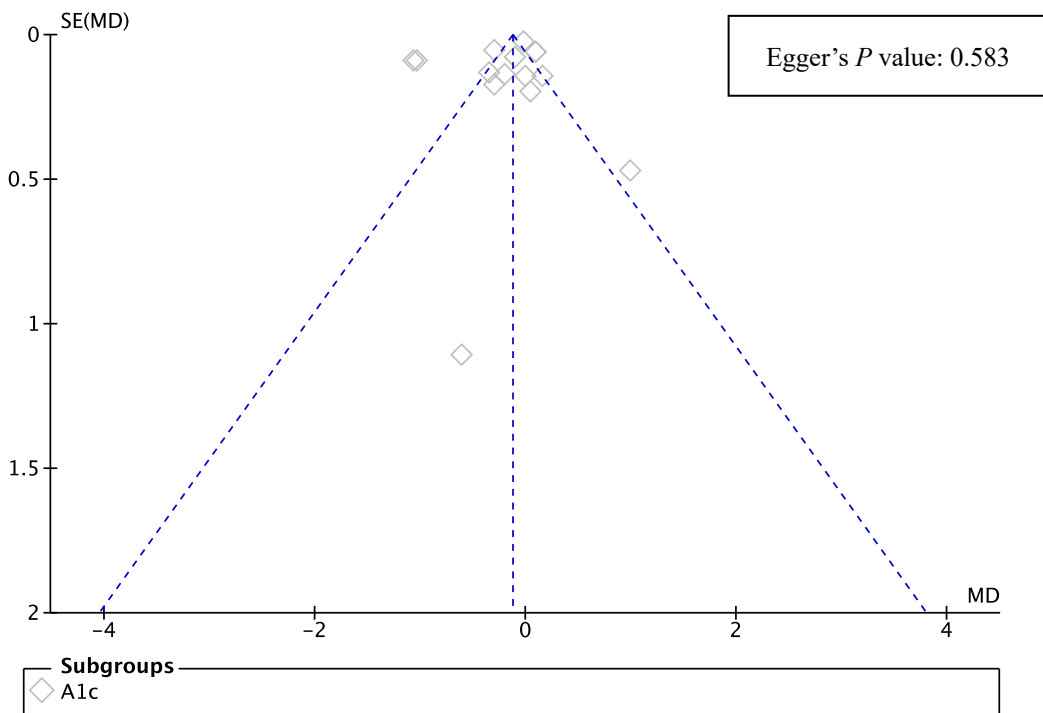


Figure S3-6-9. Funnel plot of RCTs investigating the effect of vitamin D supplementation on A1c in participants with BMI < 30.0 kg/m².

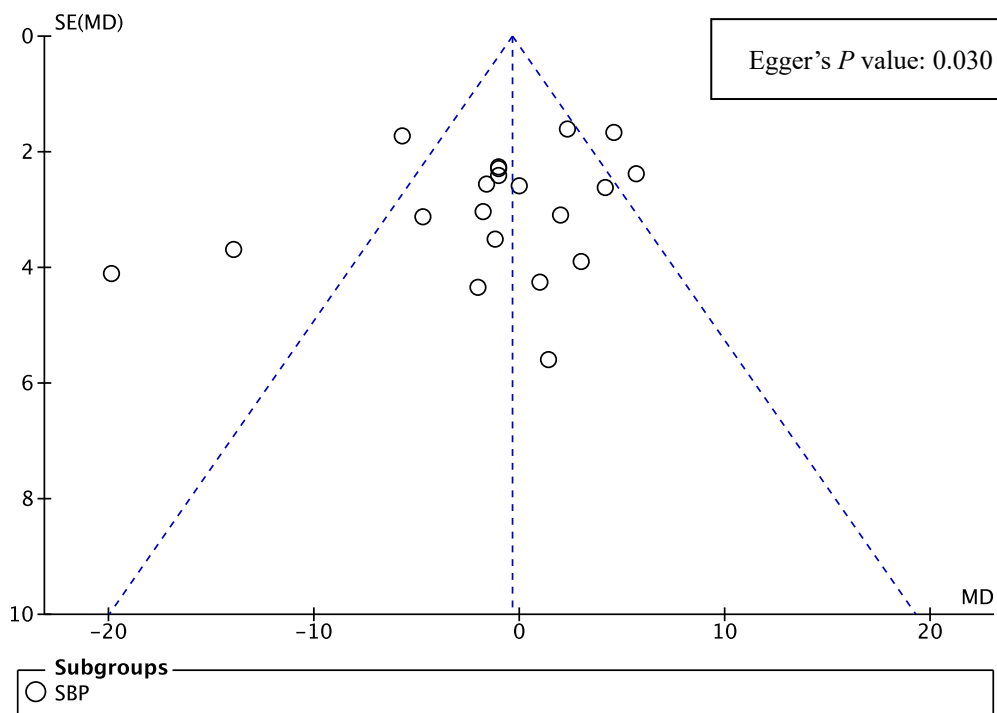


Figure S3-7-1. Funnel plot of RCTs investigating the effect of vitamin D supplementation on SBP in participants with BMI ≥ 30.0 kg/m².

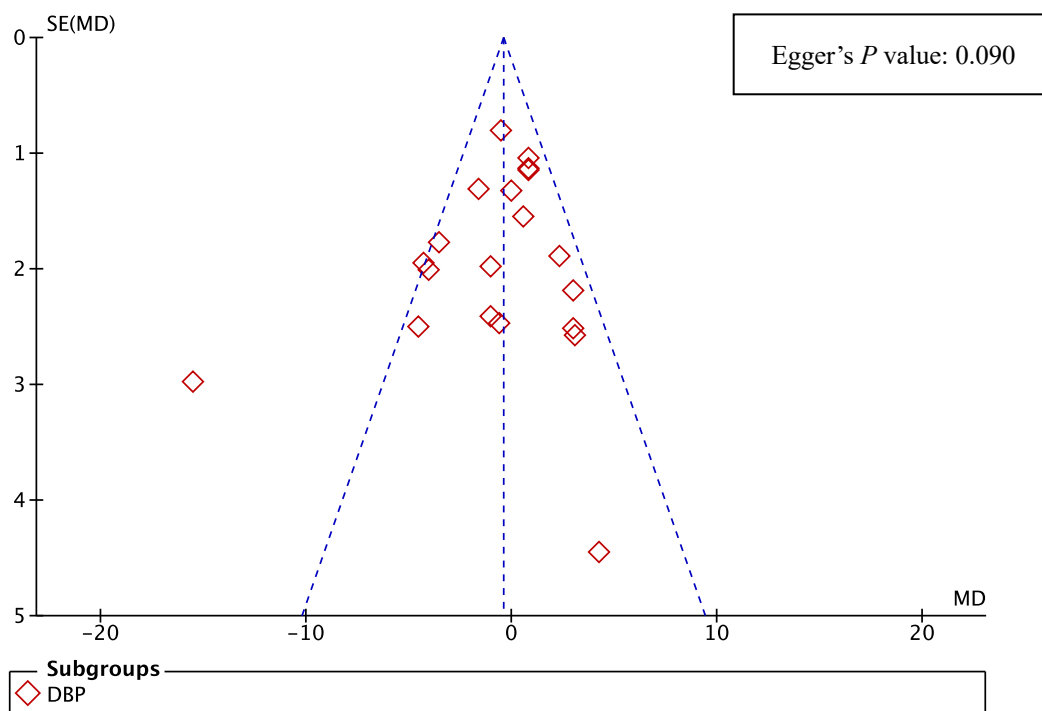


Figure S3-7-2 Funnel plot of RCTs investigating the effect of vitamin D supplementation on DBP in participants with BMI ≥ 30.0 kg/m².

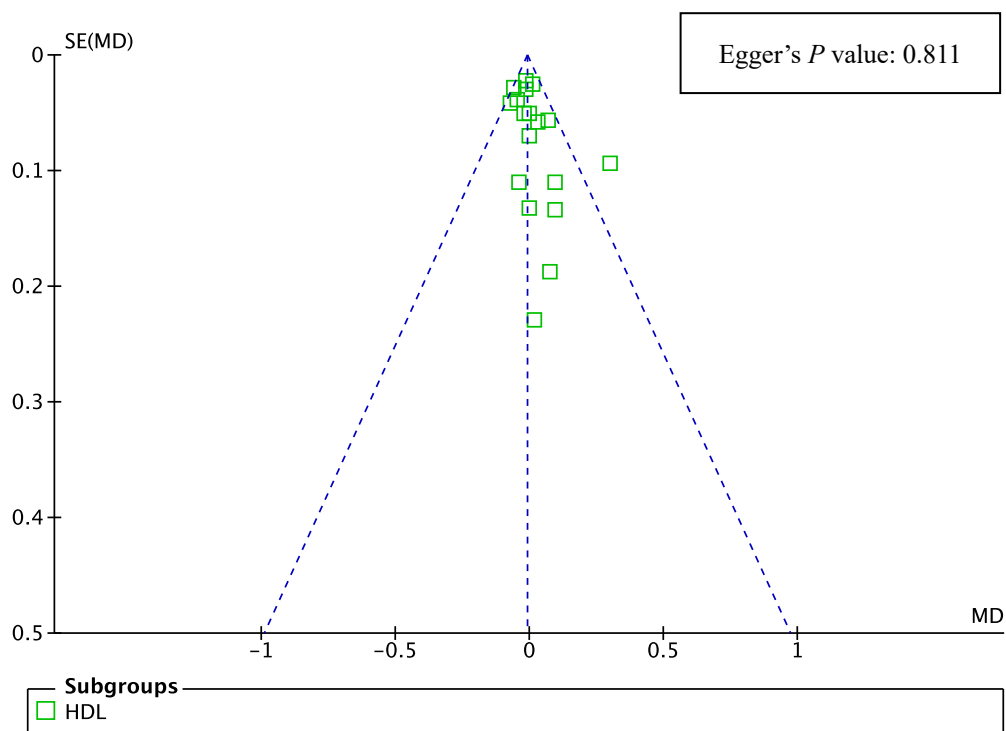


Figure S3-7-3. Funnel plot of RCTs investigating the effect of vitamin D supplementation on HDL-C in participants with BMI ≥ 30.0 kg/m².

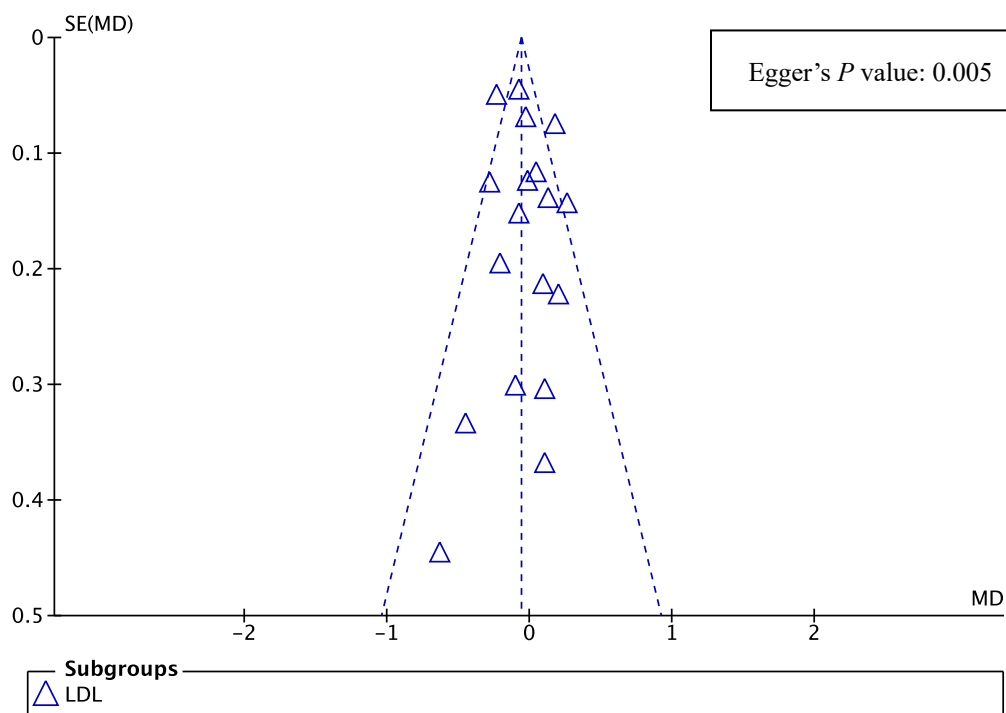


Figure S3-7-4. Funnel plot of RCTs investigating the effect of vitamin D supplementation on LDL-C in participants with BMI ≥ 30.0 kg/m².

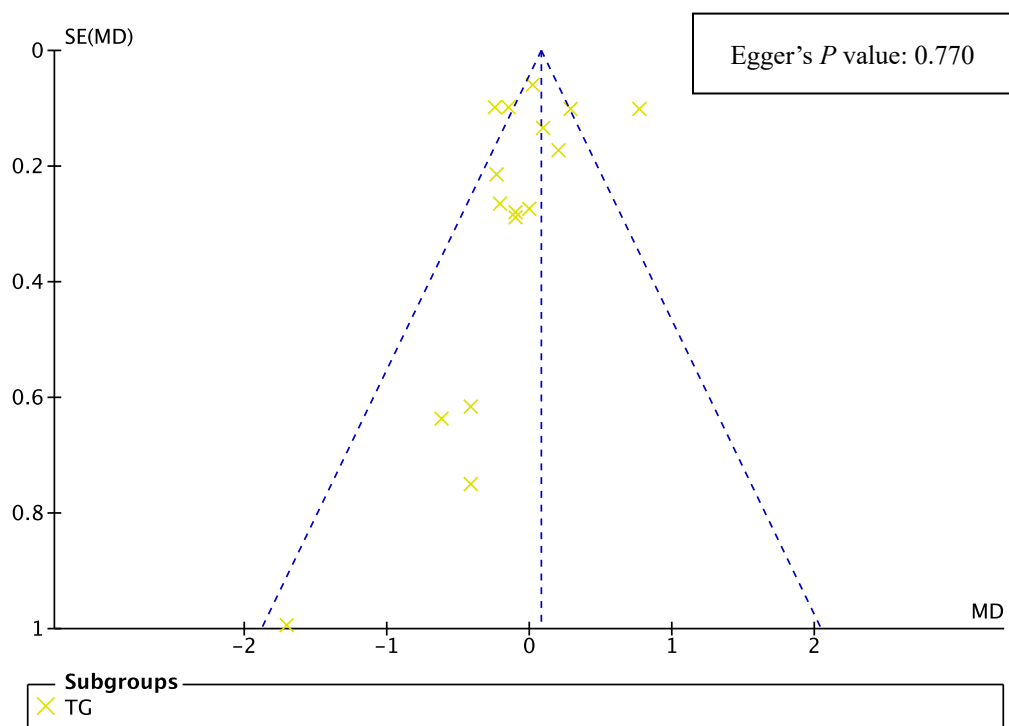


Figure S3-7-5. Funnel plot of RCTs investigating the effect of vitamin D supplementation on TG in participants with BMI ≥ 30.0 kg/m².

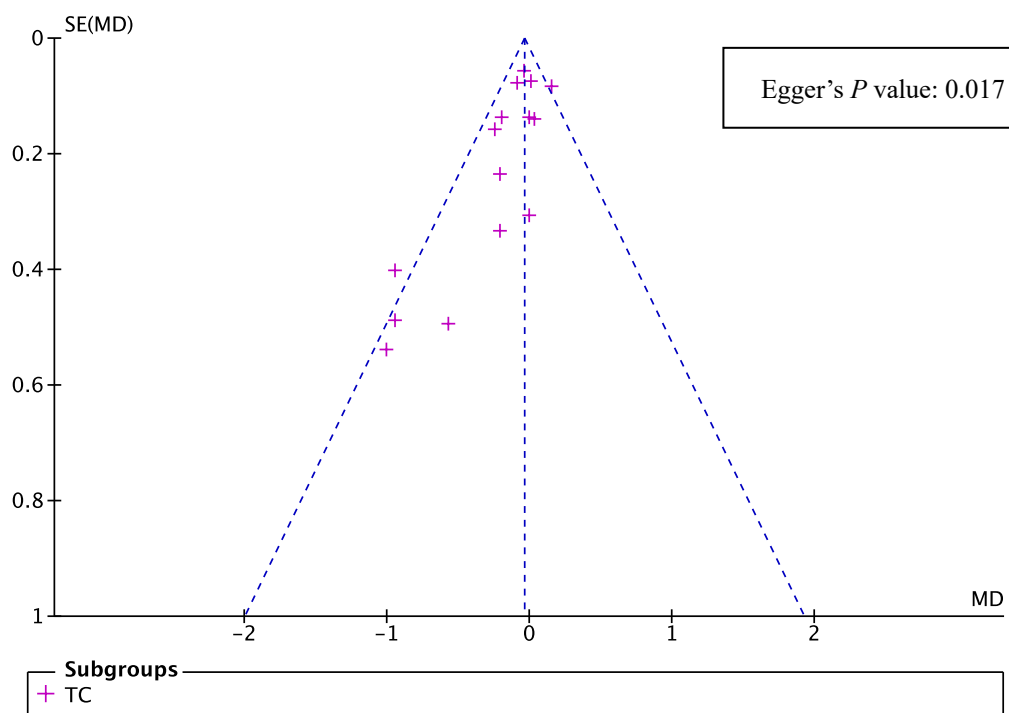


Figure S3-7-6. Funnel plot of RCTs investigating the effect of vitamin D supplementation on TC in participants with BMI ≥ 30.0 kg/m².

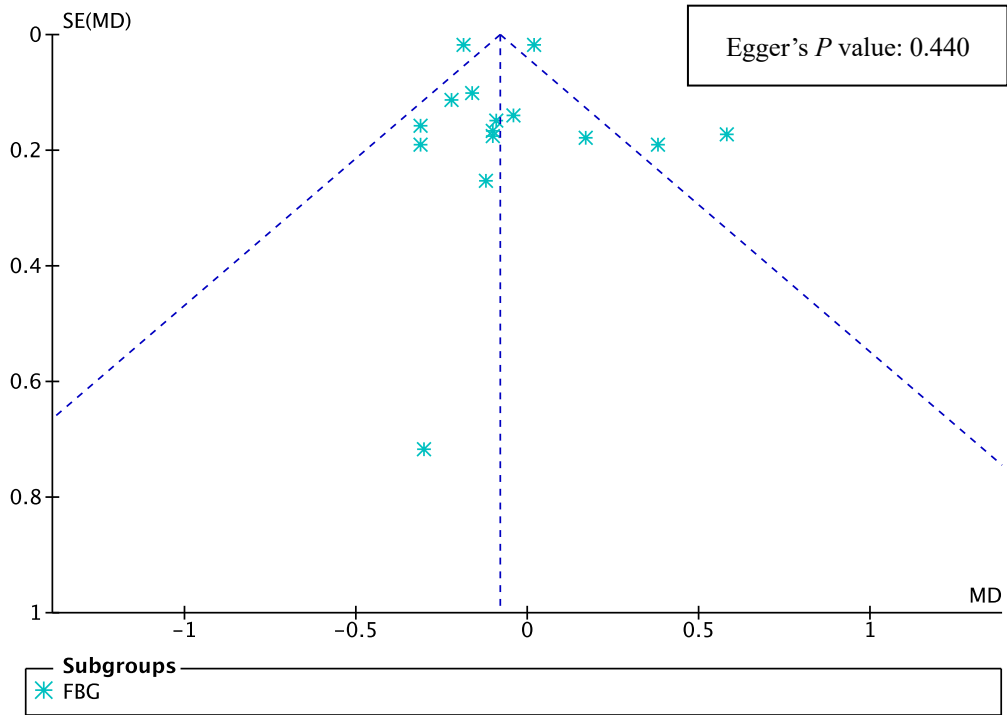


Figure S3-7-7. Funnel plot of RCTs investigating the effect of vitamin D supplementation on FBG in participants with BMI ≥ 30.0 kg/m².

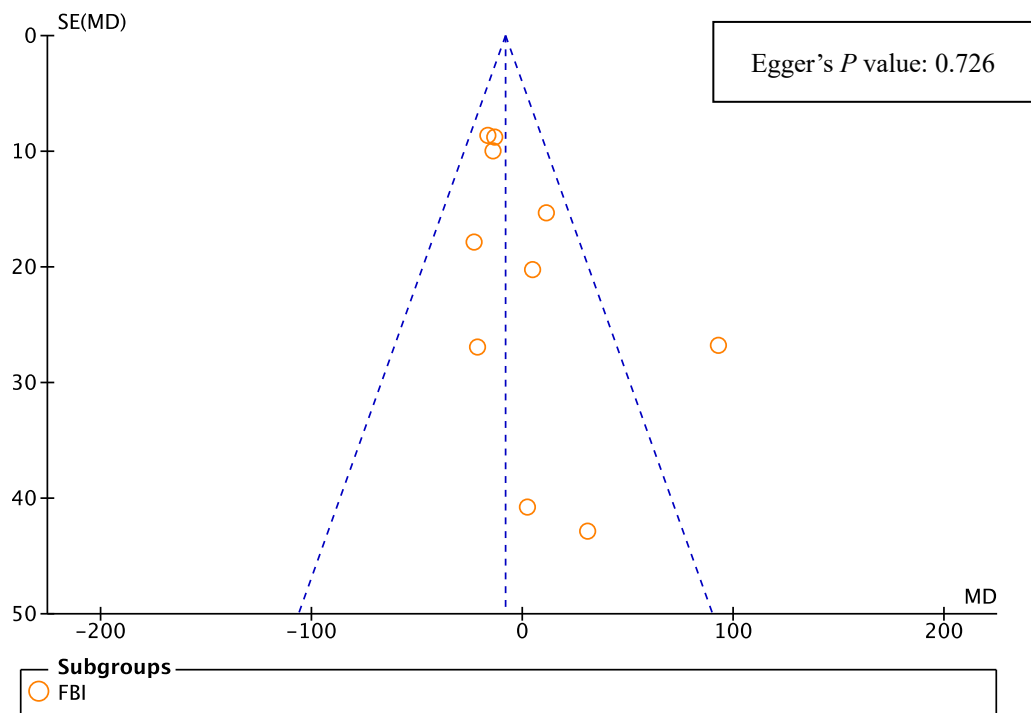


Figure S3-7-8. Funnel plot of RCTs investigating the effect of vitamin D supplementation on FBI in participants with BMI ≥ 30.0 kg/m².

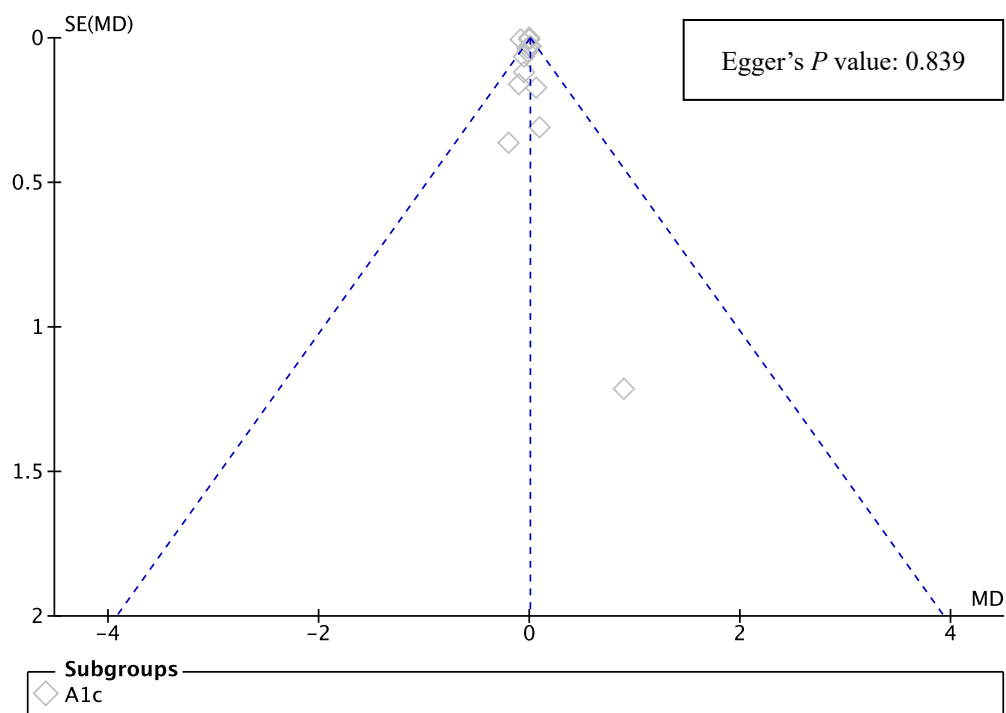


Figure S3-7-9. Funnel plot of RCTs investigating the effect of vitamin D supplementation on A1C in participants with BMI ≥ 30.0 kg/m².

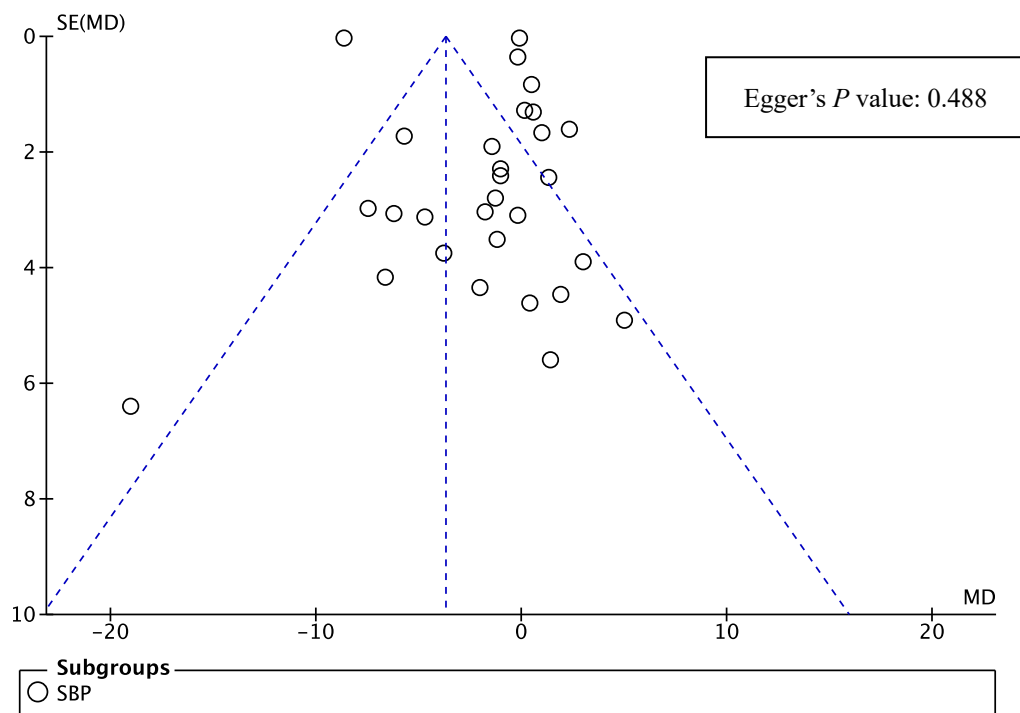


Figure S3-8-1. Funnel plot of RCTs investigating the effect of vitamin D supplementation on SBP in participants with Vitamin D supplementation dose < 3320 IU.

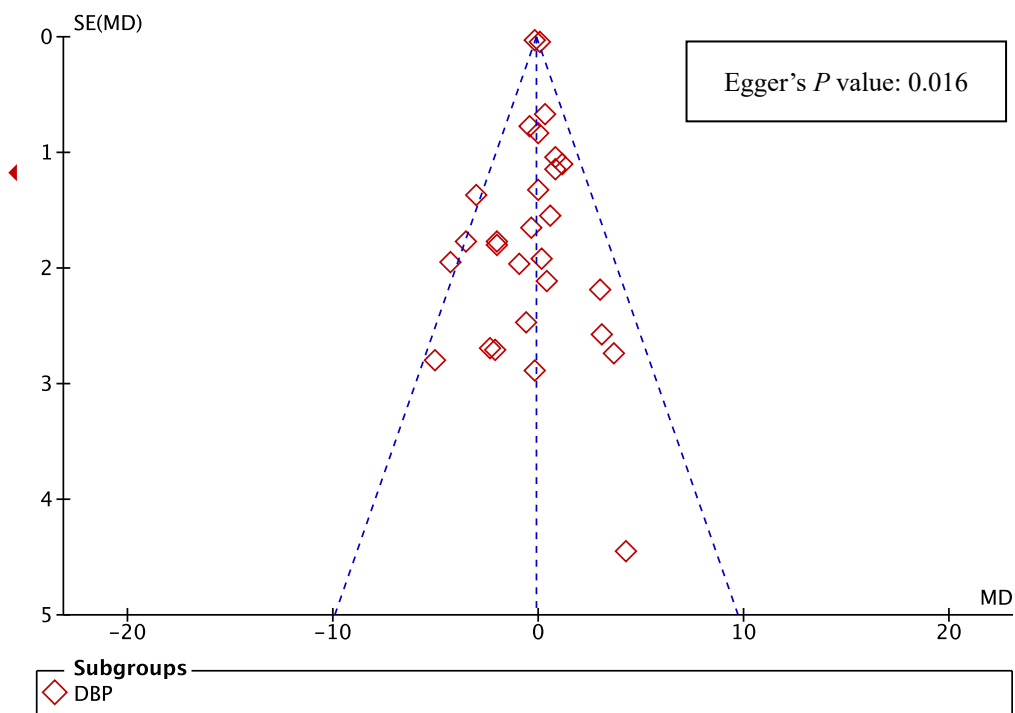


Figure S3-8-2 Funnel plot of RCTs investigating the effect of vitamin D supplementation on DBP in participants with Vitamin D supplementation dose < 3320 IU.

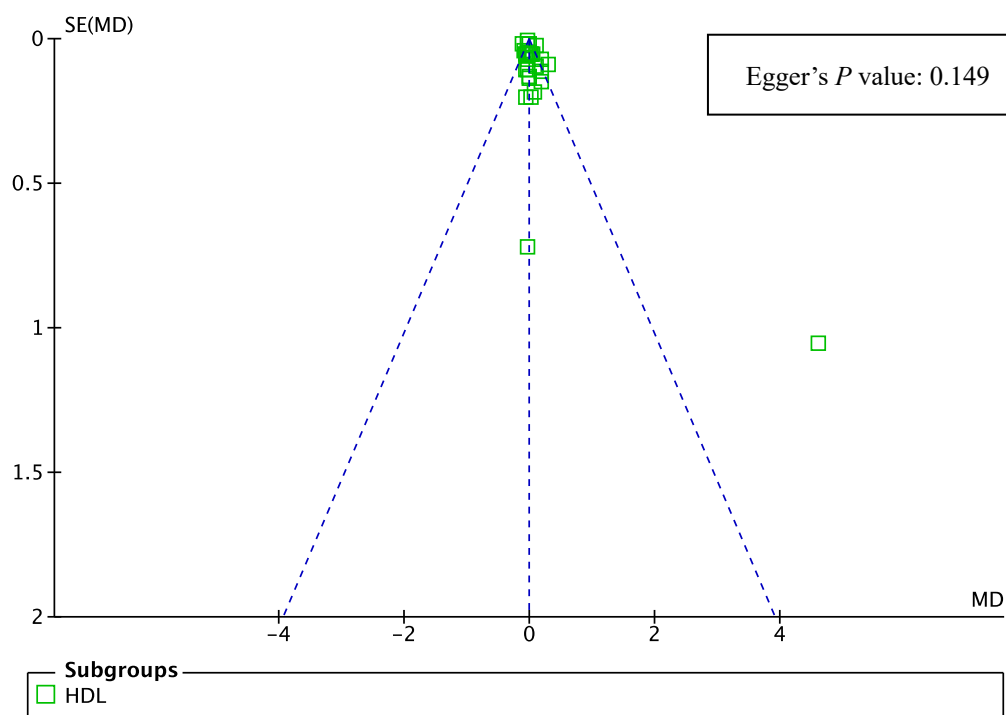


Figure S3-8-3. Funnel plot of RCTs investigating the effect of vitamin D supplementation on HDL-C in participants with Vitamin D supplementation dose < 3320 IU.

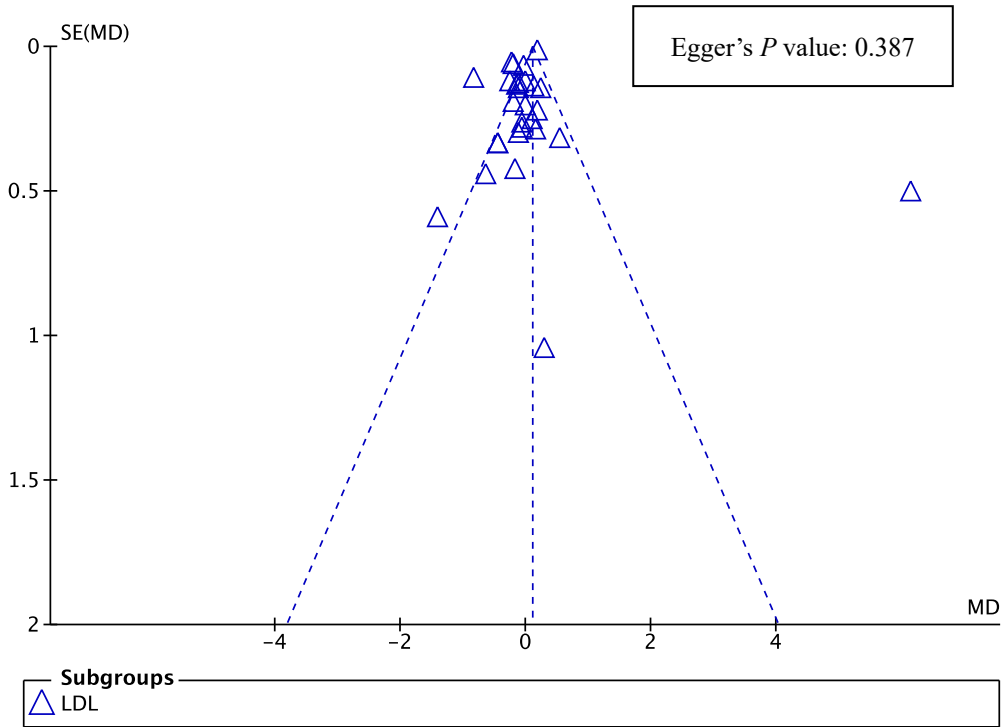


Figure S3-8-4. Funnel plot of RCTs investigating the effect of vitamin D supplementation on LDL-C in participants with Vitamin D supplementation dose < 3320 IU.

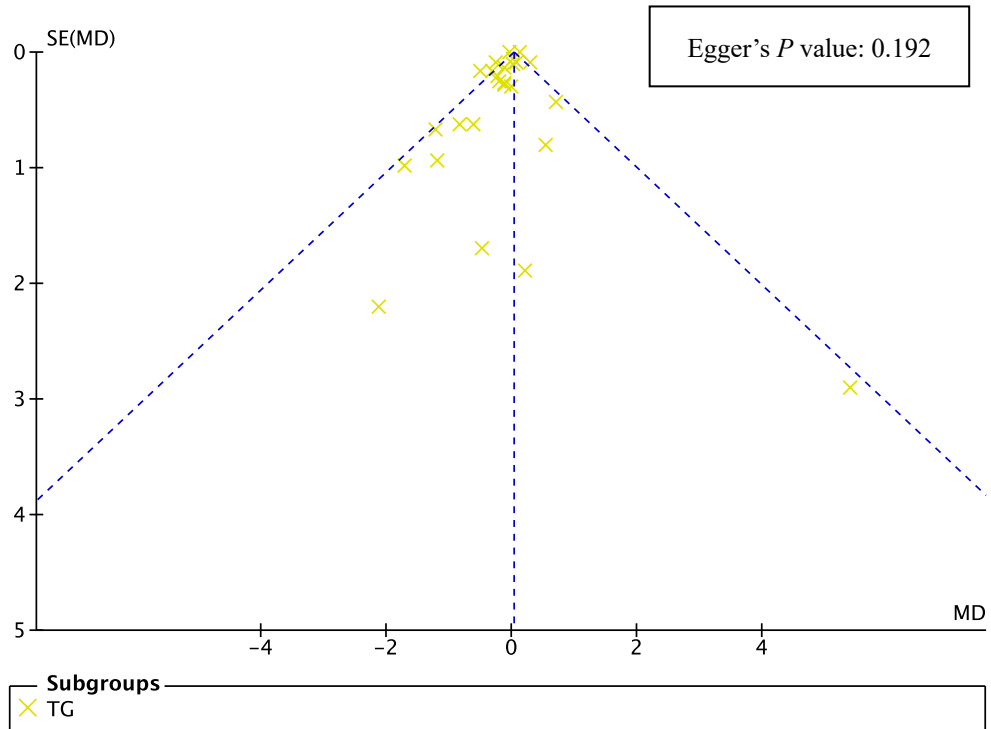


Figure S3-8-5. Funnel plot of RCTs investigating the effect of vitamin D supplementation on TG in participants with Vitamin D supplementation dose < 3320 IU.

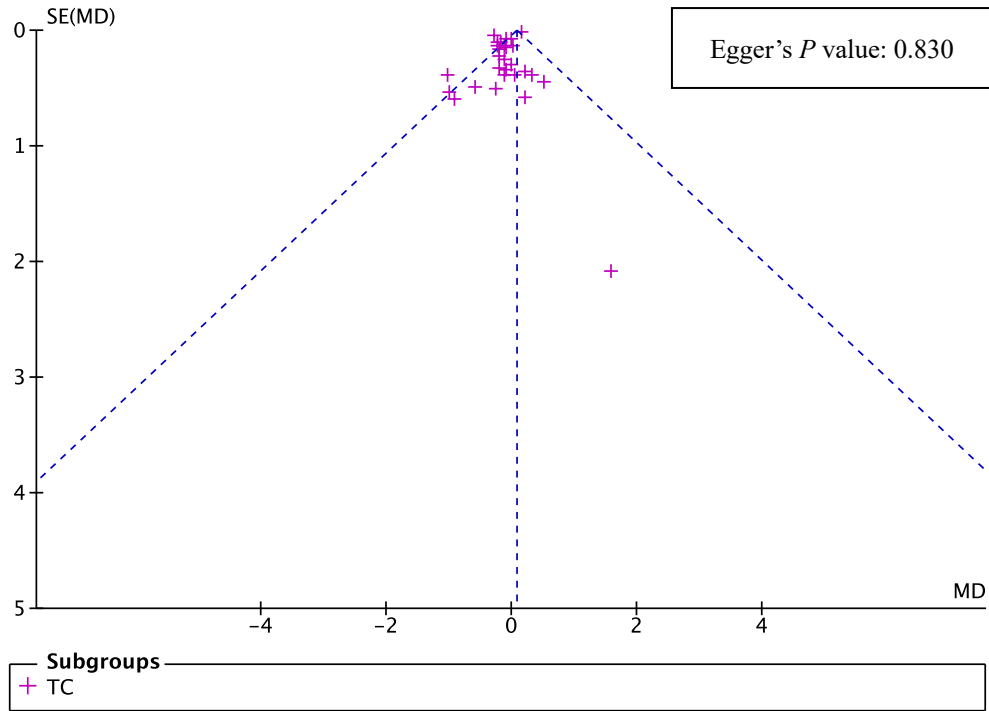


Figure S3-8-6. Funnel plot of RCTs investigating the effect of vitamin D supplementation on TC in participants with Vitamin D supplementation dose < 3320 IU.

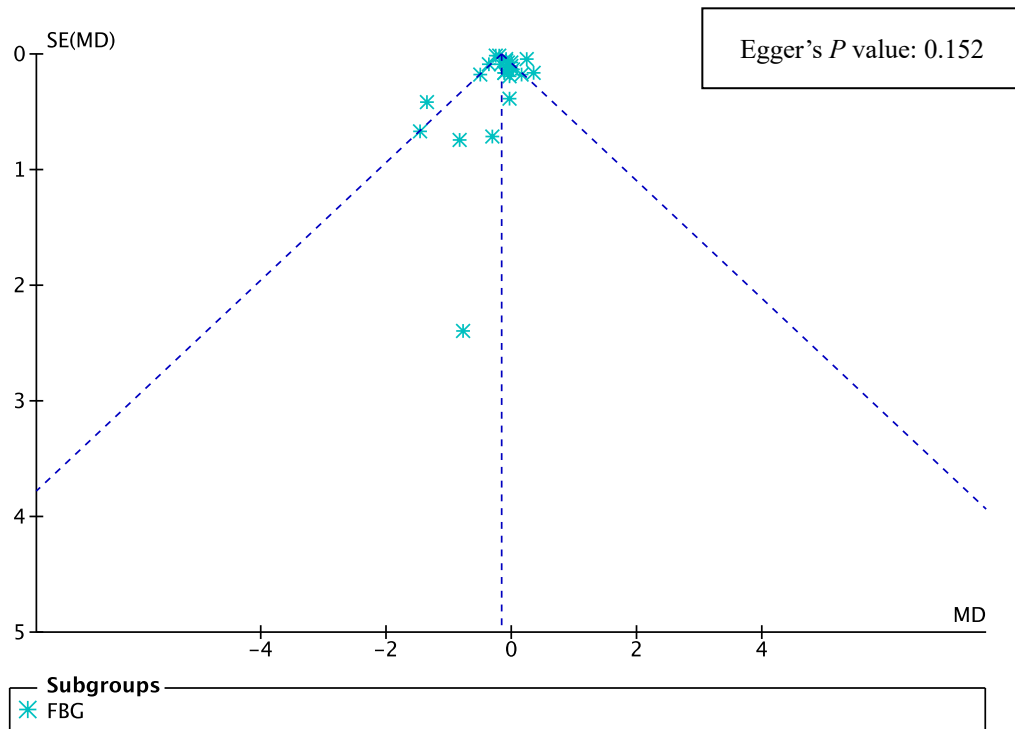


Figure S3-8-7. Funnel plot of RCTs investigating the effect of vitamin D supplementation on FBG in participants with Vitamin D supplementation dose < 3320 IU.

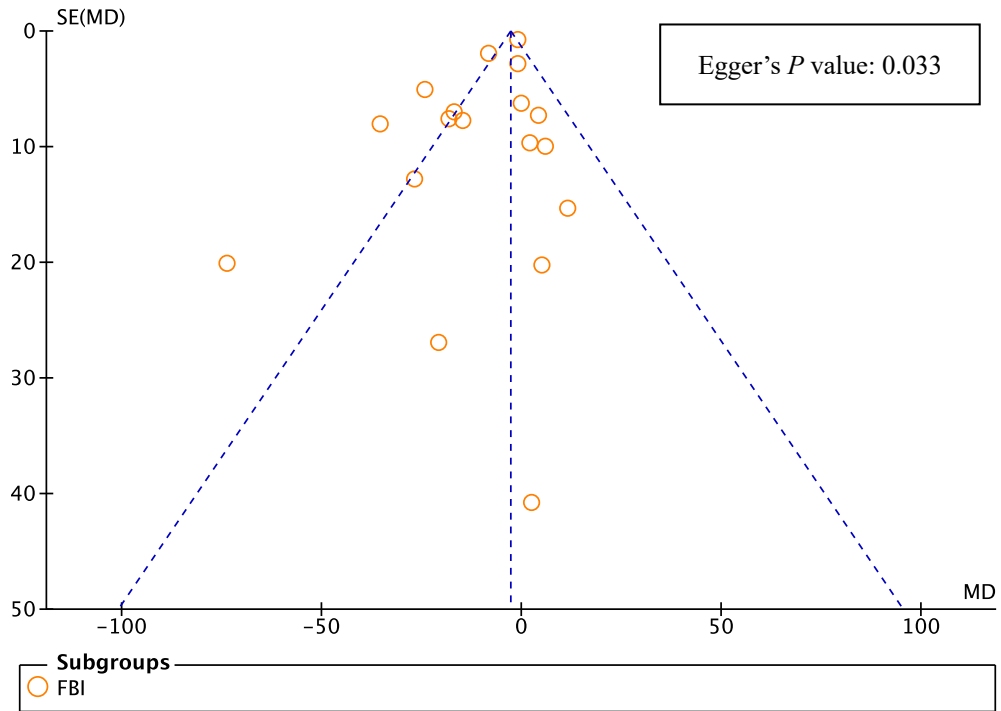


Figure S3-8-8. Funnel plot of RCTs investigating the effect of vitamin D supplementation on FBI in participants with Vitamin D supplementation dose < 3320 IU.

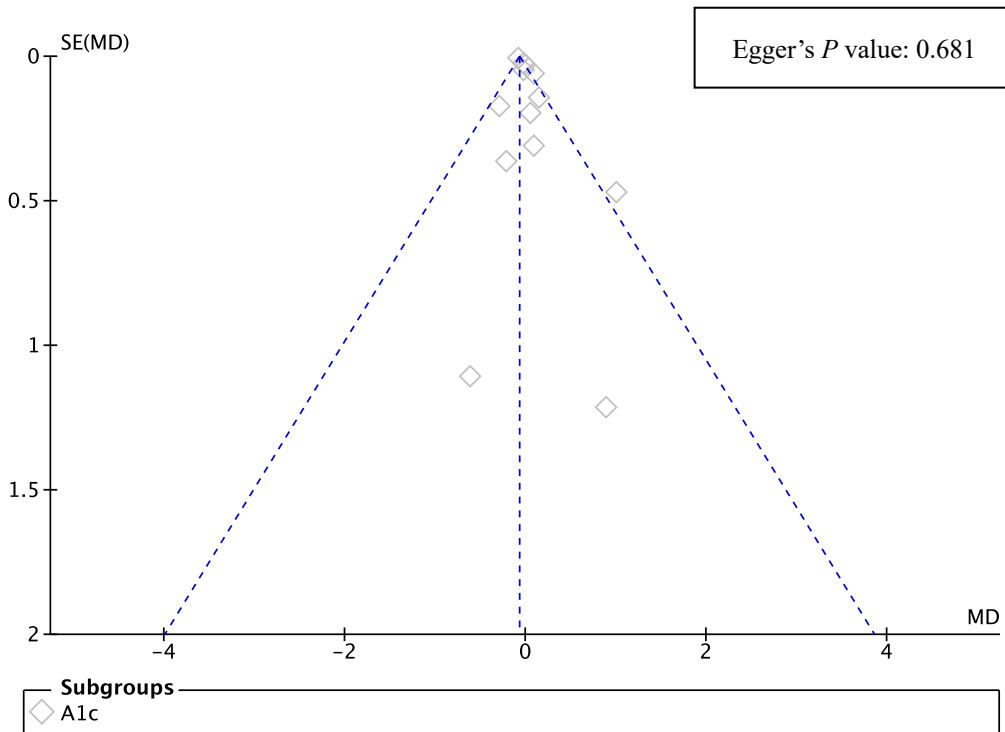


Figure S3-8-9. Funnel plot of RCTs investigating the effect of vitamin D supplementation on A1c in participants with Vitamin D supplementation dose < 3320 IU.

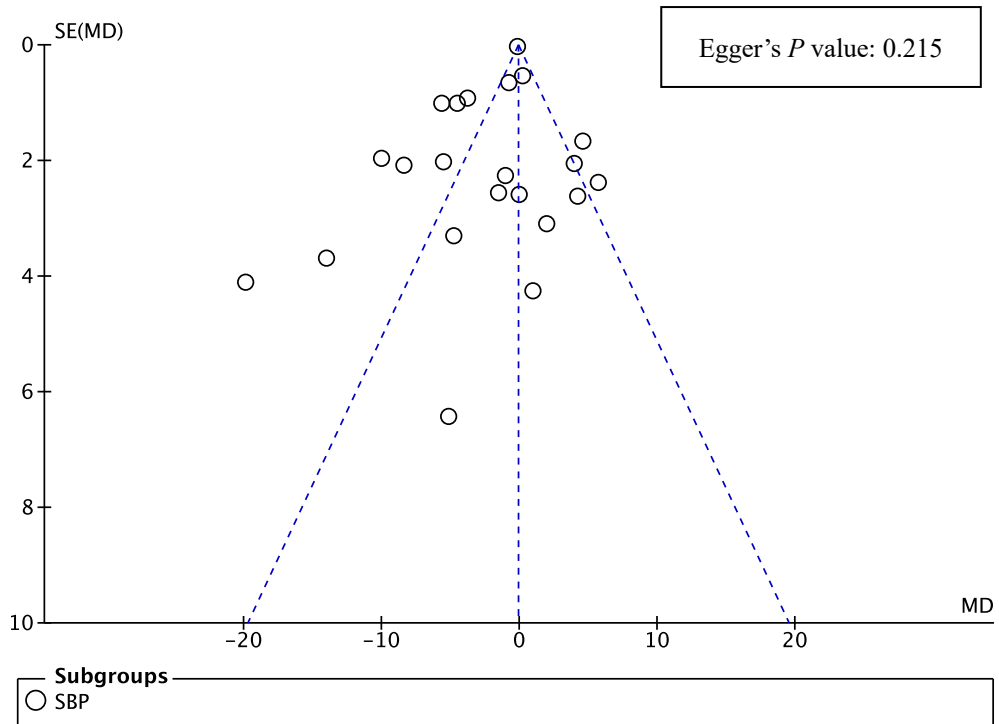


Figure S3-9-1. Funnel plot of RCTs investigating the effect of vitamin D supplementation on SBP in participants with Vitamin D supplementation dose \geq 3320 IU.

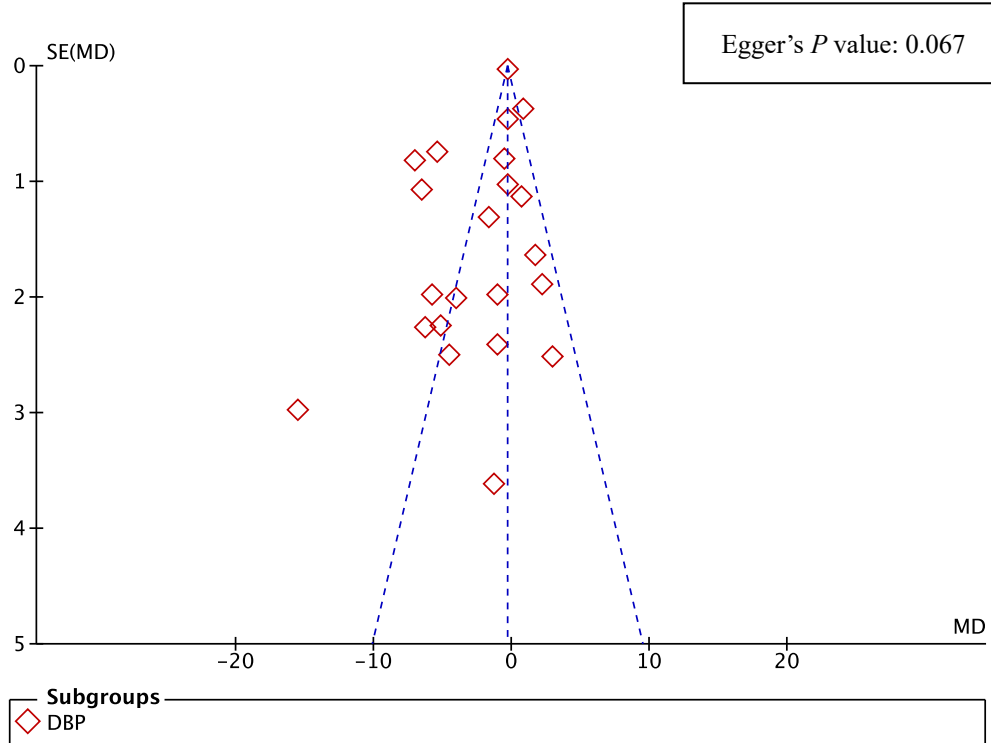


Figure S3-9-2 Funnel plot of RCTs investigating the effect of vitamin D supplementation on DBP in participants with Vitamin D supplementation dose \geq 3320 IU.

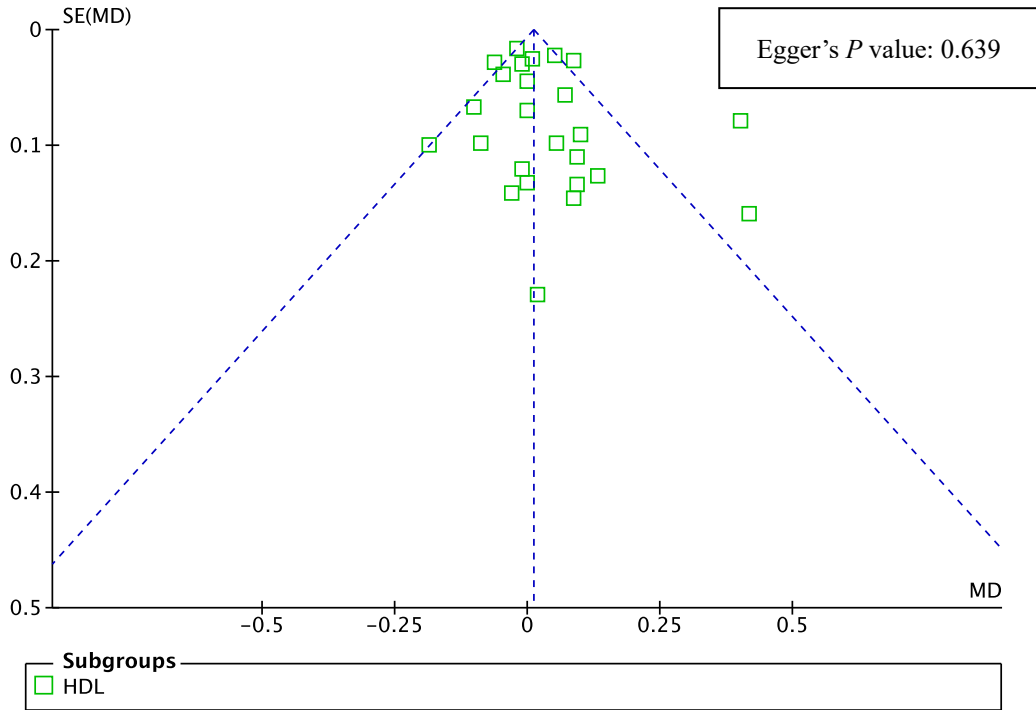


Figure S3-9-3. Funnel plot of RCTs investigating the effect of vitamin D supplementation on HDL-C in participants with Vitamin D supplementation dose ≥ 3320 IU.

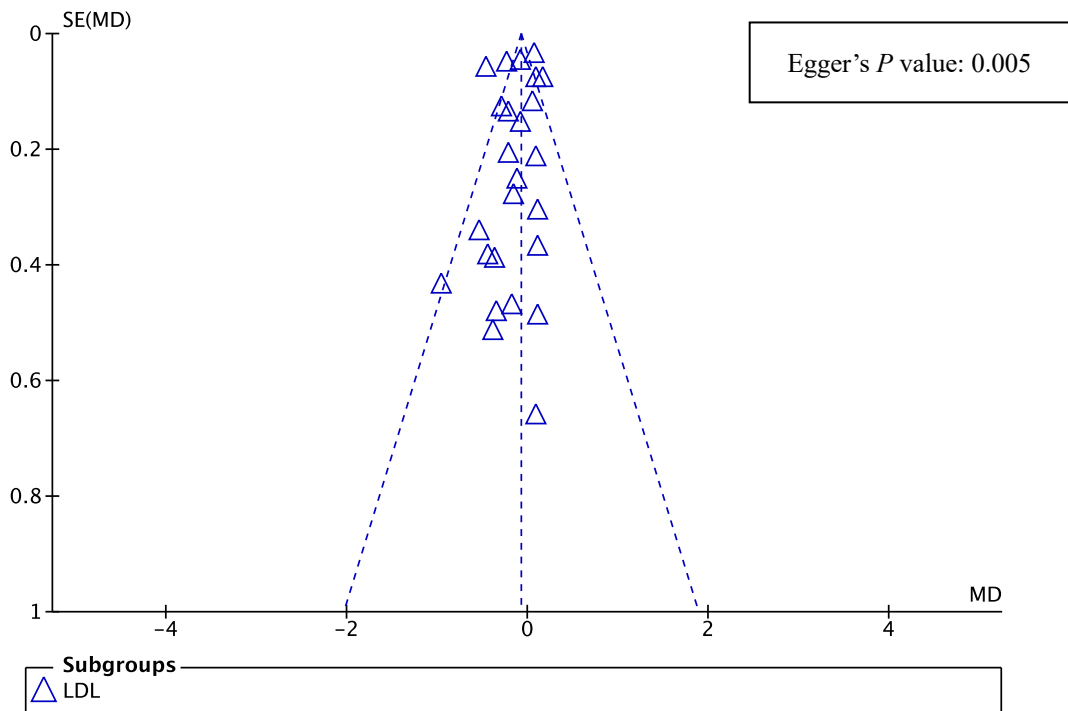


Figure S3-9-4. Funnel plot of RCTs investigating the effect of vitamin D supplementation on LDL-C in participants with Vitamin D supplementation dose ≥ 3320 IU.

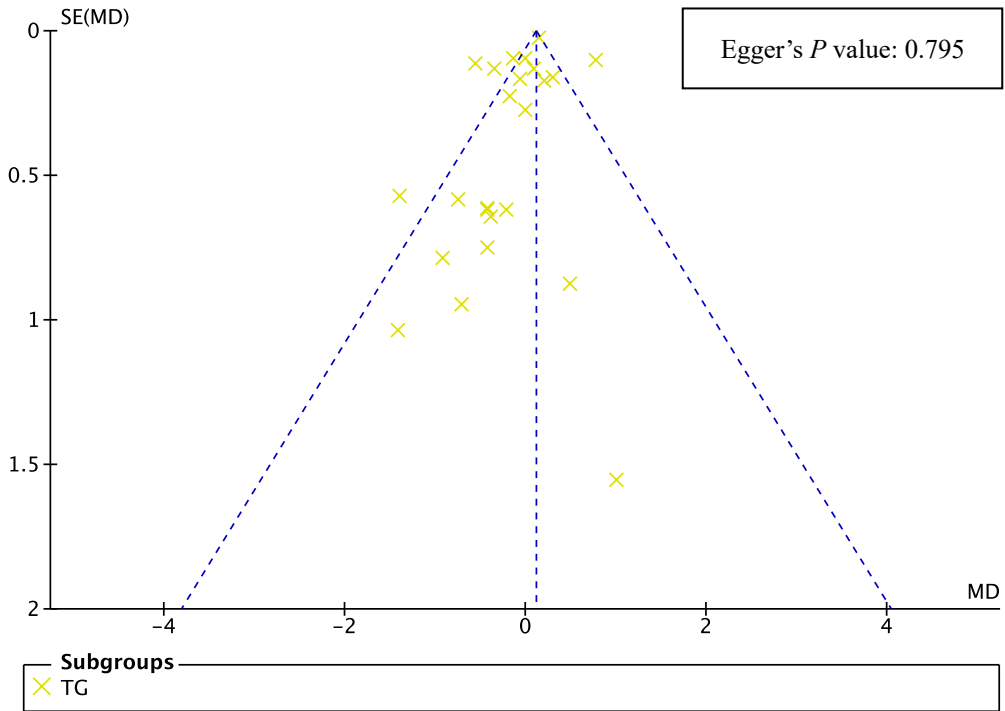


Figure S3-9-5. Funnel plot of RCTs investigating the effect of vitamin D supplementation on TG in participants with Vitamin D supplementation dose \geq 3320 IU.

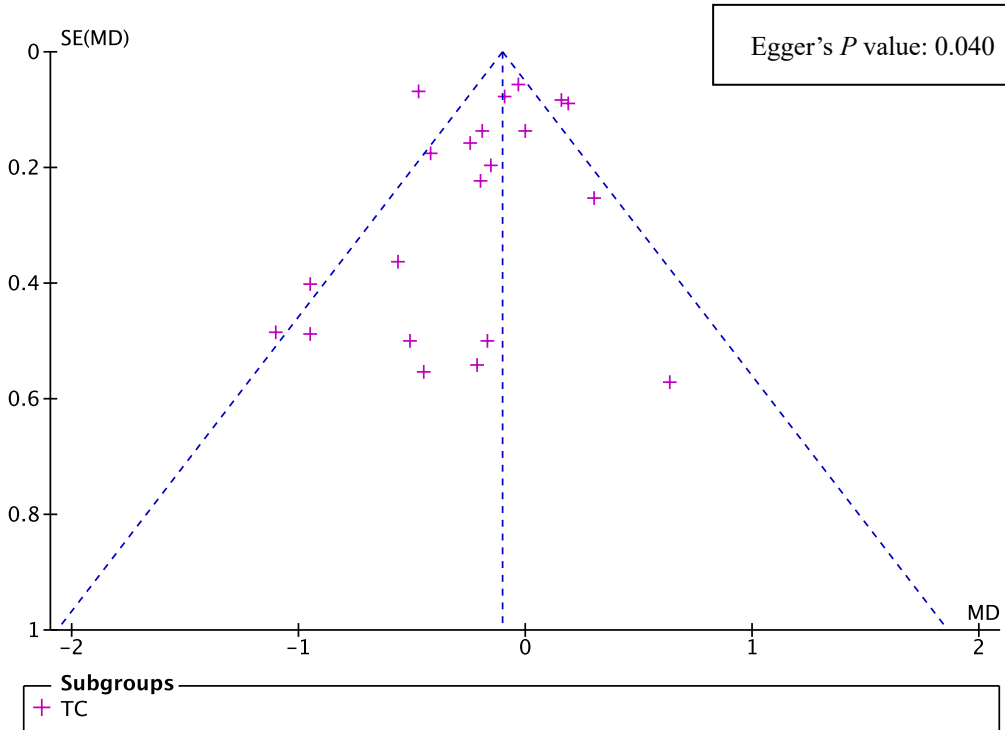


Figure S3-9-6. Funnel plot of RCTs investigating the effect of vitamin D supplementation on TC in participants with Vitamin D supplementation dose \geq 3320 IU.

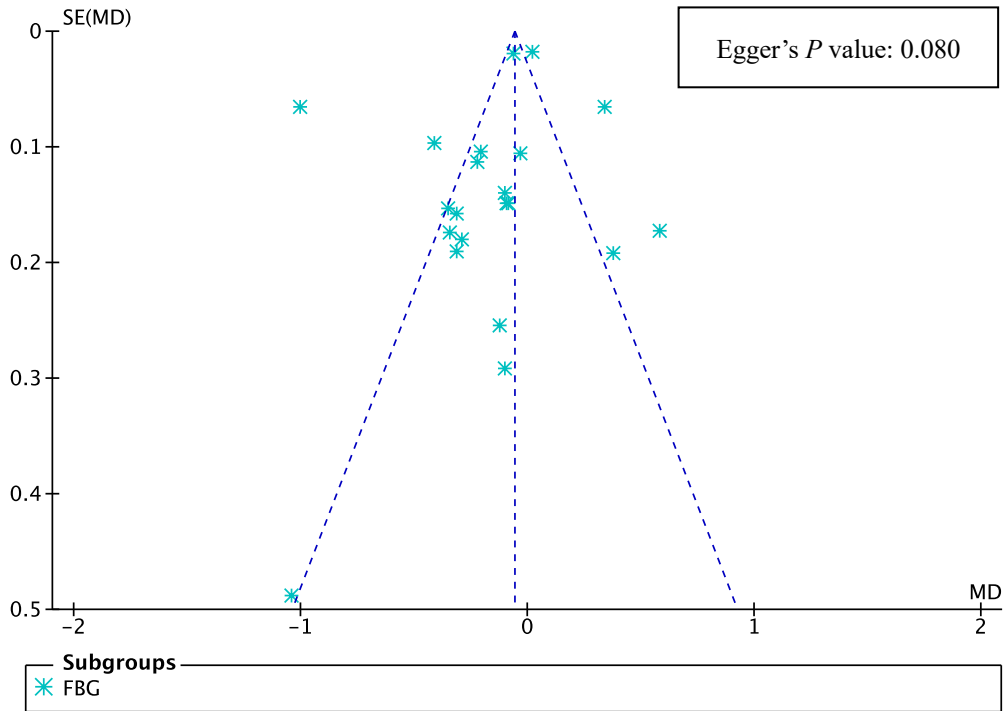


Figure S3-9-7. Funnel plot of RCTs investigating the effect of vitamin D supplementation on FBG in participants with Vitamin D supplementation dose \geq 3320 IU.

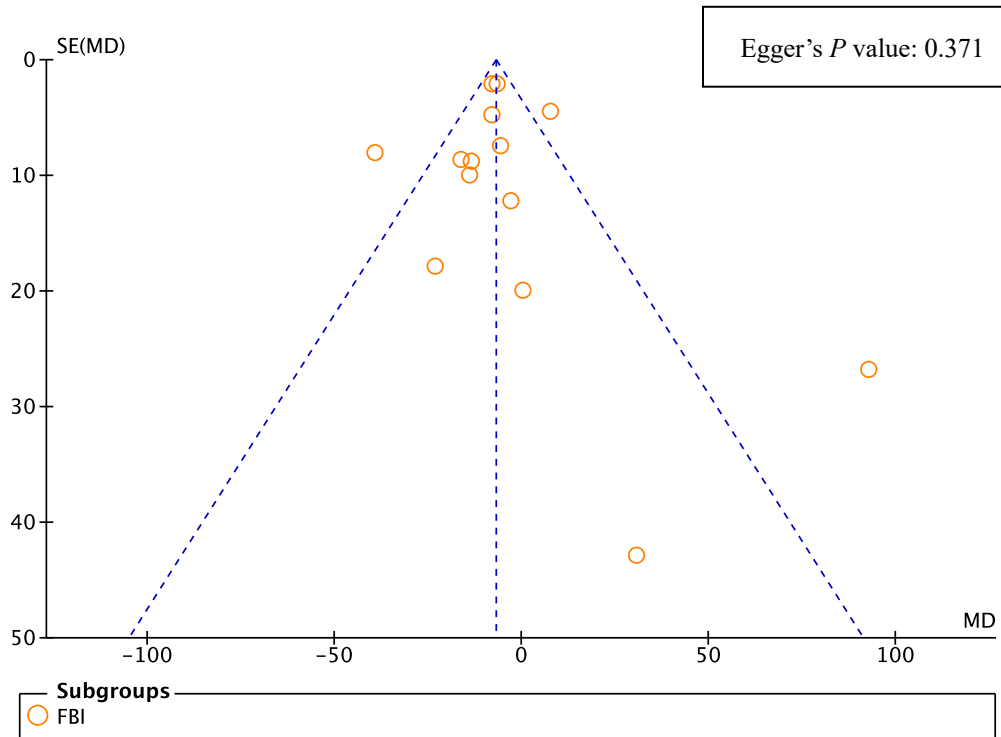


Figure S3-9-8. Funnel plot of RCTs investigating the effect of vitamin D supplementation on FBI in participants with Vitamin D supplementation dose \geq 3320 IU.

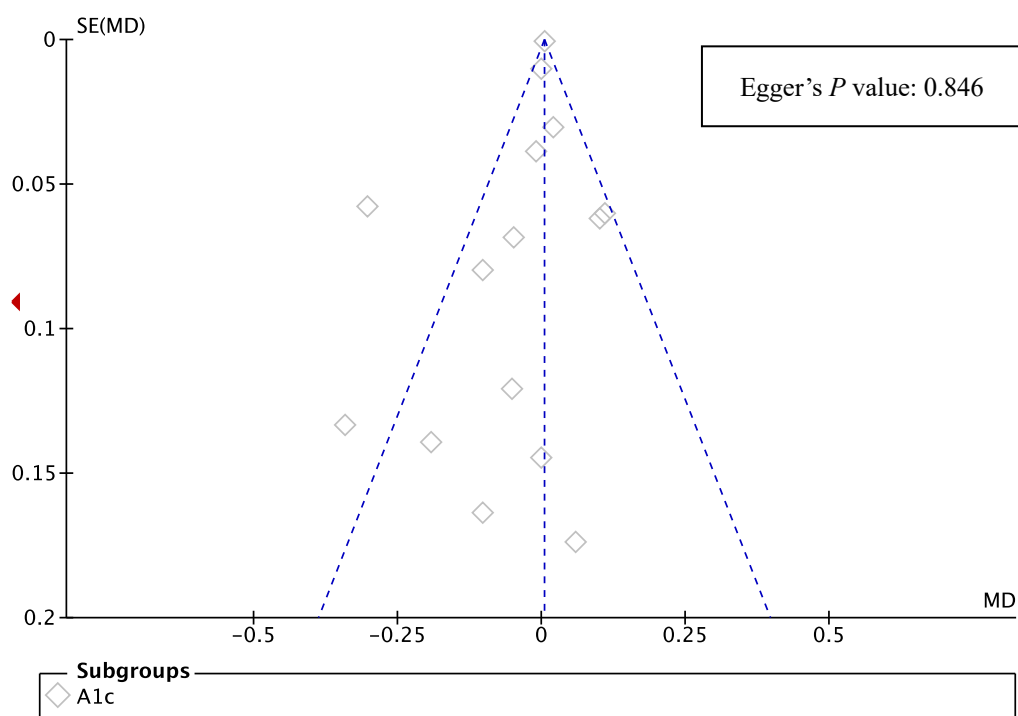


Figure S3-9-9. Funnel plot of RCTs investigating the effect of vitamin D supplementation on A1c in participants with Vitamin D supplementation dose \geq 3320 IU.

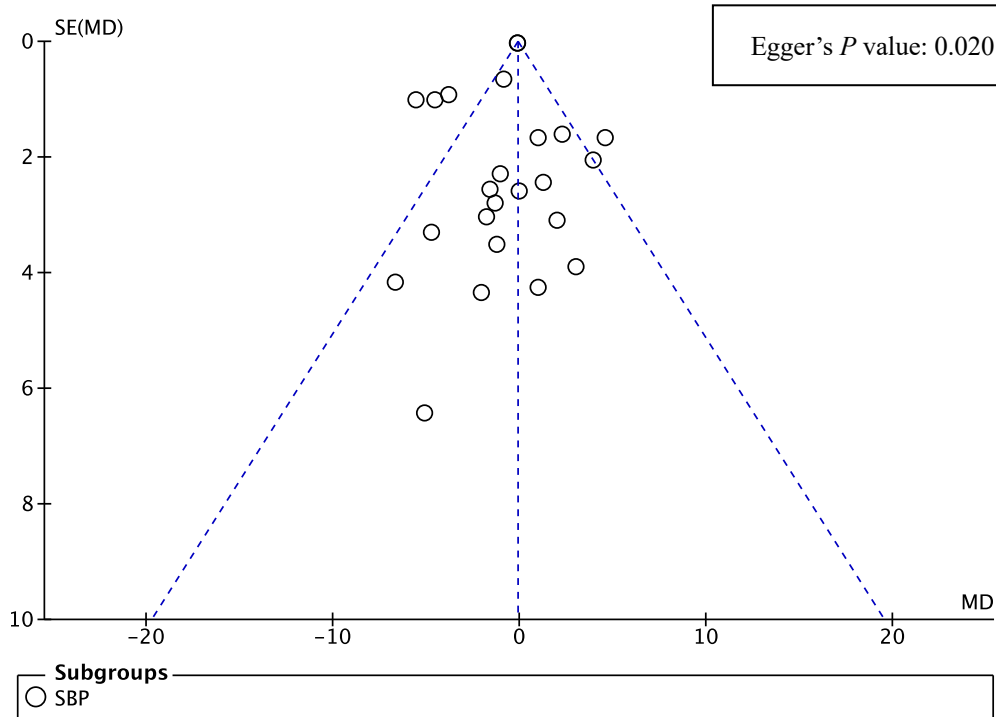


Figure S3-10-1 Funnel plot of RCTs investigating the effect of vitamin D supplementation on SBP in participants aged < 50.

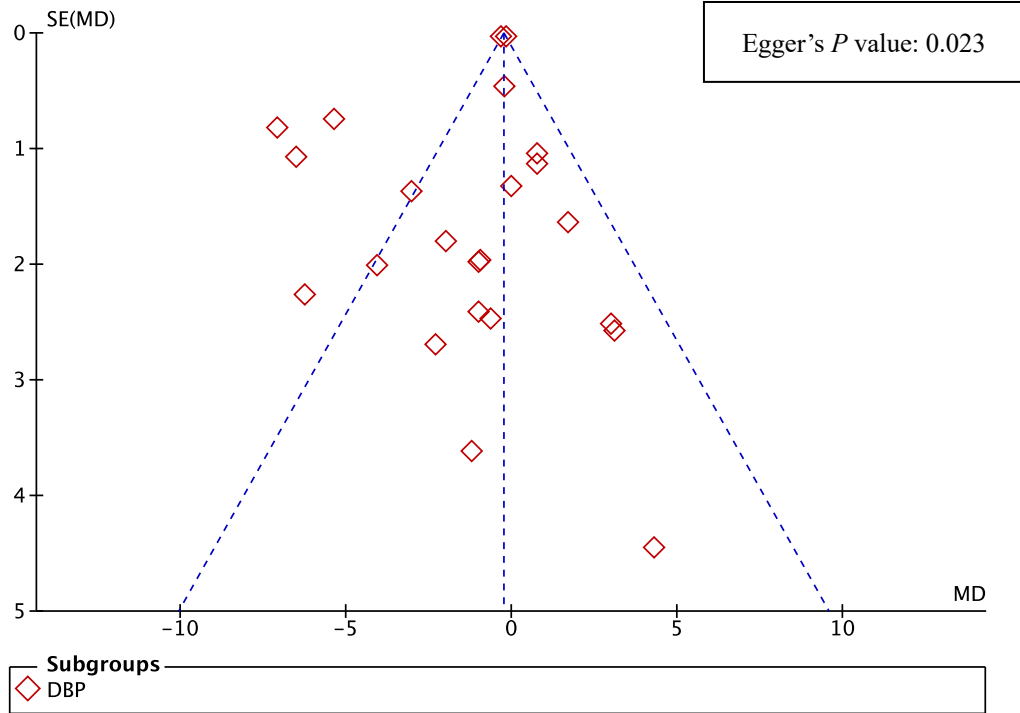


Figure S3-10-2 Funnel plot of RCTs investigating the effect of vitamin D supplementation on DBP in participants aged < 50.

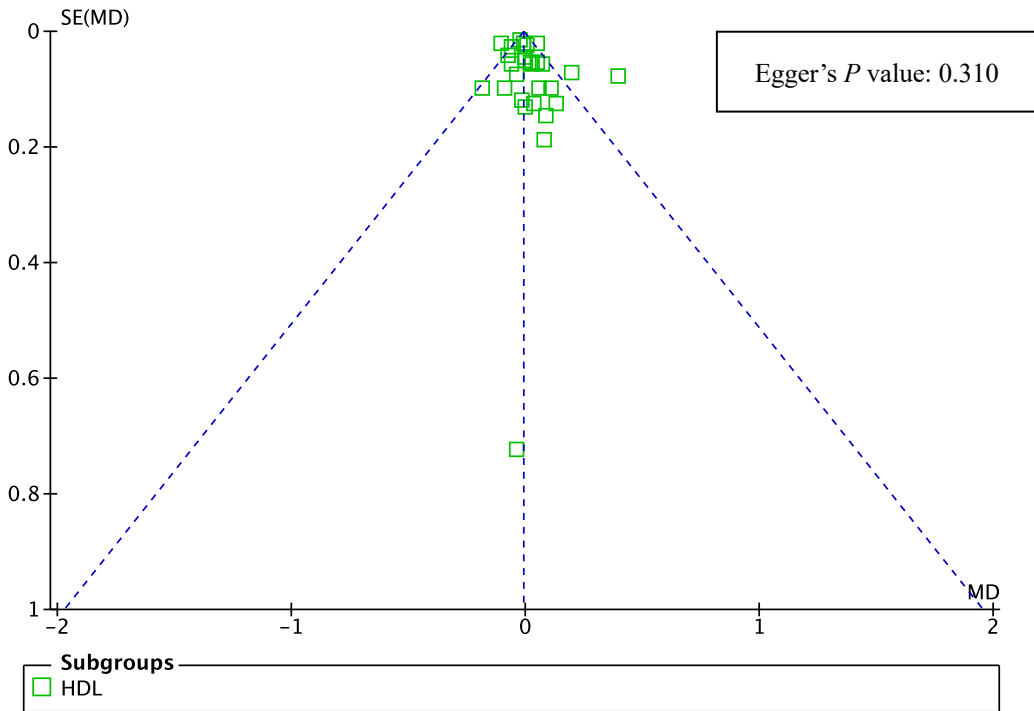


Figure S3-10-3 Funnel plot of RCTs investigating the effect of vitamin D supplementation on HDL-C in participants aged < 50.

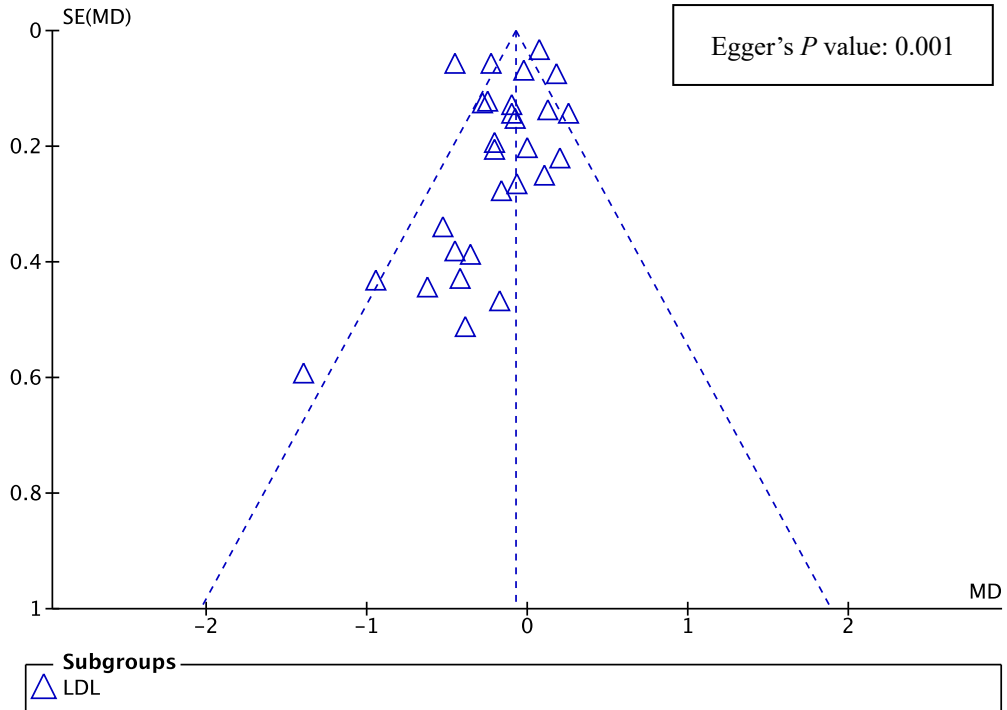


Figure S3-10-4 Funnel plot of RCTs investigating the effect of vitamin D supplementation on LDL-C in participants aged < 50.

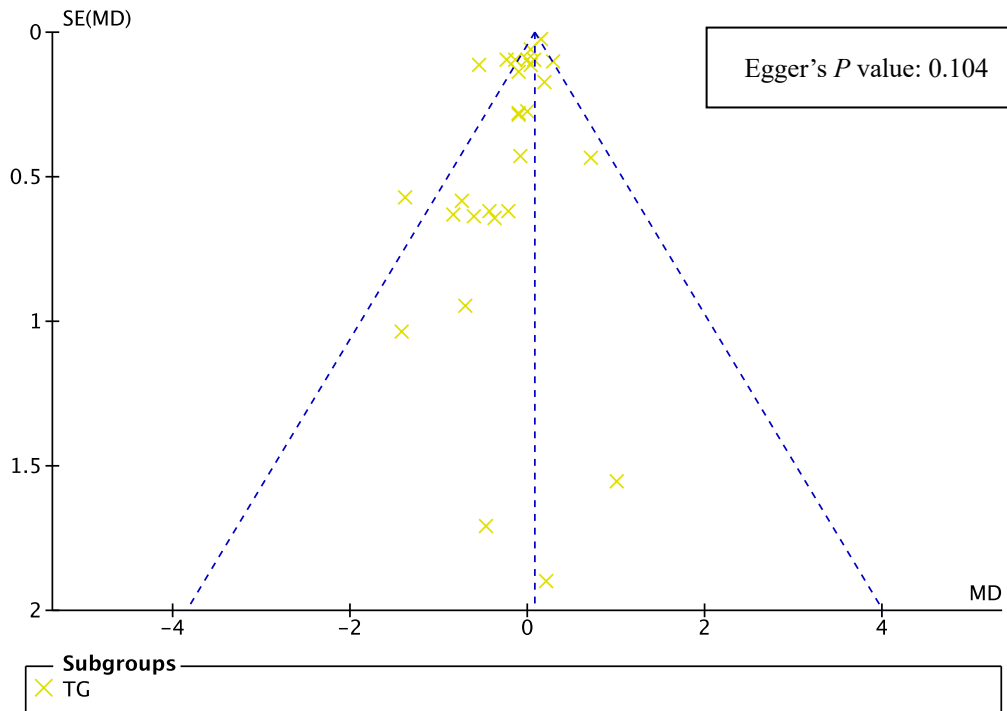


Figure S3-10-5 Funnel plot of RCTs investigating the effect of vitamin D supplementation on TG in participants aged < 50.

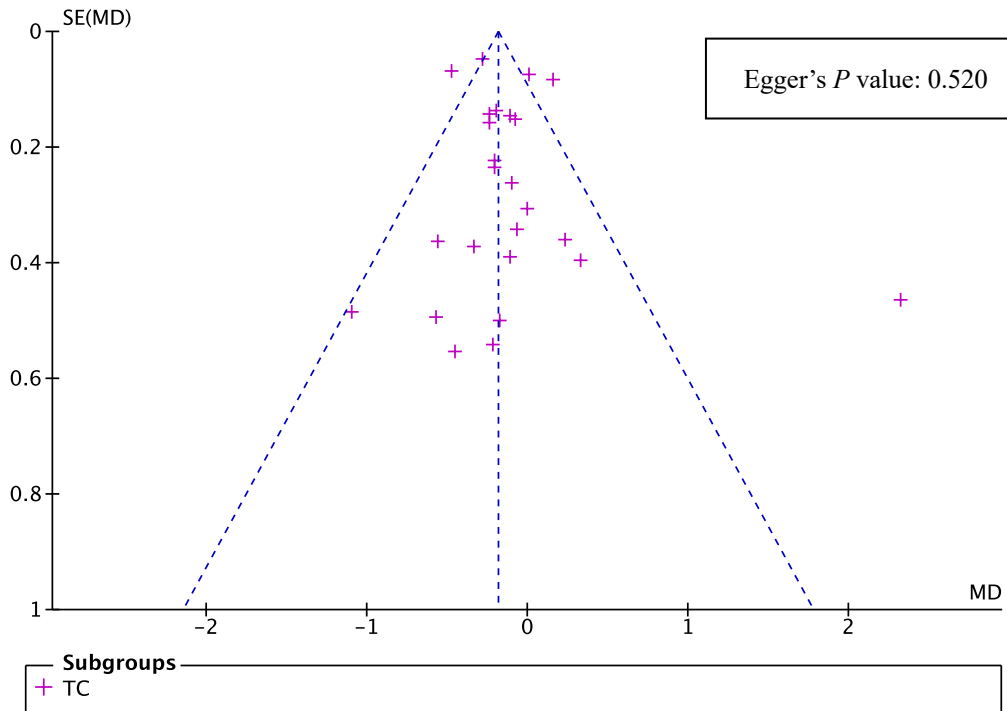


Figure S3-10-6 Funnel plot of RCTs investigating the effect of vitamin D supplementation on TC in participants aged < 50.

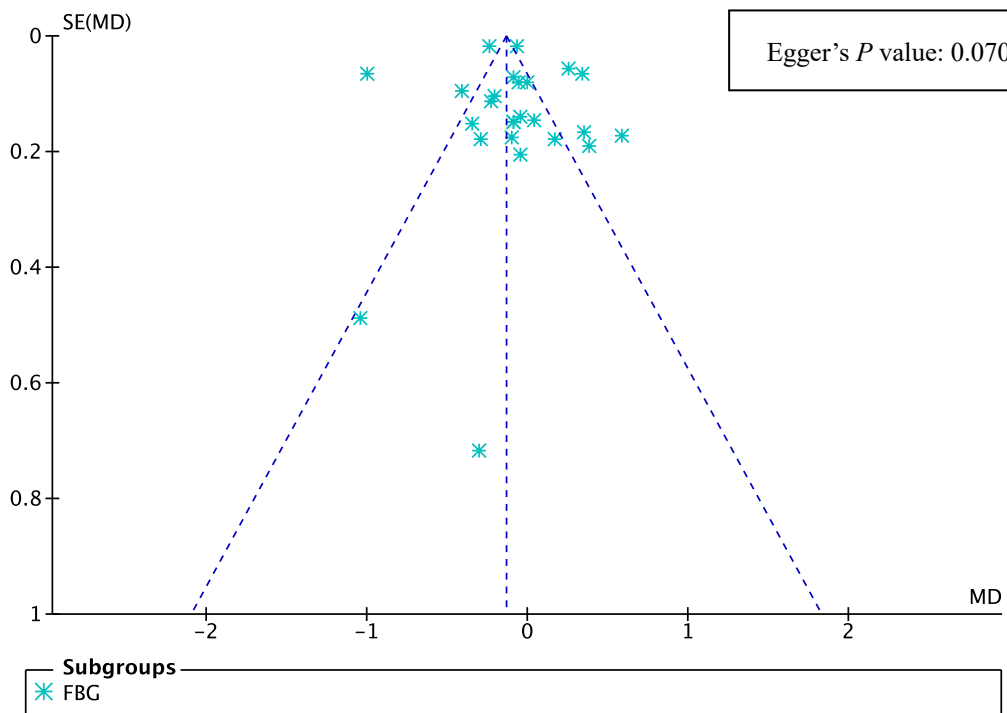


Figure S3-10-7 Funnel plot of RCTs investigating the effect of vitamin D supplementation on FBG in participants aged < 50.

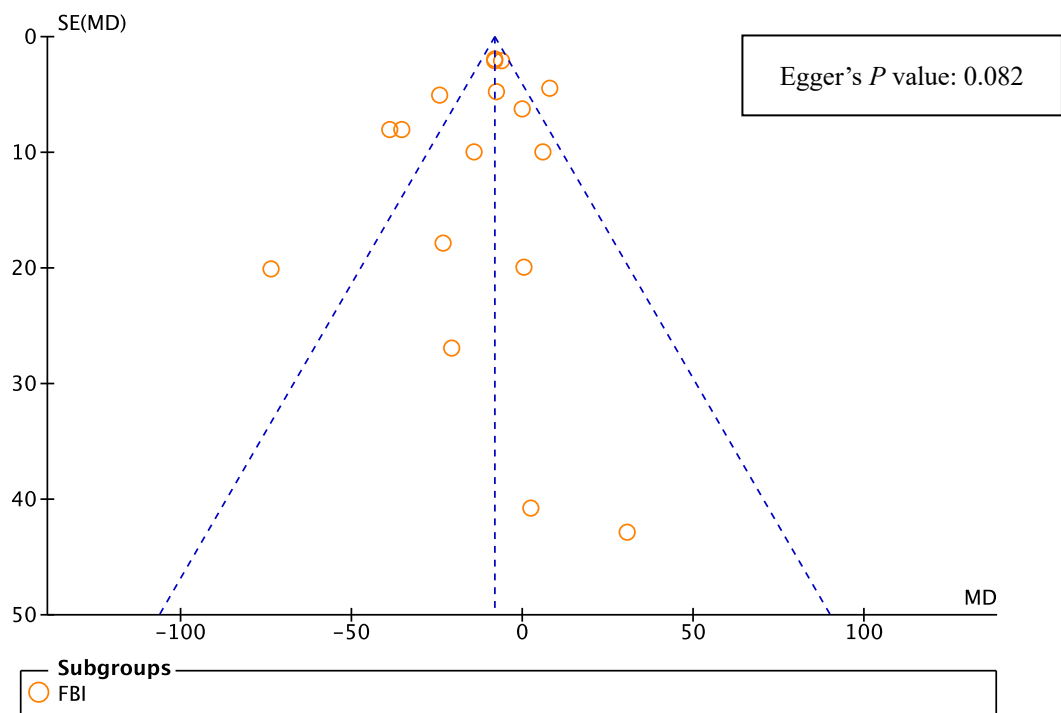


Figure S3-10-8 Funnel plot of RCTs investigating the effect of vitamin D supplementation on FBI in participants aged < 50.

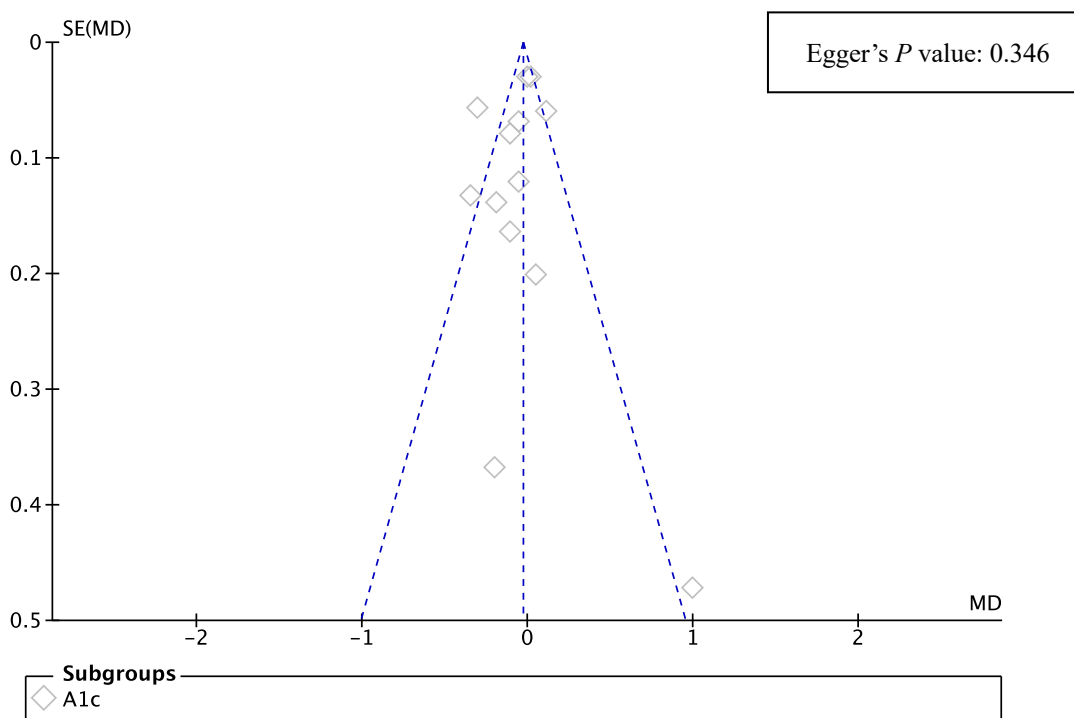


Figure S3-10-9 Funnel plot of RCTs investigating the effect of vitamin D supplementation on A1c in participants aged < 50.

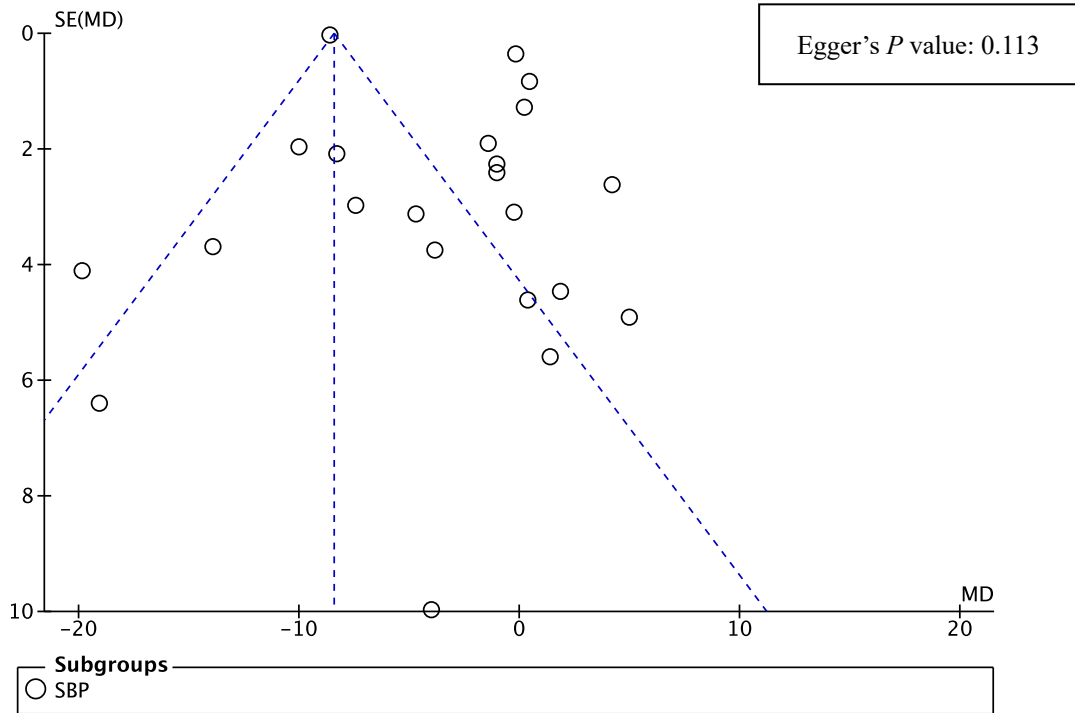


Figure S3-11-1 Funnel plot of RCTs investigating the effect of vitamin D supplementation on SBP in participants aged ≥ 50 .

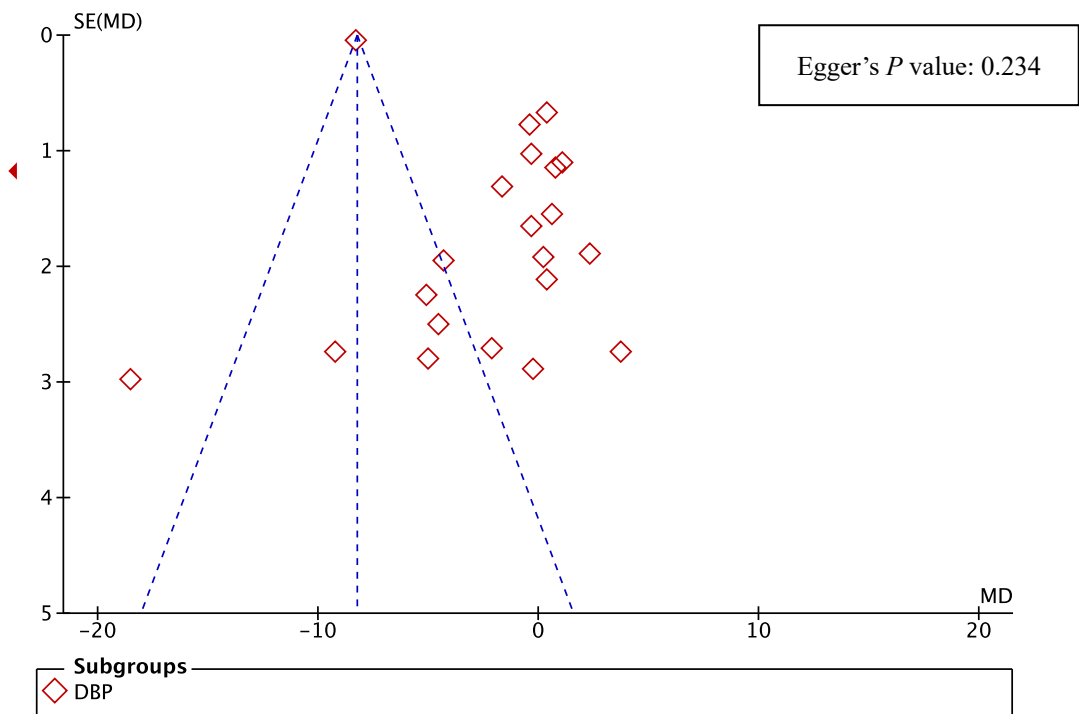


Figure S3-11-2 Funnel plot of RCTs investigating the effect of vitamin D supplementation on DBP in participants aged ≥ 50 .

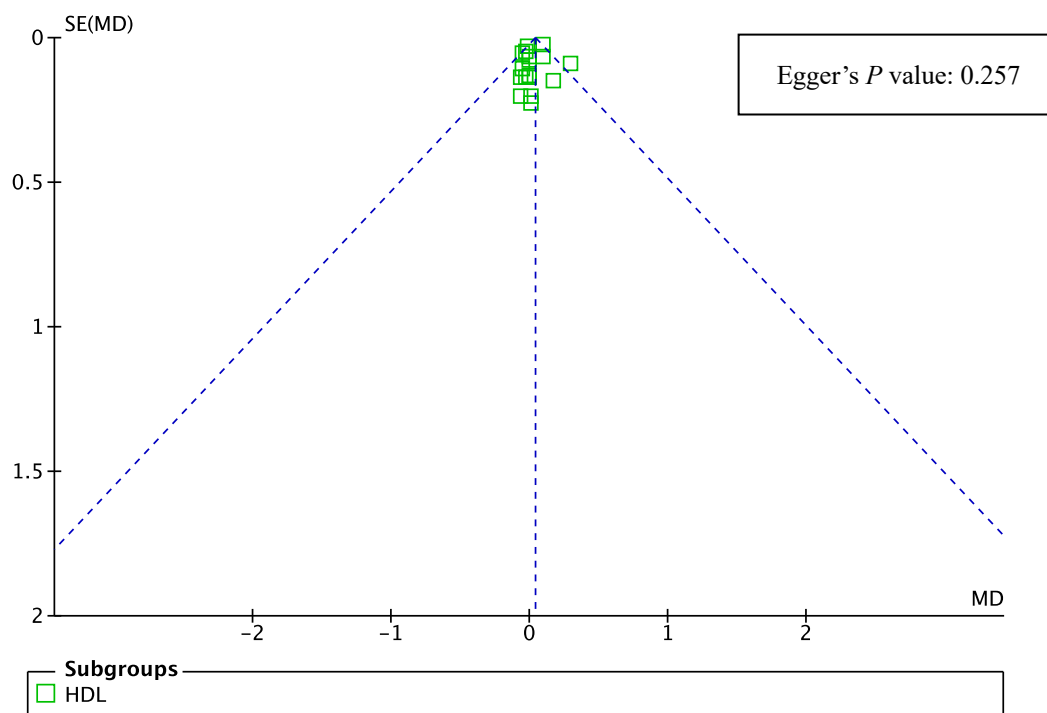


Figure S3-11-3 Funnel plot of RCTs investigating the effect of vitamin D supplementation on HDL-C in participants aged ≥ 50 .

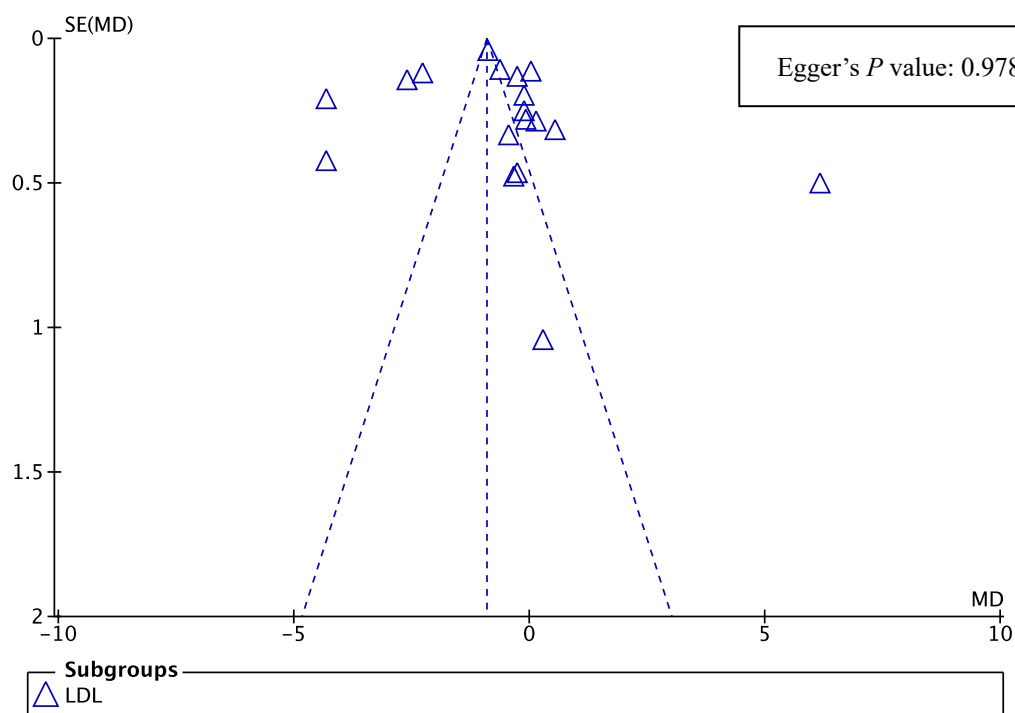


Figure S3-11-4 Funnel plot of RCTs investigating the effect of vitamin D supplementation on LDL-C in participants aged ≥ 50 .

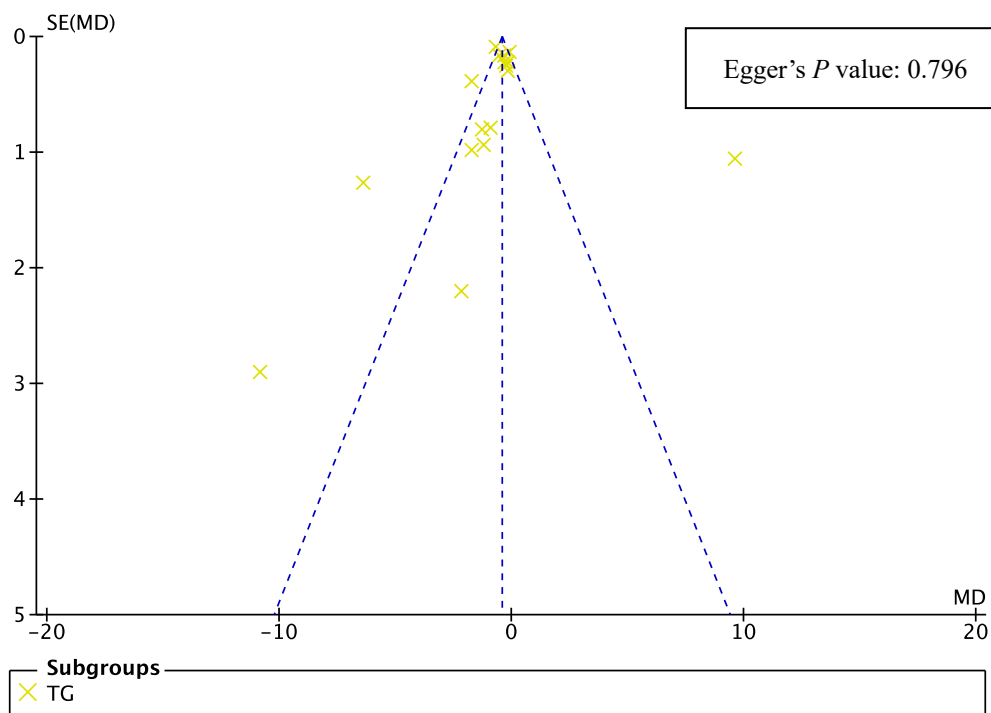


Figure S3-11-5 Funnel plot of RCTs investigating the effect of vitamin D supplementation on TG in participants aged ≥ 50 .

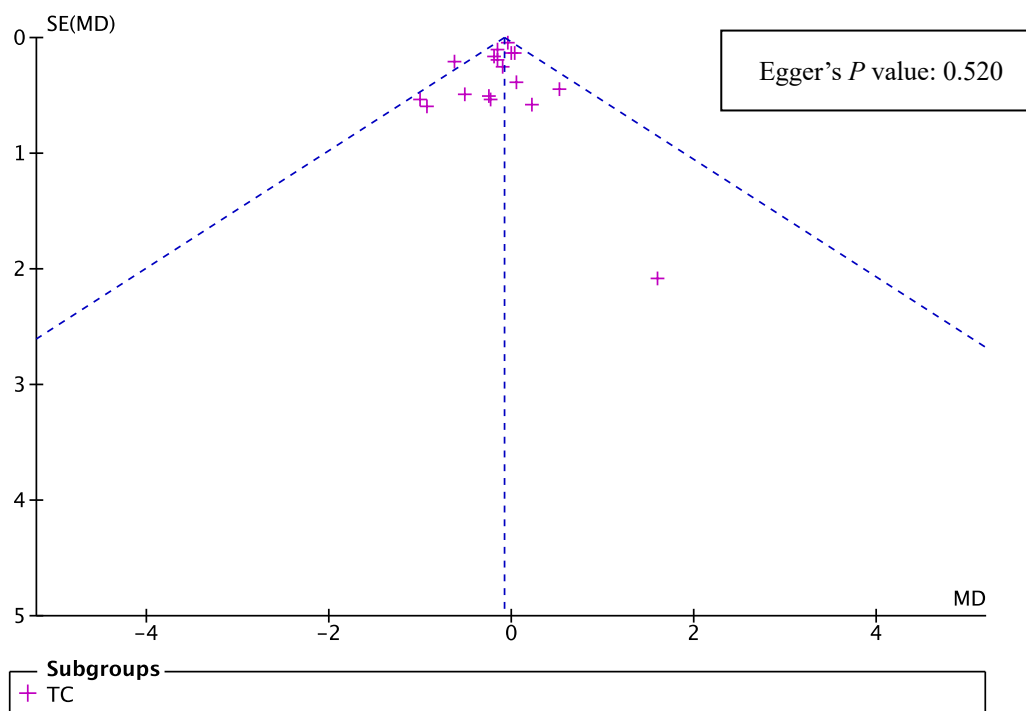


Figure S3-11-6 Funnel plot of RCTs investigating the effect of vitamin D supplementation on TC in participants aged ≥ 50 .

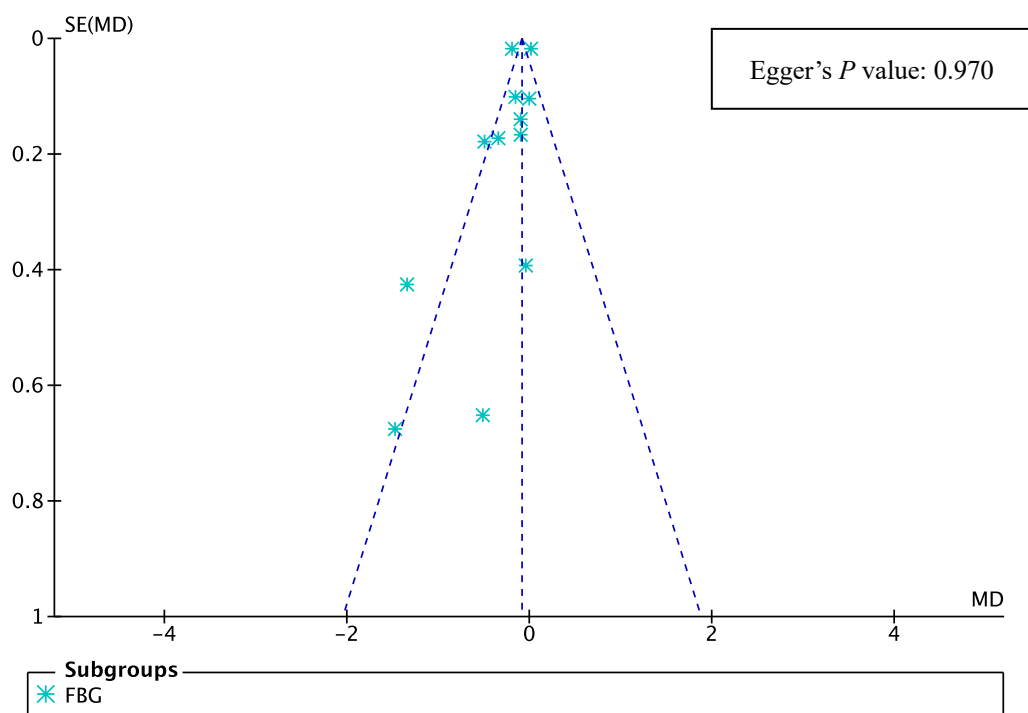


Figure S3-11-7 Funnel plot of RCTs investigating the effect of vitamin D supplementation on FBG in participants aged ≥ 50 .

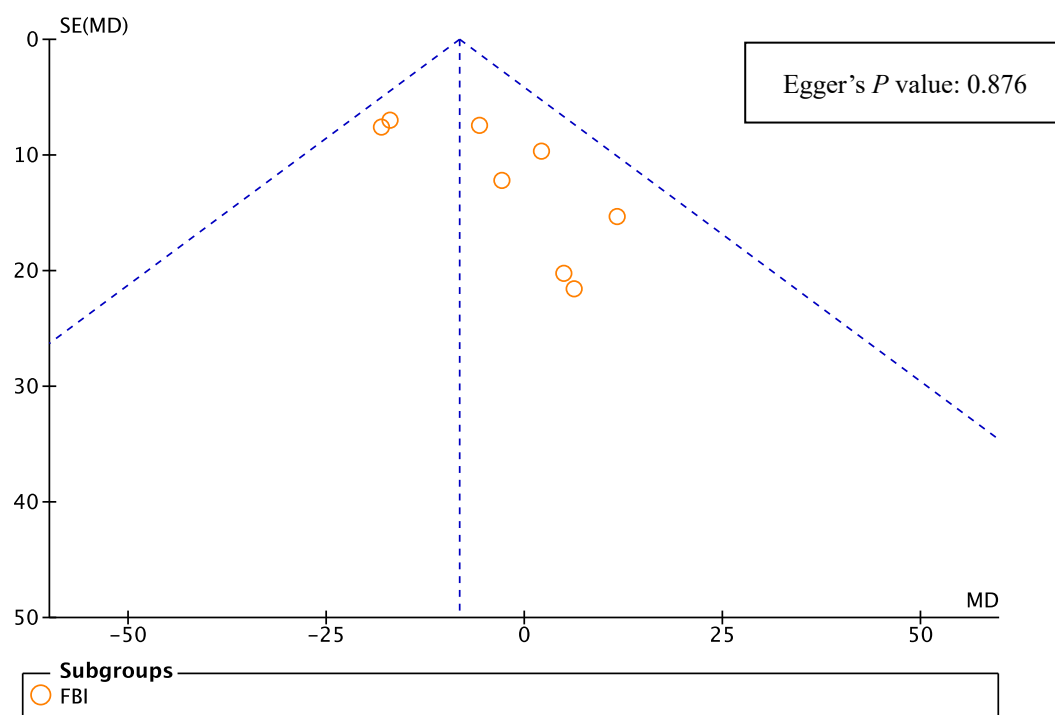


Figure S3-11-8 Funnel plot of RCTs investigating the effect of vitamin D supplementation on FBI in participants aged ≥ 50 .

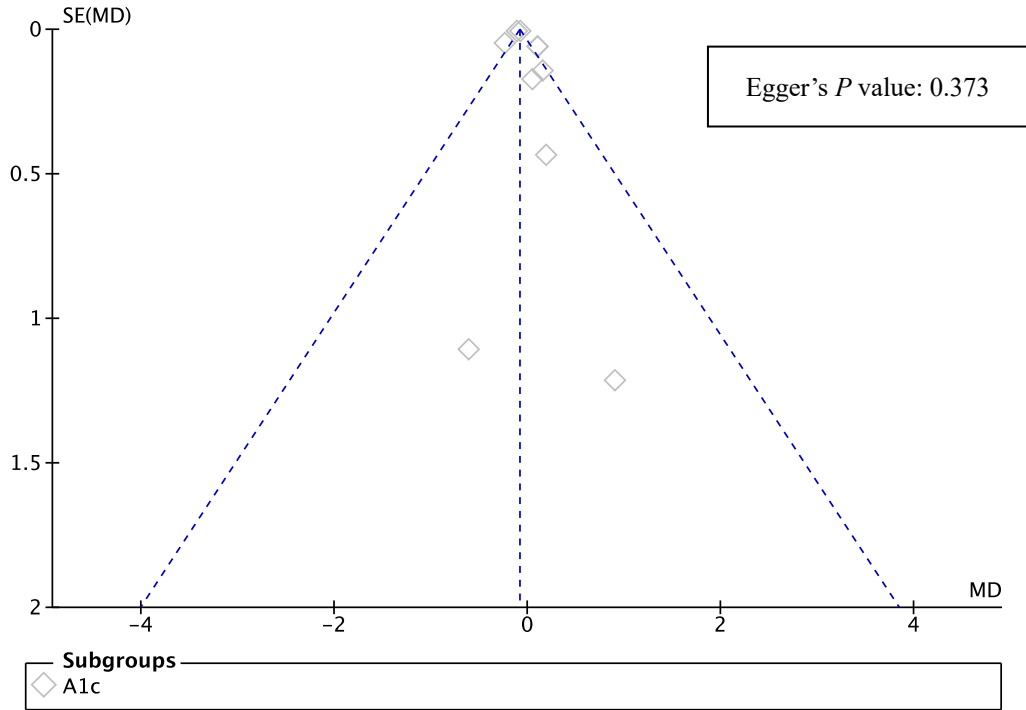


Figure S3-11-9 Funnel plot of RCTs investigating the effect of vitamin D supplementation on A1c in participants aged ≥ 50 .

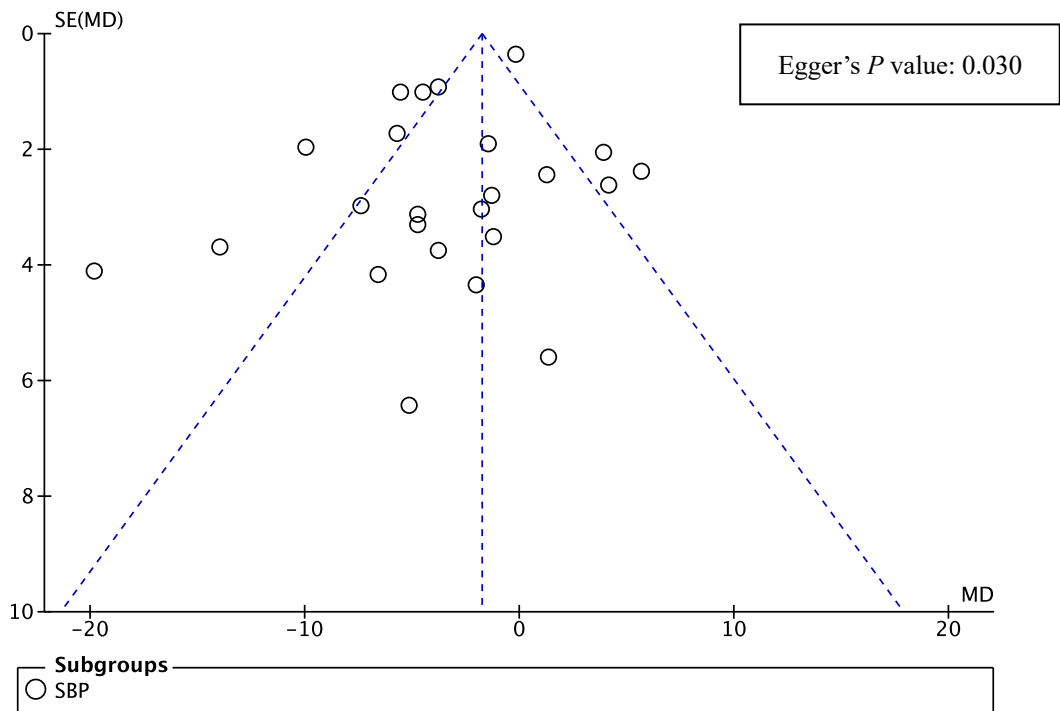


Figure S3-12-1 Funnel plot of RCTs investigating the effect of vitamin D supplementation on SBP in participants with intervention duration < 3 months.

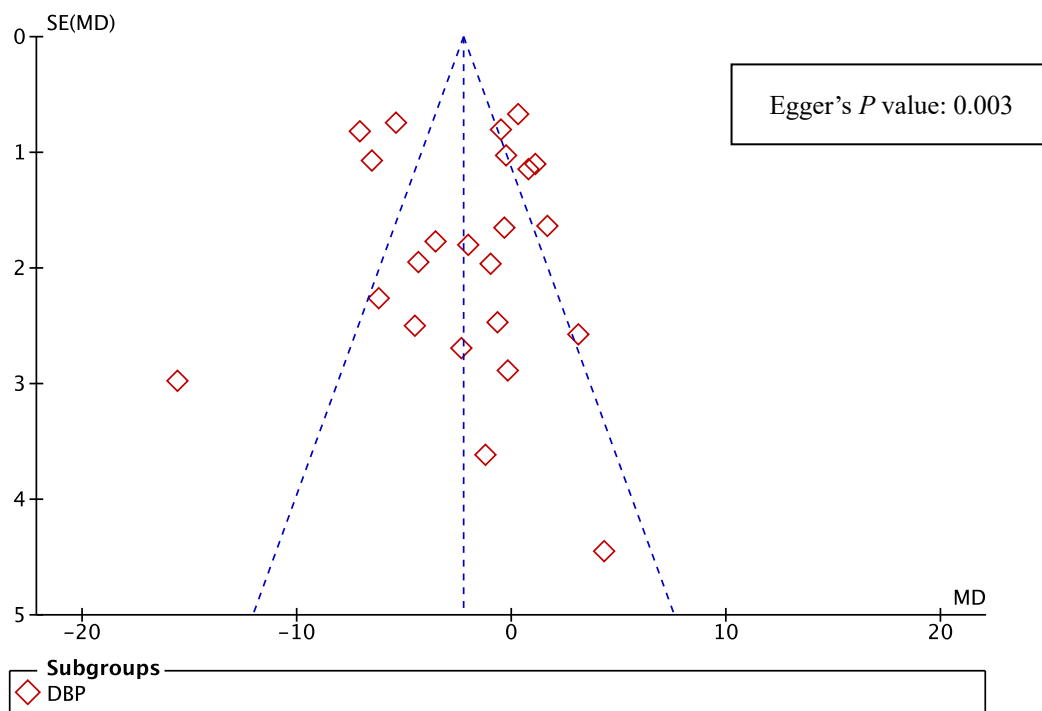


Figure S3-12-2 Funnel plot of RCTs investigating the effect of vitamin D supplementation on DBP in participants with intervention duration < 3 months.

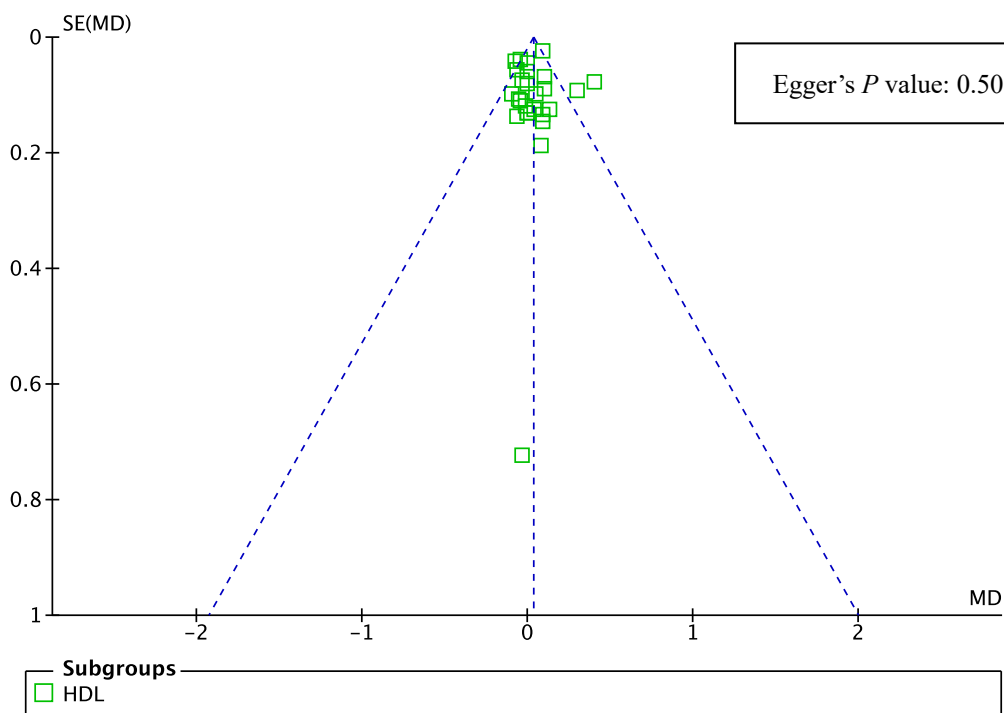


Figure S3-12-3 Funnel plot of RCTs investigating the effect of vitamin D supplementation on HDL-C in participants with intervention duration < 3 months.

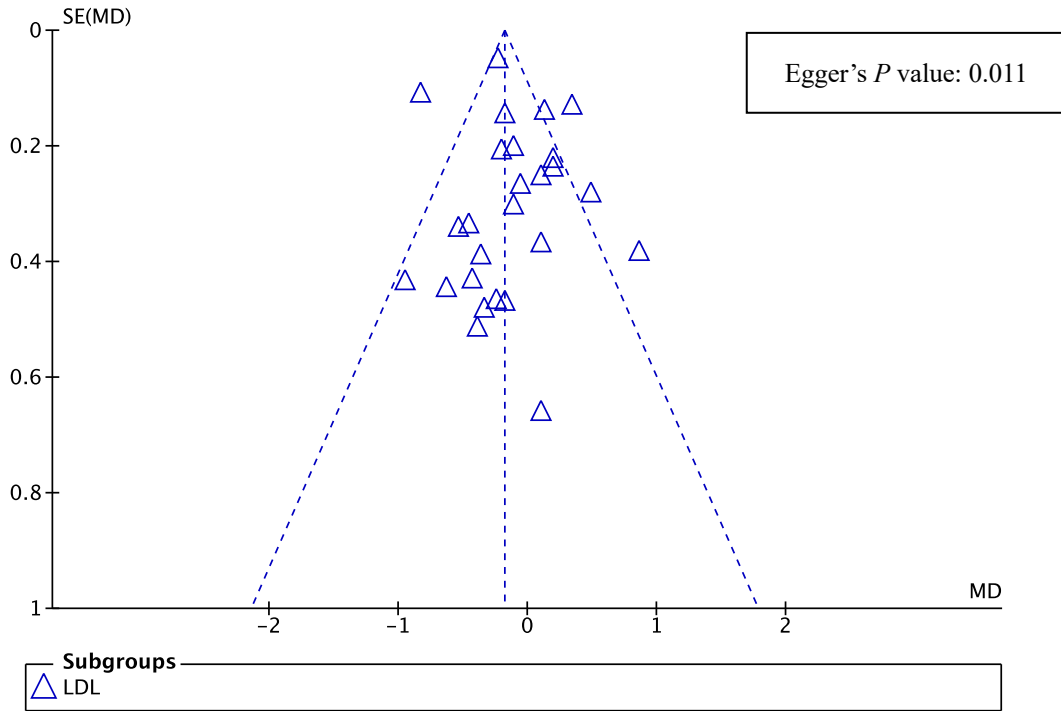


Figure S3-12-4 Funnel plot of RCTs investigating the effect of vitamin D supplementation on LDL-C in participants with intervention duration < 3 months.

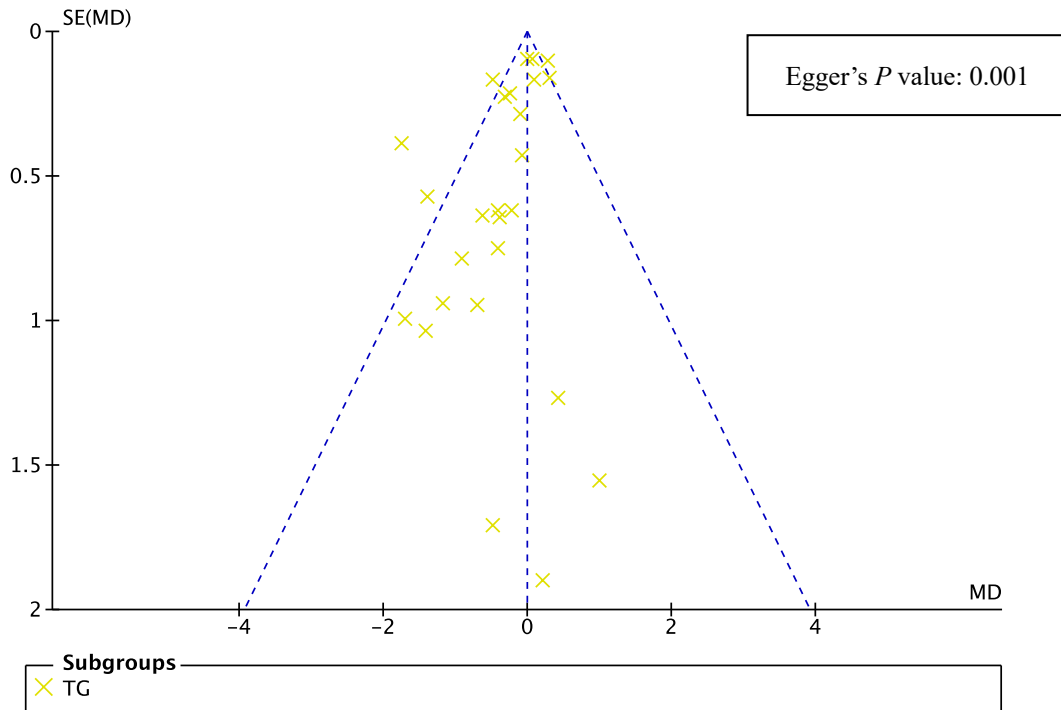


Figure S3-12-5 Funnel plot of RCTs investigating the effect of vitamin D supplementation on TG in participants with intervention duration < 3 months.

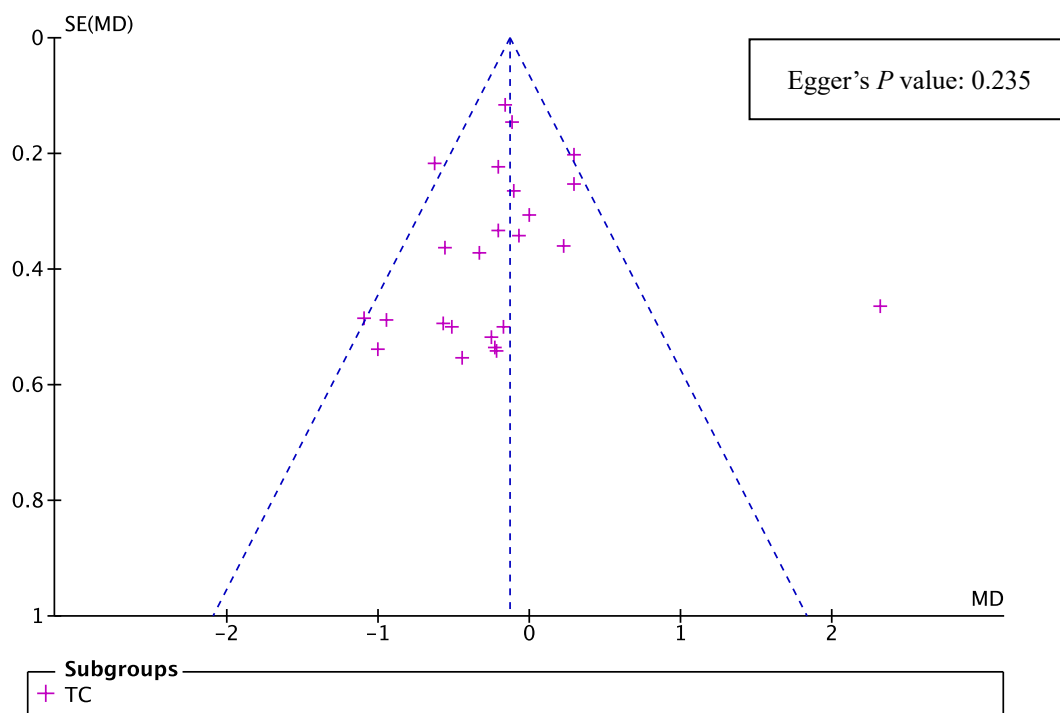


Figure S3-12-6 Funnel plot of RCTs investigating the effect of vitamin D supplementation on TC in participants with intervention duration < 3 months.

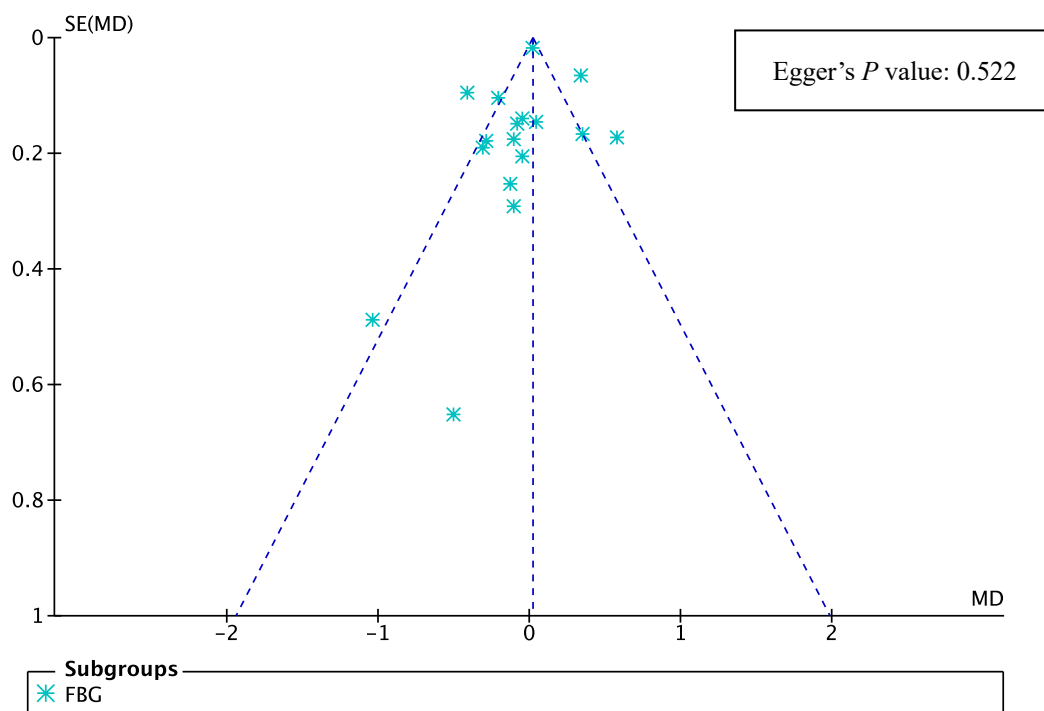


Figure S3-12-7 Funnel plot of RCTs investigating the effect of vitamin D supplementation on FBG in participants with intervention duration < 3 months.

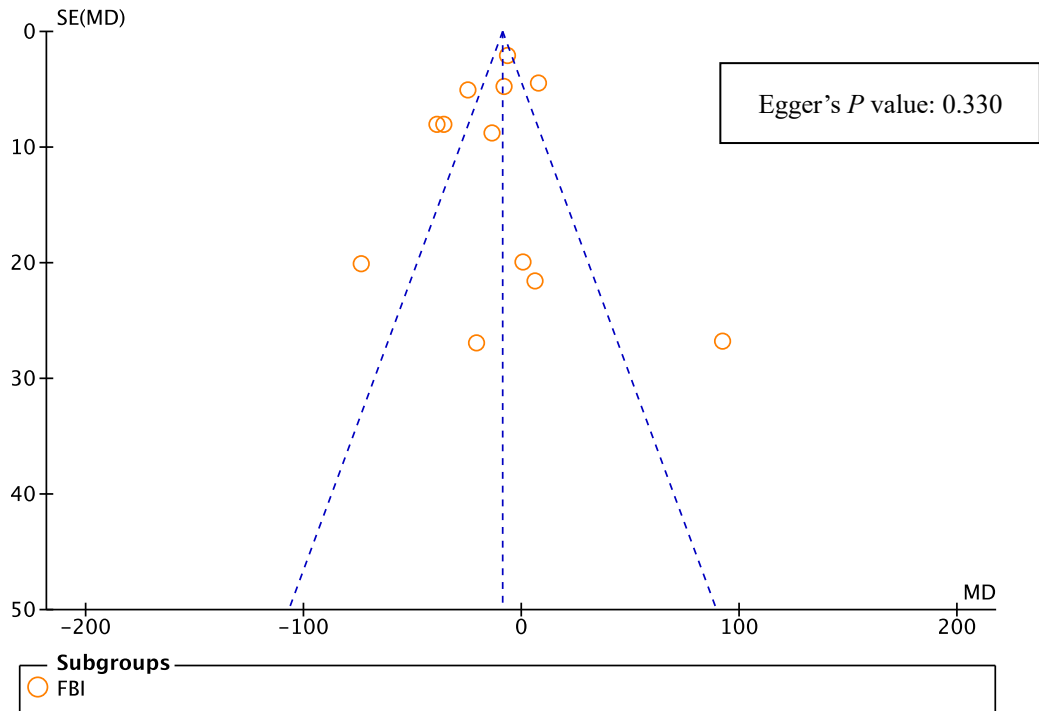


Figure S3-12-8 Funnel plot of RCTs investigating the effect of vitamin D supplementation on FBI in participants with intervention duration < 3 months.

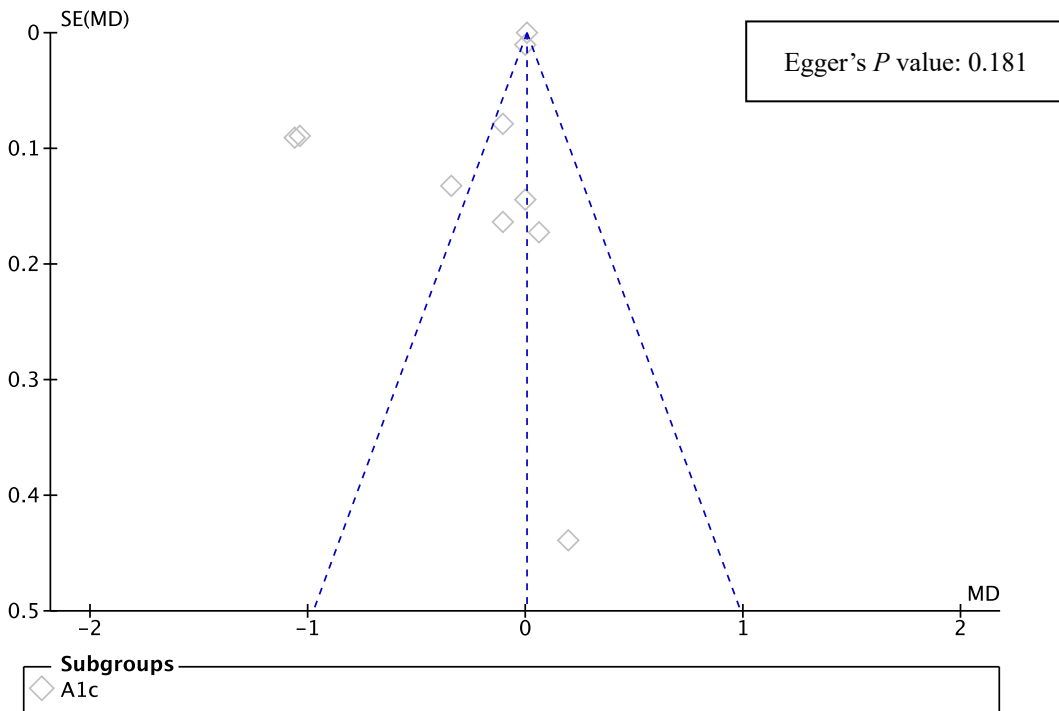


Figure S3-12-9 Funnel plot of RCTs investigating the effect of vitamin D supplementation on A1c in participants with intervention duration < 3 months.

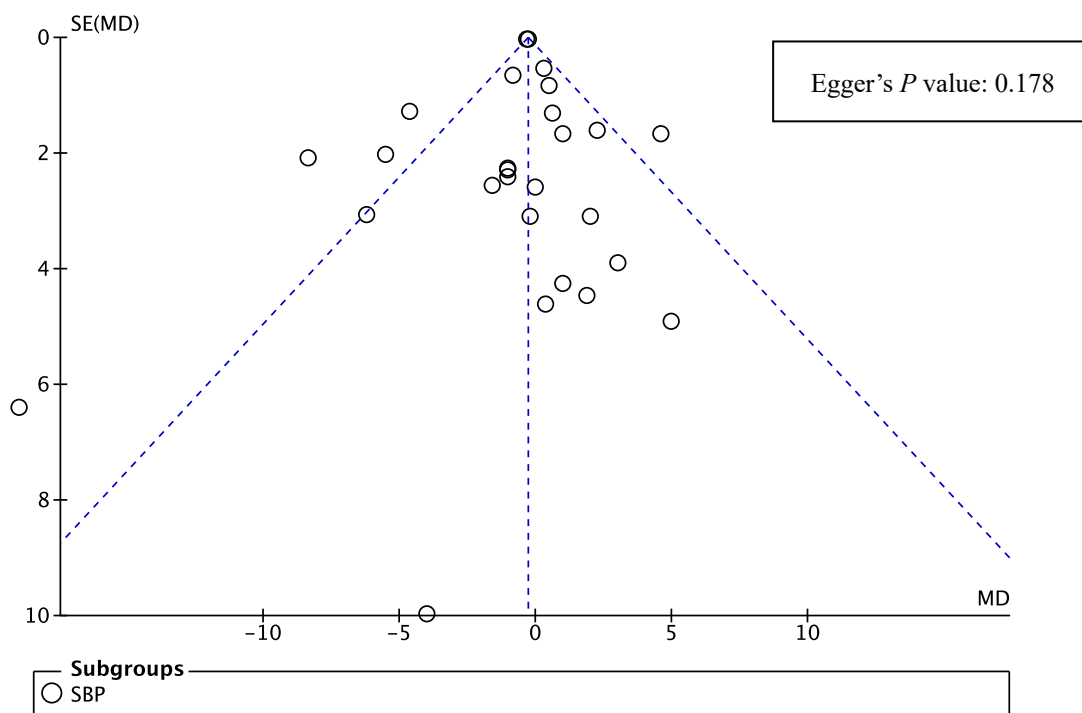


Figure S3-13-1 Funnel plot of RCTs investigating the effect of vitamin D supplementation on SBP in participants with intervention duration ≥ 3 months.

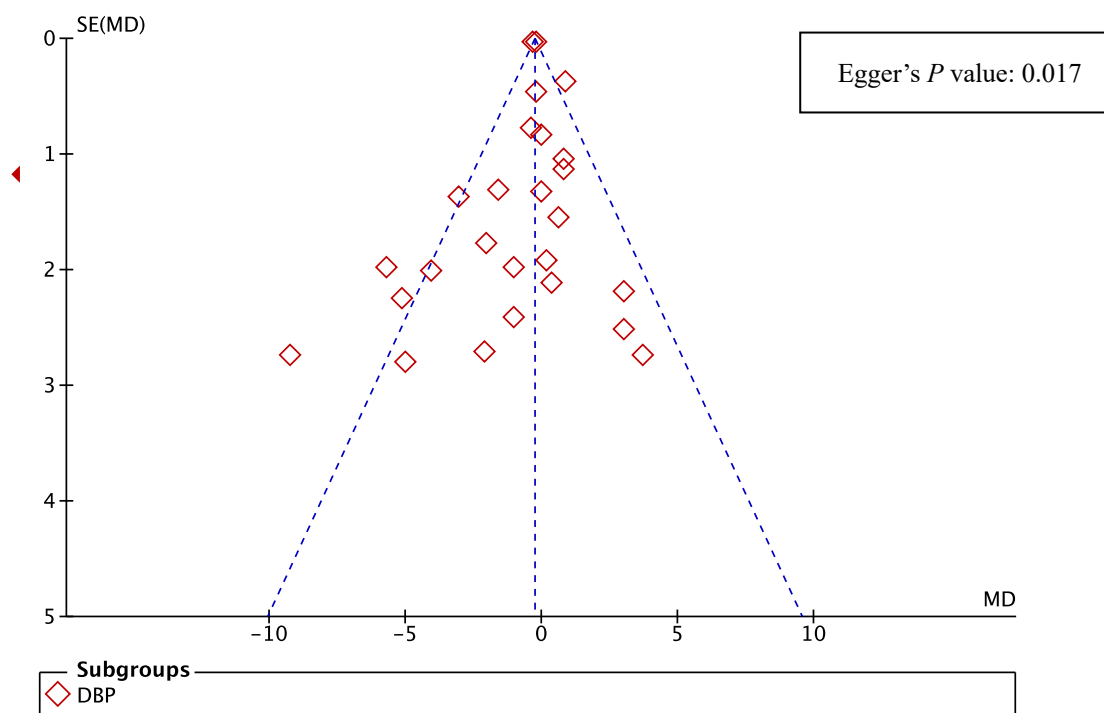


Figure S3-13-2 Funnel plot of RCTs investigating the effect of vitamin D supplementation on DBP in participants with intervention duration ≥ 3 months.

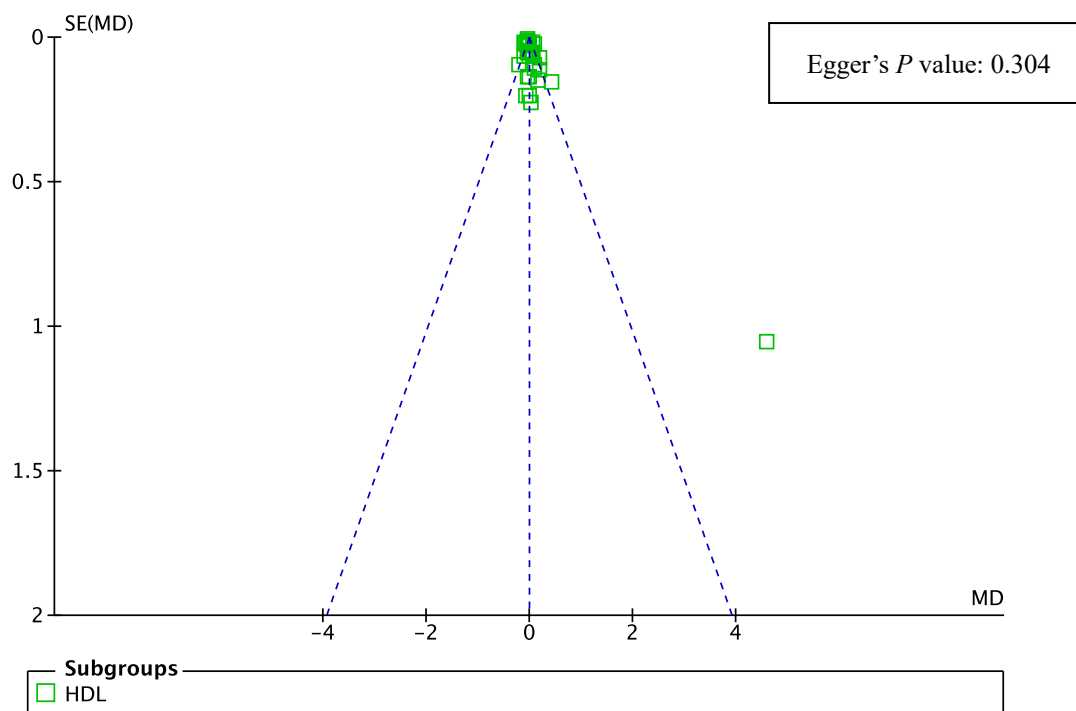


Figure S3-13-3 Funnel plot of RCTs investigating the effect of vitamin D supplementation on HDL-C in participants with intervention duration ≥ 3 months.

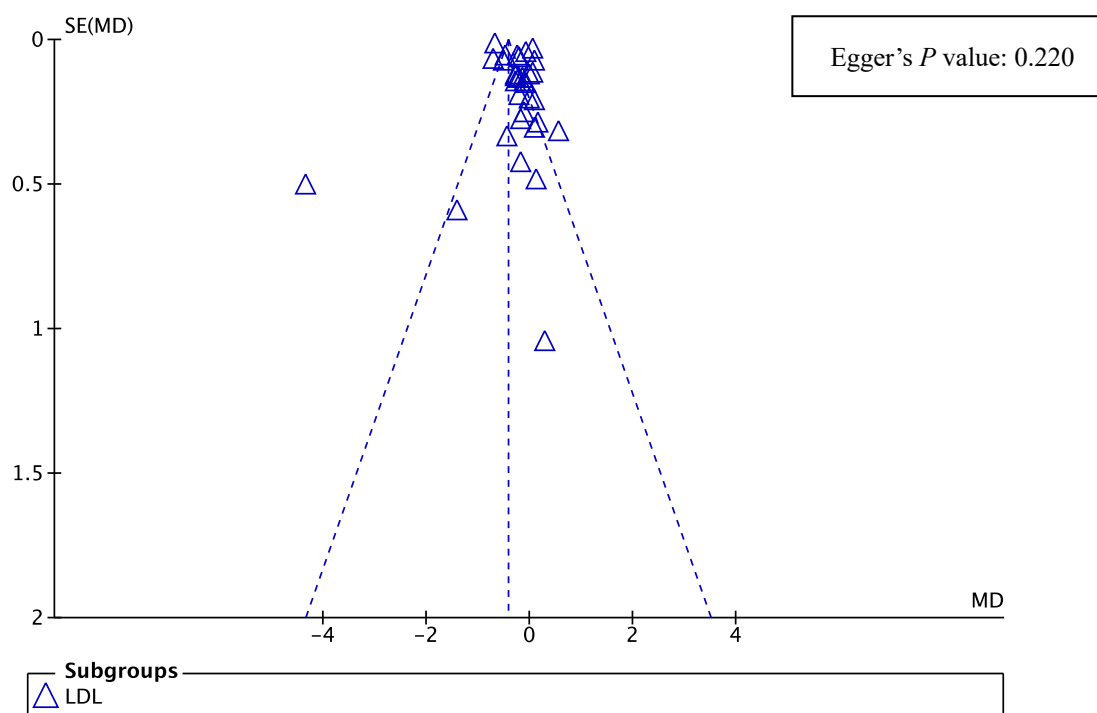


Figure S3-13-4 Funnel plot of RCTs investigating the effect of vitamin D supplementation on LDL-C in participants with intervention duration ≥ 3 months.

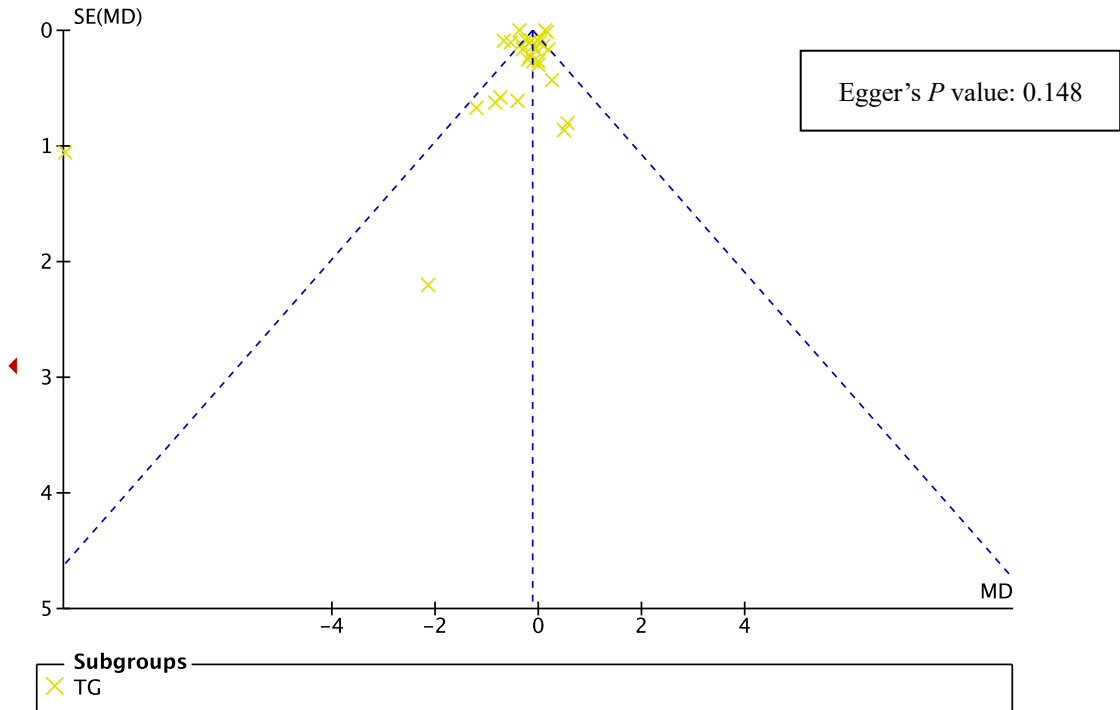


Figure S3-13-5 Funnel plot of RCTs investigating the effect of vitamin D supplementation on TG in participants with intervention duration ≥ 3 months.

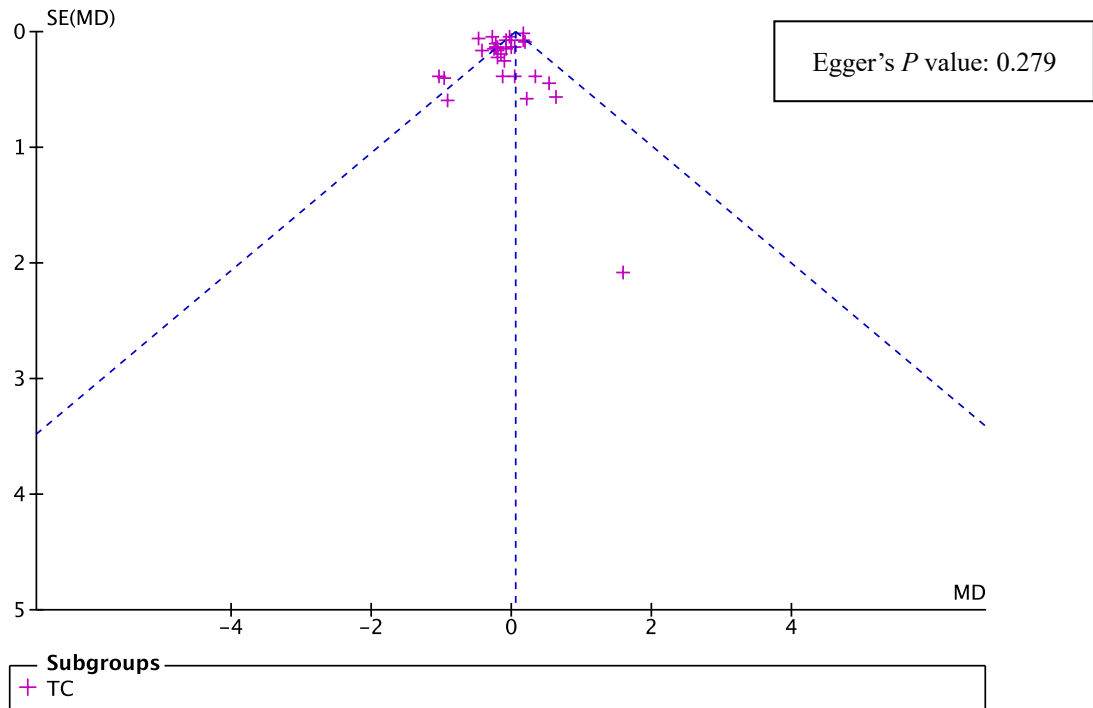


Figure S3-13-6 Funnel plot of RCTs investigating the effect of vitamin D supplementation on TC in participants with intervention duration ≥ 3 months.

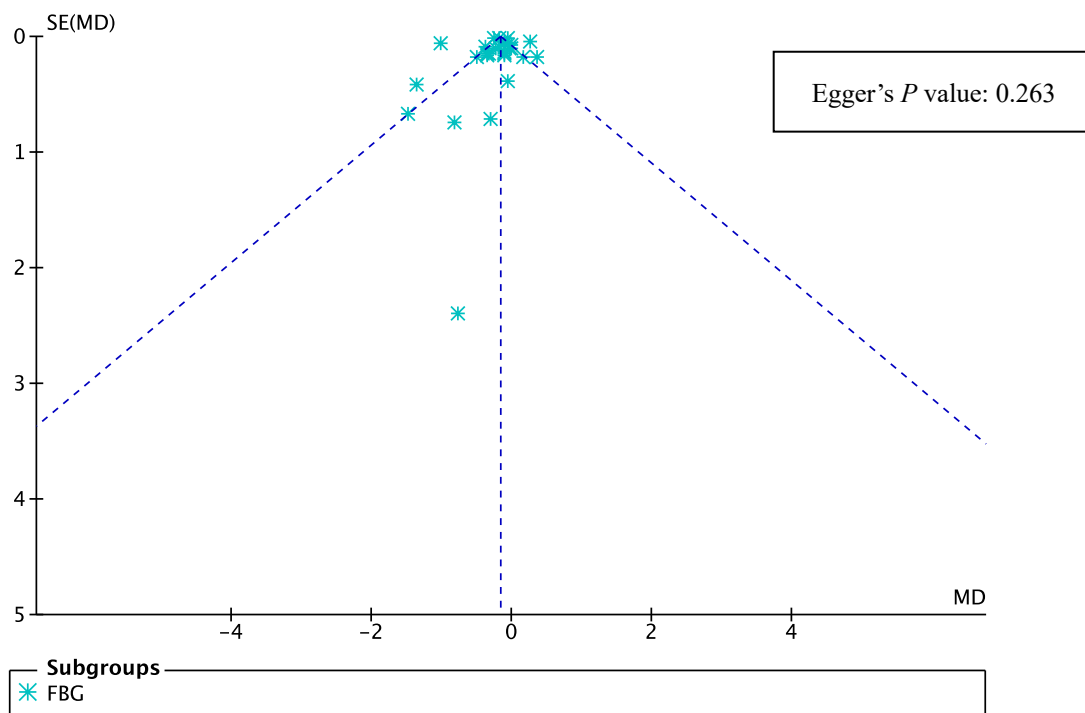


Figure S3-13-7 Funnel plot of RCTs investigating the effect of vitamin D supplementation on FBG in participants with intervention duration ≥ 3 months.

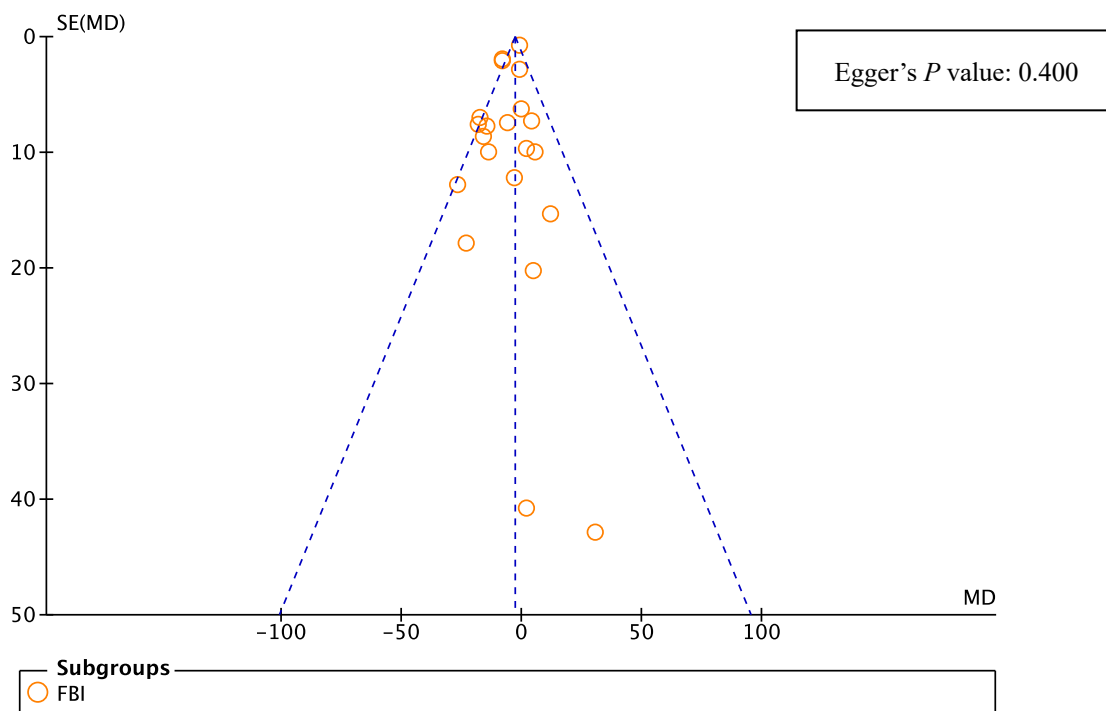


Figure S3-13-8 Funnel plot of RCTs investigating the effect of vitamin D supplementation on FBI in participants with intervention duration ≥ 3 months.

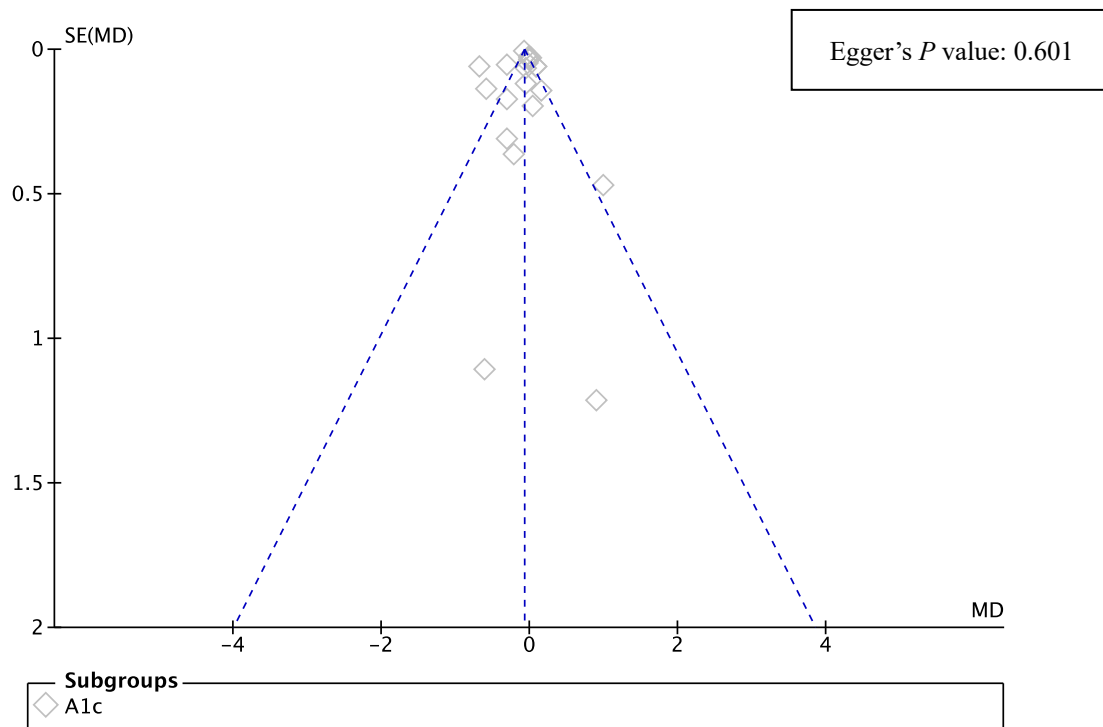


Figure S3-13-9 Funnel plot of RCTs investigating the effect of vitamin D supplementation on A1c in participants with intervention duration ≥ 3 months.

Appendix 5 – GRADE

Table S2-1. GRADE profile for vitamin D supplementation.

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	[VD]	[PLACEBO]	Relative (95% CI)	Absolute (95% CI)		
Outcome - SBP												
52	randomised trials	not serious	serious ^a	not serious	serious ^b	none	5769	5544	-	MD 2.04 lower (3.5 lower to 0.59 lower)	⊕⊕○○ Low	
Outcome - DBP												
52	randomised trials	not serious	serious ^a	not serious	not serious	none	5773	5544	-	MD 3 lower (3.61 lower to 2.39 lower)	⊕⊕⊕○ Moderate	
Outcome - HDL												

Online Supporting Material

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	[VD]	[PLACEBO]	Relative (95% CI)	Absolute (95% CI)		
58	randomised trials	not serious	serious ^a	not serious	serious ^b	none	4231	4170	-	MD 0.02 higher (0.01 lower to 0.04 higher)	⊕⊕○○ Low	

Outcome - LDL

58	randomised trials	not serious	serious ^a	not serious	serious ^b	none	4231	4170	-	MD 0.07 lower (0.16 lower to 0.02 higher)	⊕⊕○○ Low	
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Outcome - TG

56	randomised trials	not serious	serious ^a	not serious	serious ^b	none	4181	4080	-	MD 0.04 lower (0.12 lower to 0.04 higher)	⊕⊕○○ Low	
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Outcome - TC

Online Supporting Material

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	[VD]	[PLACEBO]	Relative (95% CI)	Absolute (95% CI)		
55	randomised trials	not serious	serious ^a	not serious	serious ^b	none	4055	3970	-	MD 0.12 lower (0.21 lower to 0.03 lower)	⊕⊕○○ Low	

Outcome - FBS

46	randomised trials	not serious	serious ^a	not serious	serious ^b	none	3232	3111	-	MD 0.13 lower (0.2 lower to 0.05 lower)	⊕⊕○○ Low	
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Outcome - Insulin

34	randomised trials	not serious	serious ^a	not serious	serious ^b	none	2842	2695	-	MD 7.61 lower (11.93 lower to 3.3 lower)	⊕⊕○○ Low	
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Outcome - HbA1c

Certainty assessment							No of patients		Effect		Certainty	Importance
No of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	[VD]	[PLACEBO]	Relative (95% CI)	Absolute (95% CI)		
31	randomised trials	not serious	serious ^a	not serious	serious ^b	none	1838	1821	-	MD 0.09 lower (0.13 lower to 0.05 lower)	⊕⊕○○ Low	

CI: confidence interval; MD: mean difference

Explanations

- a. Rated down for inconsistency.
- b. Rated down for imprecision.

Table S2-2. GRADE profile for chromium in participants from Western countries.

Certainty assessment							No of patients		Effect		Certainty	Importance
No of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	[VD]	[PLACEBO]	Relative (95% CI)	Absolute (95% CI)		

VD-wes - SBP

Online Supporting Material

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	[VD]	[PLACEBO]	Relative (95% CI)	Absolute (95% CI)		
28	randomised trials	not serious	serious ^a	not serious	serious ^b	none	4594	4344	-	MD 1.38 lower (2.51 lower to 0.24 lower)	⊕⊕○○ Low	

VD-wes - DBP

27	randomised trials	not serious	serious ^a	not serious	serious ^b	none	4559	4308	-	MD 1.08 lower (2.05 lower to 0.12 lower)	⊕⊕○○ Low	
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VD-wes - HDL

25	randomised trials	not serious	serious ^a	not serious	serious ^b	none	2809	2745	-	MD 0.01 higher (0.02 lower to 0.04 higher)	⊕⊕○○ Low	
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VD-wes - LDL

Online Supporting Material

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	[VD]	[PLACEBO]	Relative (95% CI)	Absolute (95% CI)		
25	randomised trials	not serious	serious ^a	not serious	serious ^b	none	2809	2745	-	MD 0.06 lower (0.14 lower to 0.01 higher)	⊕⊕○○ Low	

VD-wes - TG

23	randomised trials	not serious	serious ^a	not serious	serious ^b	none	2811	2692	-	MD 0.03 higher (0.06 lower to 0.11 higher)	⊕⊕○○ Low	
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VD-wes - TC

24	randomised trials	not serious	serious ^a	not serious	serious ^b	none	2730	2618	-	MD 0.04 lower (0.13 lower to 0.05 higher)	⊕⊕○○ Low	
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VD-wes - FBS

Online Supporting Material

Certainty assessment							No of patients		Effect		Certainty	Importance
No of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	[VD]	[PLACEBO]	Relative (95% CI)	Absolute (95% CI)		
24	randomised trials	not serious	serious ^a	not serious	serious ^b	none	2291	2185	-	MD 0.06 lower (0.14 lower to 0.01 higher)	⊕⊕○○ Low	

VD-wes - Insulin

16	randomised trials	not serious	not serious	not serious	serious ^b	none	1804	1821	-	MD 0.81 lower (4.87 lower to 3.24 higher)	⊕⊕⊕○ Moderate	
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VD-wes - HbA1c

17	randomised trials	not serious	serious ^a	not serious	serious ^b	none	1069	1048	-	MD 0.02 higher (0.04 lower to 0.08 higher)	⊕⊕○○ Low	
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CI: confidence interval; MD: mean difference

Explanations

- a. Rated down for inconsistency.
- b. Rated down for imprecision.

Table S2-3. GRADE profile for chromium in participants from non-Western countries.

Certainty assessment							No of patients		Effect		Certainty	Importance
No of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	VD	PLACBEO	Relative (95% CI)	Absolute (95% CI)		

VD-nonw - SBP

24	randomised trials	not serious	serious ^a	not serious	serious ^b	none	1175	1200	-	MD 0.49 lower (0.87 lower to 0.1 lower)	⊕⊕○○ Low	
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VD-nonw - DBP

24	randomised trials	not serious	serious ^a	not serious	serious ^b	none	1179	1200	-	MD 0.38 lower (0.67 lower to 0.1 lower)	⊕⊕○○ Low	
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VD-nonw - HDL

Online Supporting Material

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	VD	PLACBEO	Relative (95% CI)	Absolute (95% CI)		
32	randomised trials	not serious	serious ^a	not serious	serious ^b	none	1345	1360	-	MD 0.03 higher (0.01 lower to 0.07 higher)	⊕⊕○○ Low	

VD-nonw - LDL

31	randomised trials	not serious	serious ^a	not serious	serious ^b	none	1304	1319	-	MD 0.06 lower (0.23 lower to 0.12 higher)	⊕⊕○○ Low	
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VD-nonw - TG

33	randomised trials	not serious	serious ^a	not serious	serious ^b	none	1370	1388	-	MD 0.17 lower (0.39 lower to 0.05 higher)	⊕⊕○○ Low	
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VD-nonw - TC

Online Supporting Material

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	VD	PLACBEO	Relative (95% CI)	Absolute (95% CI)		
31	randomised trials	not serious	serious ^a	not serious	serious ^b	none	1308	1335	-	MD 0.2 lower (0.33 lower to 0.06 lower)	⊕⊕○○ Low	

VD-nonw - FBS

22	randomised trials	not serious	serious ^a	not serious	serious ^b	none	941	926	-	MD 0.2 lower (0.34 lower to 0.07 lower)	⊕⊕○○ Low	
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VD-nonw - Insulin

16	randomised trials	not serious	serious ^a	not serious	not serious	none	932	769	-	MD 13.21 lower (20.84 lower to 5.58 lower)	⊕⊕⊕○ Moderate	
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VD-nonw - HbA1c

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	VD	PLACBEO	Relative (95% CI)	Absolute (95% CI)		
12	randomised trials	not serious	serious ^a	not serious	serious ^b	none	691	695	-	MD 0.29 lower (0.54 lower to 0.05 lower)	⊕⊕○○ Low	

CI: confidence interval; MD: mean difference

Explanations

- a. Rated down for inconsistency.
- b. Rated down for imprecision.

Table S2-4. GRADE profile for chromium in participants with baseline 25-hydroxyvitamin D < 15.0 ng/mL.

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	[VD]	[placebo]	Relative (95% CI)	Absolute (95% CI)		

VD baseline low - SBP

Online Supporting Material

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	[VD]	[placebo]	Relative (95% CI)	Absolute (95% CI)		
29	randomised trials	not serious	serious ^a	not serious	serious ^b	none	2331	2104	-	MD 0.97 lower (1.42 lower to 0.52 lower)	⊕⊕○○ Low	

VD baseline low - DBP

29	randomised trials	not serious	serious ^a	not serious	not serious	none	2335	2104	-	MD 4.66 lower (5.58 lower to 3.73 lower)	⊕⊕⊕○ Moderate	
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VD baseline low - HDL

27	randomised trials	not serious	serious ^a	not serious	serious ^b	none	1311	1239	-	MD 0.02 higher (0.02 lower to 0.06 higher)	⊕⊕○○ Low	
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VD baseline low - LDL

Online Supporting Material

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	[VD]	[placebo]	Relative (95% CI)	Absolute (95% CI)		
27	randomised trials	not serious	serious ^a	not serious	serious ^b	none	1311	1239	-	MD 0.11 lower (0.21 lower to 0)	⊕⊕○○ Low	

VD baseline low - TG

26	randomised trials	not serious	serious ^a	not serious	serious ^b	none	1303	1231	-	MD 0.11 lower (0.32 lower to 0.09 higher)	⊕⊕○○ Low	
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VD baseline low - TC

24	randomised trials	not serious	serious ^a	not serious	not serious	none	1099	1026	-	MD 0.26 lower (0.37 lower to 0.14 lower)	⊕⊕⊕○ Moderate	
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VD baseline low - FBG

Online Supporting Material

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	[VD]	[placebo]	Relative (95% CI)	Absolute (95% CI)		
21	randomised trials	not serious	serious ^a	not serious	serious ^b	none	899	812	-	MD 0.14 lower (0.23 lower to 0.05 lower)	⊕⊕○○ Low	

VD baseline low - FBI

16	randomised trials	not serious	serious ^a	not serious	not serious	none	809	651	-	MD 14.19 lower (20.02 lower to 8.37 lower)	⊕⊕⊕○ Moderate	
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VD baseline low - A1c

11	randomised trials	not serious	serious ^a	not serious	serious ^b	none	482	499	-	MD 0.27 lower (0.48 lower to 0.05 lower)	⊕⊕○○ Low	
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CI: confidence interval; MD: mean difference

Explanations

- a. Rated down for inconsistency.
- b. Rated down for imprecision.

Table S2-5. GRADE profile for chromium in participants with baseline 25-hydroxyvitamin D \geq 15.0 ng/mL.

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	[VD]	[placebo]	Relative (95% CI)	Absolute (95% CI)		
VD baseline high - SBP												
19	randomised trials	not serious	serious ^a	not serious	serious ^b	none	2169	2174	-	MD 2.4 lower (5.33 lower to 0.52 higher)	⊕⊕○○ Low	
VD baseline high - DBP												
19	randomised trials	not serious	serious ^a	not serious	serious ^b	none	2169	2174	-	MD 0.48 lower (1.25 lower to 0.29 higher)	⊕⊕○○ Low	

Online Supporting Material

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	[VD]	[placebo]	Relative (95% CI)	Absolute (95% CI)		

VD baseline high - HDL

24	randomised trials	not serious	serious ^a	not serious	serious ^b	none	1476	1498	-	MD 0.02 higher (0.02 lower to 0.06 higher)	⊕⊕○○ Low	
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VD baseline high - LDL

24	randomised trials	not serious	serious ^a	not serious	serious ^b	none	1476	1498	-	MD 0.14 lower (0.26 lower to 0.03 lower)	⊕⊕○○ Low	
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VD baseline high - TG

23	randomised trials	not serious	serious ^a	not serious	serious ^b	none	1434	1416	-	MD 0.03 higher (0.1 lower to 0.16 higher)	⊕⊕○○ Low	
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Online Supporting Material

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	[VD]	[placebo]	Relative (95% CI)	Absolute (95% CI)		

VD baseline high - TC

22	randomised trials	not serious	serious ^a	not serious	serious ^b	none	1421	1418	-	MD 0.02 lower (0.13 lower to 0.08 higher)	⊕⊕○○ Low	
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VD baseline high - FBG

21	randomised trials	not serious	serious ^a	not serious	serious ^b	none	1347	1314	-	MD 0.11 lower (0.23 lower to 0.01 higher)	⊕⊕○○ Low	
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VD baseline high - FBI

13	randomised trials	not serious	not serious	not serious	serious ^b	none	1004	1013	-	MD 1.66 lower (6.27 lower to 2.96 higher)	⊕⊕⊕○ Moderate	
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Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	[VD]	[placebo]	Relative (95% CI)	Absolute (95% CI)		

VD baseline high - A1c

18	randomised trials	not serious	serious ^a	not serious	serious ^b	none	1284	1250	-	MD 0.03 lower (0.08 lower to 0.01 higher)	⊕⊕○○ Low	
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CI: confidence interval; MD: mean difference

Explanations

- a. Rated down for inconsistency.
- b. Rated down for imprecision.

Table S2-6. GRADE profile for chromium in participants with BMI < 30 kg/m².

Online Supporting Material

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	[VD]	[placebo]	Relative (95% CI)	Absolute (95% CI)		

30 BMI low - SBP

26	randomised trials	not serious	serious ^a	not serious	serious ^b	none	2509	2530	-	MD 2.37 lower (4.39 lower to 0.34 lower)	⊕⊕○○ Low	
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30 BMI low - DBP

26	randomised trials	not serious	serious ^a	not serious	not serious	none	2518	2532	-	MD 4.15 lower (4.98 lower to 3.32 lower)	⊕⊕⊕○ Moderate	
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30 BMI low - HDL

33	randomised trials	not serious	serious ^a	not serious	serious ^b	none	1624	1624	-	MD 0.03 higher (0.01 lower to 0.06 higher)	⊕⊕○○ Low	
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Online Supporting Material

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	[VD]	[placebo]	Relative (95% CI)	Absolute (95% CI)		

30 BMI low - LDL

33	randomised trials	not serious	serious ^a	not serious	serious ^b	none	1624	1624	-	MD 0.07 lower (0.22 lower to 0.08 higher)	⊕⊕○○ Low	
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30 BMI low - TG

34	randomised trials	not serious	serious ^a	not serious	serious ^b	none	1704	1665	-	MD 0.08 lower (0.19 lower to 0.02 higher)	⊕⊕○○ Low	
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30 BMI low - TC

32	randomised trials	not serious	serious ^a	not serious	serious ^b	none	1641	1613	-	MD 0.11 lower (0.26 lower to 0.04 higher)	⊕⊕○○ Low	
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Online Supporting Material

Certainty assessment							No of patients		Effect		Certainty	Importance
No of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	[VD]	[placebo]	Relative (95% CI)	Absolute (95% CI)		

30 BMI low - FBG

24	randomised trials	not serious	serious ^a	not serious	serious ^b	none	1293	1248	-	MD 0.21 lower (0.33 lower to 0.09 lower)	⊕⊕○○ Low	
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30 BMI low - FBI

17	randomised trials	not serious	serious ^a	not serious	not serious	none	1180	1013	-	MD 12.69 lower (18.31 lower to 7.08 lower)	⊕⊕⊕○ Moderate	
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30 BMI low - A1c

16	randomised trials	not serious	serious ^a	not serious	serious ^b	none	1055	1004	-	MD 0.18 lower (0.38 lower to 0.01 higher)	⊕⊕○○ Low	
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CI: confidence interval; MD: mean difference

Explanations

- a. Rated down for inconsistency,
- b. Rated down for imprecision.

Table S2-7. GRADE profile for chromium in participants with BMI ≥ 30 kg/m².

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	[VD]	[placebo]	Relative (95% CI)	Absolute (95% CI)		
30 BMI high - SBP												
20	randomised trials	not serious	serious ^a	not serious	serious ^b	none	1002	1020	-	MD 1.13 lower (3.44 lower to 1.17 higher)	⊕⊕○○ Low	

30 BMI high - DBP

Online Supporting Material

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	[VD]	[placebo]	Relative (95% CI)	Absolute (95% CI)		
20	randomised trials	not serious	serious ^a	not serious	serious ^b	none	1002	1020	-	MD 0.73 lower (1.98 lower to 0.52 higher)	⊕⊕○○ Low	

30 BMI high - HDL

18	randomised trials	not serious	not serious	not serious	serious ^b	none	1049	1072	-	MD 0.01 lower (0.03 lower to 0.02 higher)	⊕⊕⊕○ Moderate	
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30 BMI high - LDL

18	randomised trials	not serious	serious ^a	not serious	serious ^b	none	1049	1072	-	MD 0.03 lower (0.12 lower to 0.06 higher)	⊕⊕○○ Low	
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30 BMI high - TG

Online Supporting Material

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	[VD]	[placebo]	Relative (95% CI)	Absolute (95% CI)		
16	randomised trials	not serious	serious ^a	not serious	serious ^b	none	985	1006	-	MD 0.01 higher (0.18 lower to 0.2 higher)	⊕⊕○○ Low	

30 BMI high - TC

15	randomised trials	not serious	not serious	not serious	serious ^b	none	831	855	-	MD 0.07 lower (0.16 lower to 0.03 higher)	⊕⊕⊕○ Moderate	
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30 BMI high - FBG

15	randomised trials	not serious	serious ^a	not serious	serious ^b	none	737	748	-	MD 0.06 lower (0.16 lower to 0.05 higher)	⊕⊕○○ Low	
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30 BMI high - FBI

Online Supporting Material

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	[VD]	[placebo]	Relative (95% CI)	Absolute (95% CI)		
10	randomised trials	not serious	serious ^a	not serious	serious ^b	none	563	578	-	MD 2.59 lower (17.68 lower to 12.5 higher)	⊕⊕○○ Low	

30 BMI high - A1c

14	randomised trials	not serious	serious ^a	not serious	serious ^b	none	726	760	-	MD 0.02 lower (0.05 lower to 0.02 higher)	⊕⊕○○ Low	
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CI: confidence interval; MD: mean difference

Explanations

- a. Rated down for inconsistency.
- b. Rated down for imprecision.

Table S2-8. GRADE profile for chromium in participants with vitamin D supplementation dose < 3320IU.

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	[VD]	[placebo]	Relative (95% CI)	Absolute (95% CI)		
dose low - SBP												
29	randomised trials	not serious	serious ^a	not serious	serious ^b	none	2688	2675	-	MD 1.71 lower (4.12 lower to 0.7 higher)	⊕⊕○○ Low	
dose low - DBP												
29	randomised trials	not serious	serious ^a	not serious	not serious	none	2688	2675	-	MD 3.43 lower (4.53 lower to 2.32 lower)	⊕⊕⊕○ Moderate	
dose low - HDL												

Online Supporting Material

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	[VD]	[placebo]	Relative (95% CI)	Absolute (95% CI)		
29	randomised trials	not serious	serious ^a	not serious	serious ^b	none	1677	1675	-	MD 0.01 higher (0.02 lower to 0.04 higher)	⊕⊕○○ Low	

dose low - LDL

29	randomised trials	not serious	serious ^a	not serious	serious ^b	none	1677	1675	-	MD 0 (0.15 lower to 0.16 higher)	⊕⊕○○ Low	
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dose low - TG

28	randomised trials	not serious	serious ^a	not serious	serious ^b	none	1667	1624	-	MD 0.04 lower (0.14 lower to 0.06 higher)	⊕⊕○○ Low	
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dose low - TC

Online Supporting Material

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	[VD]	[placebo]	Relative (95% CI)	Absolute (95% CI)		
29	randomised trials	not serious	serious ^a	not serious	serious ^b	none	1729	1693	-	MD 0.11 lower (0.23 lower to 0.01 higher)	⊕⊕○○ Low	

dose low - FBG

25	randomised trials	not serious	serious ^a	not serious	serious ^b	none	2206	2162	-	MD 0.09 lower (0.17 lower to 0.01 lower)	⊕⊕○○ Low	
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dose low - FBI

19	randomised trials	not serious	serious ^a	not serious	serious ^b	none	2222	2054	-	MD 9.32 lower (14.63 lower to 4.02 lower)	⊕⊕○○ Low	
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dose low - A1c

Certainty assessment							No of patients		Effect		Certainty	Importance
No of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	[VD]	[placebo]	Relative (95% CI)	Absolute (95% CI)		
14	randomised trials	not serious	serious ^a	not serious	serious ^b	none	960	920	-	MD 0.01 lower (0.07 lower to 0.05 higher)	⊕⊕○○ Low	

CI: confidence interval; MD: mean difference

Explanations

- a. Rated down for inconsistency.
- b. Rated down for imprecision.

Table S2-9. GRADE profile for chromium in participants with vitamin D supplementation dose ≥ 3320IU.

Certainty assessment							No of patients		Effect		Certainty	Importance
No of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	[VD]	[placebo]	Relative (95% CI)	Absolute (95% CI)		

dose high - SBP

Online Supporting Material

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	[VD]	[placebo]	Relative (95% CI)	Absolute (95% CI)		
22	randomised trials	not serious	serious ^a	not serious	serious ^b	none	3066	2859	-	MD 2.25 lower (3.67 lower to 0.84 lower)	⊕⊕○○ Low	

dose high - DBP

22	randomised trials	not serious	serious ^a	not serious	serious ^b	none	3070	2859	-	MD 2.25 lower (3.34 lower to 1.16 lower)	⊕⊕○○ Low	
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dose high - HDL

26	randomised trials	not serious	serious ^a	not serious	serious ^b	none	2453	2390	-	MD 0.02 higher (0.01 lower to 0.06 higher)	⊕⊕○○ Low	
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dose high - LDL

Online Supporting Material

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	[VD]	[placebo]	Relative (95% CI)	Absolute (95% CI)		
26	randomised trials	not serious	serious ^a	not serious	serious ^b	none	2453	2390	-	MD 0.12 lower (0.23 lower to 0.01 lower)	⊕⊕○○ Low	

dose high - TG

25	randomised trials	not serious	serious ^a	not serious	serious ^b	none	2413	2351	-	MD 0.06 lower (0.23 lower to 0.11 higher)	⊕⊕○○ Low	
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dose high - TC

23	randomised trials	not serious	serious ^a	not serious	serious ^b	none	2225	2172	-	MD 0.13 lower (0.28 lower to 0.02 higher)	⊕⊕○○ Low	
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dose high - FBG

Online Supporting Material

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	[VD]	[placebo]	Relative (95% CI)	Absolute (95% CI)		
21	randomised trials	not serious	serious ^a	not serious	serious ^b	none	1026	949	-	MD 0.15 lower (0.28 lower to 0.03 lower)	⊕⊕○○ Low	

dose high - FBI

14	randomised trials	not serious	serious ^a	not serious	serious ^b	none	577	595	-	MD 7.77 lower (14.11 lower to 1.43 lower)	⊕⊕○○ Low	
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dose high - A1c

17	randomised trials	not serious	serious ^a	not serious	serious ^b	none	878	901	-	MD 0.15 lower (0.22 lower to 0.09 lower)	⊕⊕○○ Low	
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CI: confidence interval; MD: mean difference

Explanations

- a. Rated down for inconsistency.
- b. Rated down for imprecision.

Table S2-10. GRADE profile for chromium in participants aged < 50.

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	[VD]	[placebo]	Relative (95% CI)	Absolute (95% CI)		
age<50 - SBP												
24	randomised trials	not serious	serious ^a	not serious	serious ^b	none	2081	1847	-	MD 0.5 lower (0.87 lower to 0.12 lower)	⊕⊕○○ Low	
age<50 - DBP												
23	randomised trials	not serious	serious ^a	not serious	serious ^b	none	2043	1808	-	MD 1.12 lower (1.51 lower to 0.72 lower)	⊕⊕○○ Low	

Online Supporting Material

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	[VD]	[placebo]	Relative (95% CI)	Absolute (95% CI)		

age<50 - HDL

28	randomised trials	not serious	serious ^a	not serious	serious ^b	none	1384	1406	-	MD 0.01 higher (0.02 lower to 0.04 higher)	⊕⊕○○ Low	
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age<50 - LDL

28	randomised trials	not serious	serious ^a	not serious	serious ^b	none	1384	1406	-	MD 0.13 lower (0.23 lower to 0.02 lower)	⊕⊕○○ Low	
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age<50 - TG

28	randomised trials	not serious	serious ^a	not serious	serious ^b	none	1399	1383	-	MD 0.05 lower (0.17 lower to 0.06 higher)	⊕⊕○○ Low	
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Online Supporting Material

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	[VD]	[placebo]	Relative (95% CI)	Absolute (95% CI)		

age<50 - TC

25	randomised trials	not serious	serious ^a	not serious	serious ^b	none	1129	1131	-	MD 0.13 lower (0.26 lower to 0)	⊕⊕○○ Low	
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age<50 - FBG

25	randomised trials	not serious	serious ^a	not serious	serious ^b	none	1212	1182	-	MD 0.08 lower (0.19 lower to 0.04 higher)	⊕⊕○○ Low	
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age<50 - FBI

17	randomised trials	not serious	serious ^a	not serious	not serious	none	1013	861	-	MD 11.57 lower (17.25 lower to 5.9 lower)	⊕⊕⊕○ Moderate	
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age<50 - A1c

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	[VD]	[placebo]	Relative (95% CI)	Absolute (95% CI)		
13	randomised trials	not serious	serious ^a	not serious	serious ^b	none	774	751	-	MD 0.07 lower (0.15 lower to 0.02 higher)	⊕⊕○○ Low	

CI: confidence interval; MD: mean difference

Explanations

- a. Rated down for inconsistency.
- b. Rated down for imprecision.

Table S2-11. GRADE profile for chromium in participants aged ≥ 50.

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	[VD]	[placebo]	Relative (95% CI)	Absolute (95% CI)		

age>=50 - SBP

Online Supporting Material

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	[VD]	[placebo]	Relative (95% CI)	Absolute (95% CI)		
22	randomised trials	not serious	serious ^a	not serious	serious ^b	none	2093	2101	-	MD 3.84 lower (6.63 lower to 1.05 lower)	⊕⊕○○ Low	

age>=50 - DBP

22	randomised trials	not serious	serious ^a	not serious	serious ^b	none	2093	2101	-	MD 5.66 lower (11.32 lower to 0)	⊕⊕○○ Low	
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age>=50 - HDL

18	randomised trials	not serious	serious ^a	not serious	serious ^b	none	786	801	-	MD 0.03 higher (0.03 lower to 0.09 higher)	⊕⊕○○ Low	
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age>=50 - LDL

Online Supporting Material

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	[VD]	[placebo]	Relative (95% CI)	Absolute (95% CI)		
18	randomised trials	not serious	serious ^a	not serious	serious ^b	none	786	801	-	MD 0.58 lower (1.15 lower to 0.01 lower)	⊕⊕○○ Low	

age>=50 - TG

17	randomised trials	not serious	not serious	not serious	serious ^b	none	730	743	-	MD 0.47 lower (0.93 lower to 0.02 lower)	⊕⊕⊕○ Moderate	
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age>=50 - TC

17	randomised trials	not serious	serious ^a	not serious	serious ^b	none	730	741	-	MD 0.1 lower (0.2 lower to 0)	⊕⊕○○ Low	
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age>=50 - FBG

Online Supporting Material

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	[VD]	[placebo]	Relative (95% CI)	Absolute (95% CI)		
12	randomised trials	not serious	serious ^a	not serious	serious ^b	none	446	444	-	MD 0.17 lower (0.29 lower to 0.05 lower)	⊕⊕○○ Low	

age>=50 - FBI

8	randomised trials	not serious	not serious	not serious	serious ^b	none	309	312	-	MD 8.12 lower (15.13 lower to 1.1 lower)	⊕⊕⊕○ Moderate	
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age>=50 - A1c

10	randomised trials	not serious	serious ^a	not serious	serious ^b	none	355	354	-	MD 0.06 lower (0.11 lower to 0.01 lower)	⊕⊕○○ Low	
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CI: confidence interval; MD: mean difference

Explanations

- a. Rated down for inconsistency.
- b. Rated down for imprecision.

Table S2-12. GRADE profile for chromium in participants with intervention duration < 3 months.

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	[VD]	[placebo]	Relative (95% CI)	Absolute (95% CI)		
duration<3m - SBP												
24	randomised trials	not serious	serious ^a	not serious	serious ^b	none	1962	1703	-	MD 3.27 lower (5.06 lower to 1.48 lower)	⊕⊕○○ Low	
duration<3m - DBP												
23	randomised trials	not serious	serious ^a	not serious	serious ^b	none	1897	1638	-	MD 2.21 lower (3.73 lower to 0.68 lower)	⊕⊕○○ Low	

Online Supporting Material

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	[VD]	[placebo]	Relative (95% CI)	Absolute (95% CI)		

duration<3m - HDL

26	randomised trials	not serious	serious ^a	not serious	serious ^b	none	980	991	-	MD 0.04 higher (0.01 lower to 0.08 higher)	⊕⊕○○ Low	
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duration<3m - LDL

26	randomised trials	not serious	serious ^a	not serious	serious ^b	none	980	991	-	MD 0.11 lower (0.28 lower to 0.05 higher)	⊕⊕○○ Low	
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duration<3m - TG

26	randomised trials	not serious	serious ^a	not serious	serious ^b	none	996	1010	-	MD 0.2 lower (0.39 lower to 0.01 lower)	⊕⊕○○ Low	
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Online Supporting Material

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	[VD]	[placebo]	Relative (95% CI)	Absolute (95% CI)		

duration<3m - TC

24	randomised trials	not serious	serious ^a	not serious	serious ^b	none	886	904	-	MD 0.15 lower (0.35 lower to 0.04 higher)	⊕⊕○○ Low	
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duration<3m - FBG

17	randomised trials	not serious	serious ^a	not serious	serious ^b	none	663	673	-	MD 0.04 lower (0.17 lower to 0.09 higher)	⊕⊕○○ Low	
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duration<3m - FBI

12	randomised trials	not serious	serious ^a	not serious	serious ^b	none	628	467	-	MD 13.49 lower (24.44 lower to 2.55 lower)	⊕⊕○○ Low	
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Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	[VD]	[placebo]	Relative (95% CI)	Absolute (95% CI)		
duration<3m - A1c												
10	randomised trials	not serious	serious ^a	not serious	serious ^b	none	409	416	-	MD 0.28 lower (0.38 lower to 0.18 lower)	⊕⊕○○ Low	

CI: confidence interval; MD: mean difference

Explanations

- a. Rated down for inconsistency.
- b. Rated down for imprecision.

Table S2-13. GRADE profile for chromium in participants with intervention duration ≥ 3 months.

Online Supporting Material

Certainty assessment							No of patients		Effect		Certainty	Importance
No of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	[VD]	[placebo]	Relative (95% CI)	Absolute (95% CI)		

duration >=3m - SBP

27	randomised trials	not serious	serious ^a	not serious	serious ^b	none	2731	2760	-	MD 0.31 lower (0.61 lower to 0.01 lower)	⊕⊕○○ Low	
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duration >=3m - DBP

27	randomised trials	not serious	serious ^a	not serious	not serious	none	2735	2760	-	MD 4.01 lower (4.95 lower to 3.07 lower)	⊕⊕⊕○ Moderate	
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duration >=3m - HDL

32	randomised trials	not serious	serious ^a	not serious	serious ^b	none	3251	3179	-	MD 0.01 higher (0.02 lower to 0.03 higher)	⊕⊕○○ Low	
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Online Supporting Material

Certainty assessment							No of patients		Effect		Certainty	Importance
No of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	[VD]	[placebo]	Relative (95% CI)	Absolute (95% CI)		

duration >=3m - LDL

32	randomised trials	not serious	serious ^a	not serious	serious ^b	none	3251	3179	-	MD 0.23 lower (0.38 lower to 0.08 lower)	⊕⊕○○ Low	
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duration >=3m - TG

30	randomised trials	not serious	serious ^a	not serious	serious ^b	none	3185	3070	-	MD 0.2 lower (0.35 lower to 0.05 lower)	⊕⊕○○ Low	
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duration >=3m - TC

30	randomised trials	not serious	serious ^a	not serious	serious ^b	none	3161	3058	-	MD 0.11 lower (0.22 lower to 0)	⊕⊕○○ Low	
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Online Supporting Material

Certainty assessment							No of patients		Effect		Certainty	Importance
No of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	[VD]	[placebo]	Relative (95% CI)	Absolute (95% CI)		

duration >=3m - FBG

29	randomised trials	not serious	serious ^a	not serious	serious ^b	none	2569	2438	-	MD 0.17 lower (0.26 lower to 0.09 lower)	⊕⊕○○ Low	
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duration >=3m - FBI

21	randomised trials	not serious	serious ^a	not serious	serious ^b	none	2171	2182	-	MD 5.72 lower (9.09 lower to 2.35 lower)	⊕⊕○○ Low	
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duration >=3m - A1c

21	randomised trials	not serious	serious ^a	not serious	serious ^b	none	1429	1405	-	MD 0.09 lower (0.16 lower to 0.02 lower)	⊕⊕○○ Low	
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CI: confidence interval; MD: mean difference

Explanations

- a. Rated down for inconsistency.
- b. Rated down for imprecision.

Appendix 6 - Results of sensitivity analysis of the systematic removal of each study

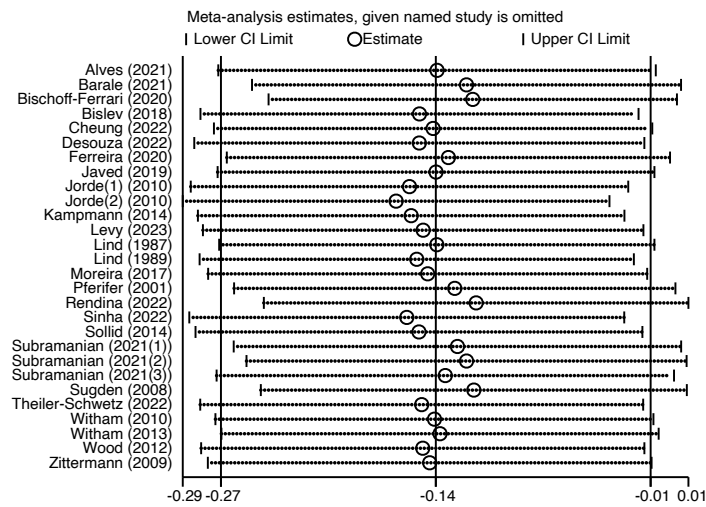


Figure S4-1 Sensitivity analysis of the systematic removal of each study for SBP in participants from Western countries.

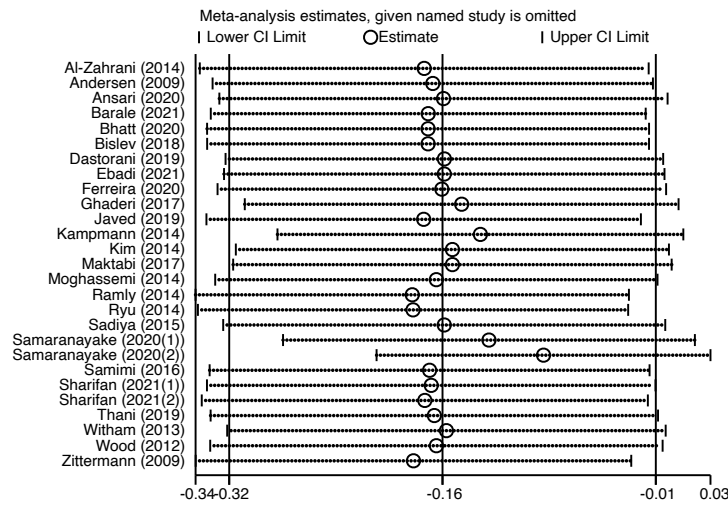


Figure S4-2 Sensitivity analysis of the systematic removal of each study for LDL-C in participants with baseline 25-hydroxyvitamin D < 15.0 ng/mL.

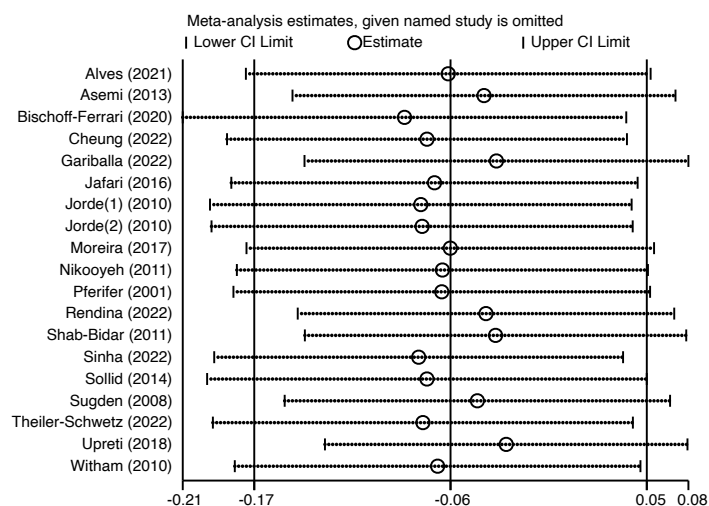


Figure S4-3 Sensitivity analysis of the systematic removal of each study for DBP in participants with baseline 25-hydroxyvitamin D \geq 15.0 ng/mL.

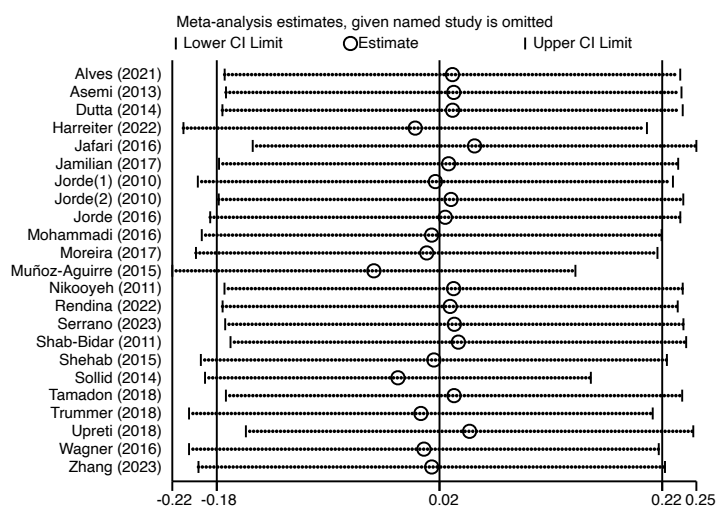


Figure S4-4 Sensitivity analysis of the systematic removal of each study for TG in participants with baseline 25-hydroxyvitamin D \geq 15.0 ng/mL.

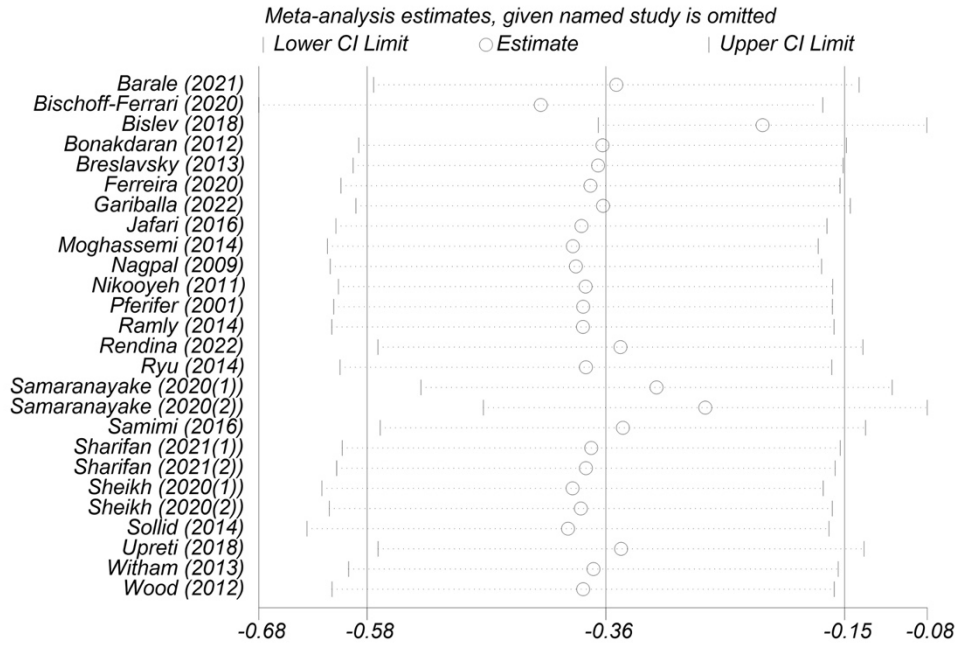


Figure S4-5 Sensitivity analysis of the systematic removal of each study for DBP in participants with BMI < 30 kg/m².

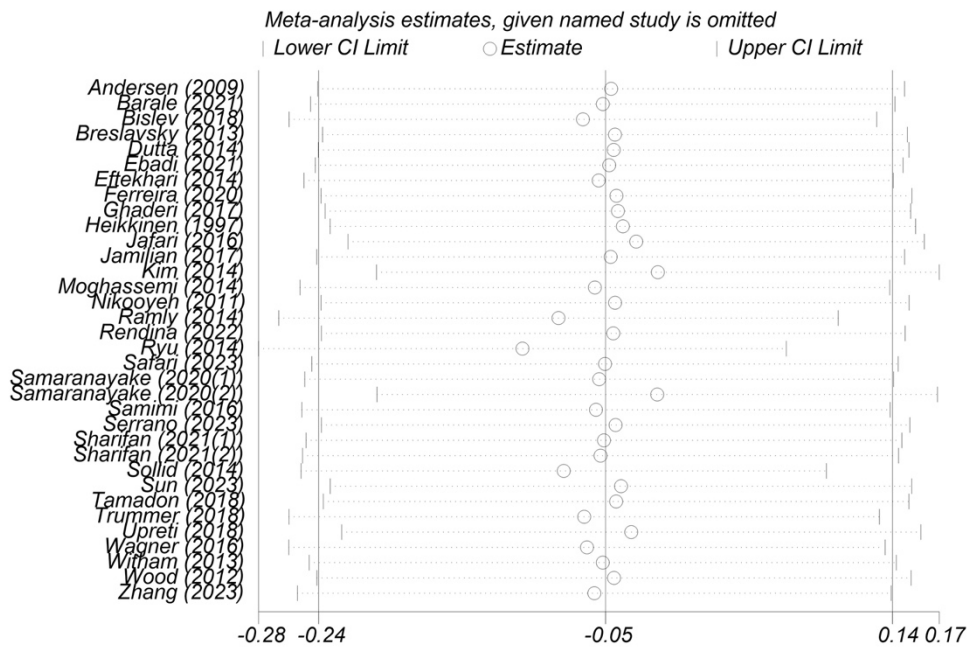


Figure S4-6 Sensitivity analysis of the systematic removal of each study for TG in participants with BMI < 30 kg/m².

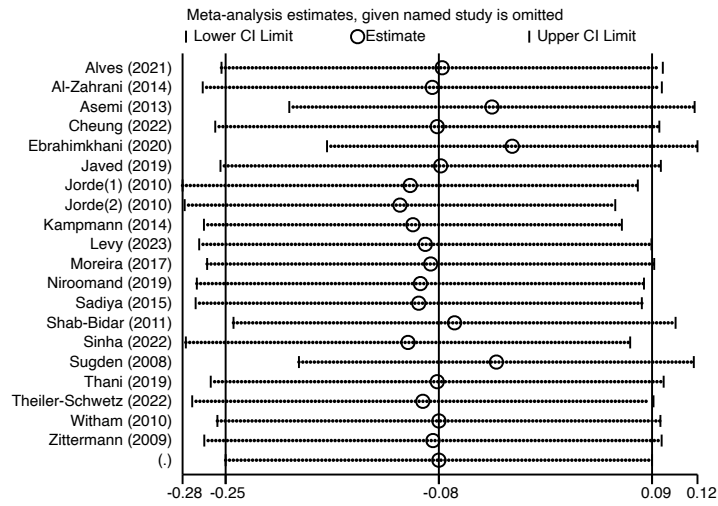


Figure S4-7 Sensitivity analysis of the systematic removal of each study for SBP in participants with BMI ≥ 30 kg/m².

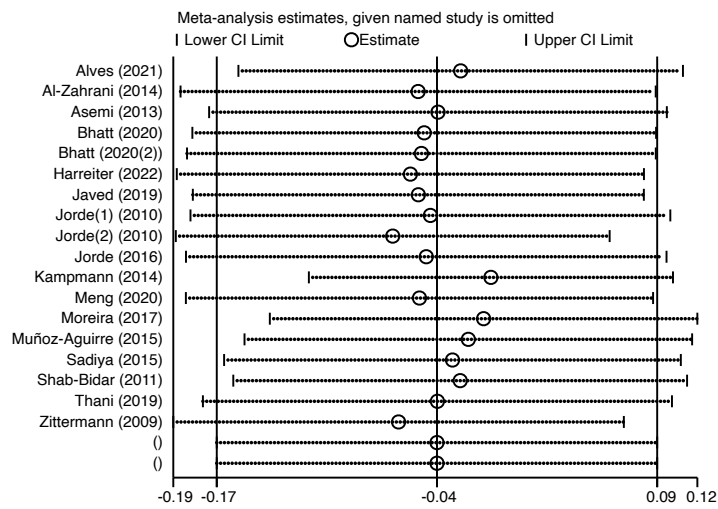


Figure S4-8 Sensitivity analysis of the systematic removal of each study for LDL-C in participants with BMI ≥ 30 kg/m².

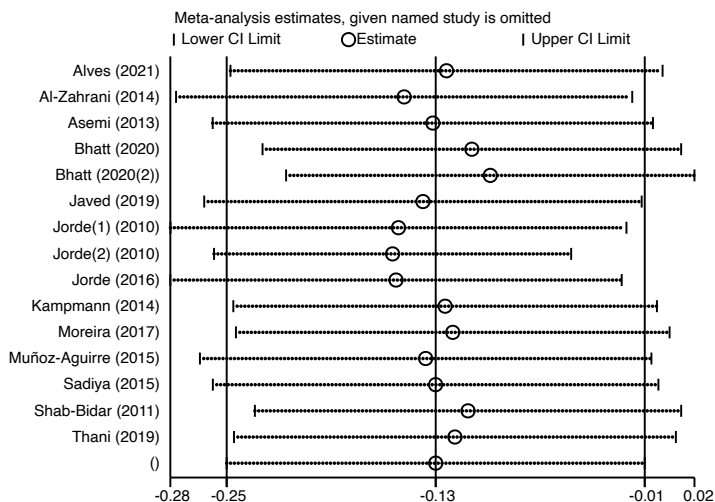


Figure S4-9 Sensitivity analysis of the systematic removal of each study for TC in participants with BMI ≥ 30 kg/m².

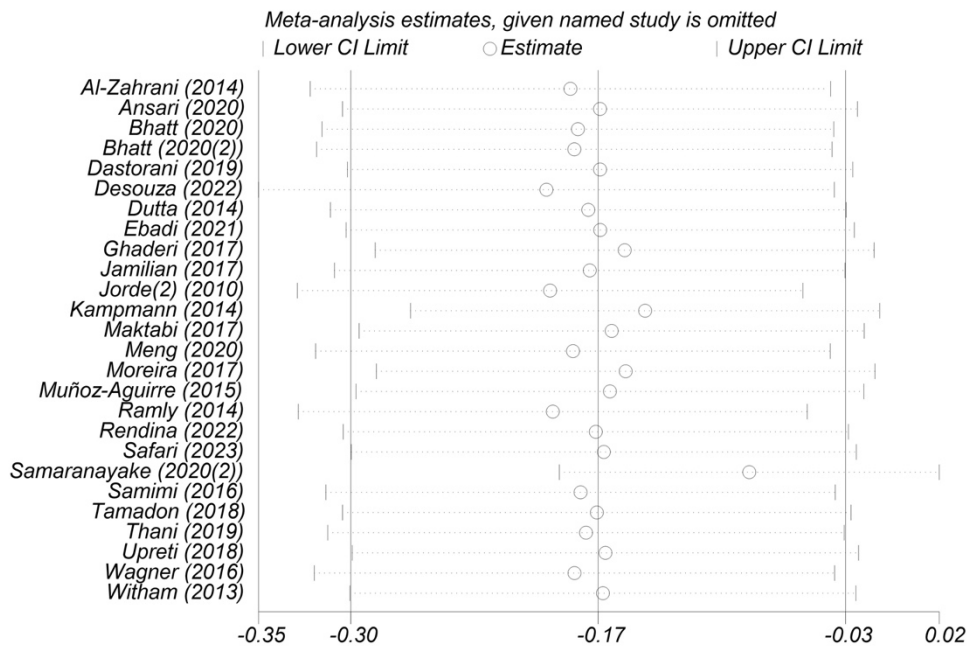


Figure S4-10 Sensitivity analysis of the systematic removal of each study for LDL-C in participants with vitamin D supplementation dose ≥ 3320 IU.

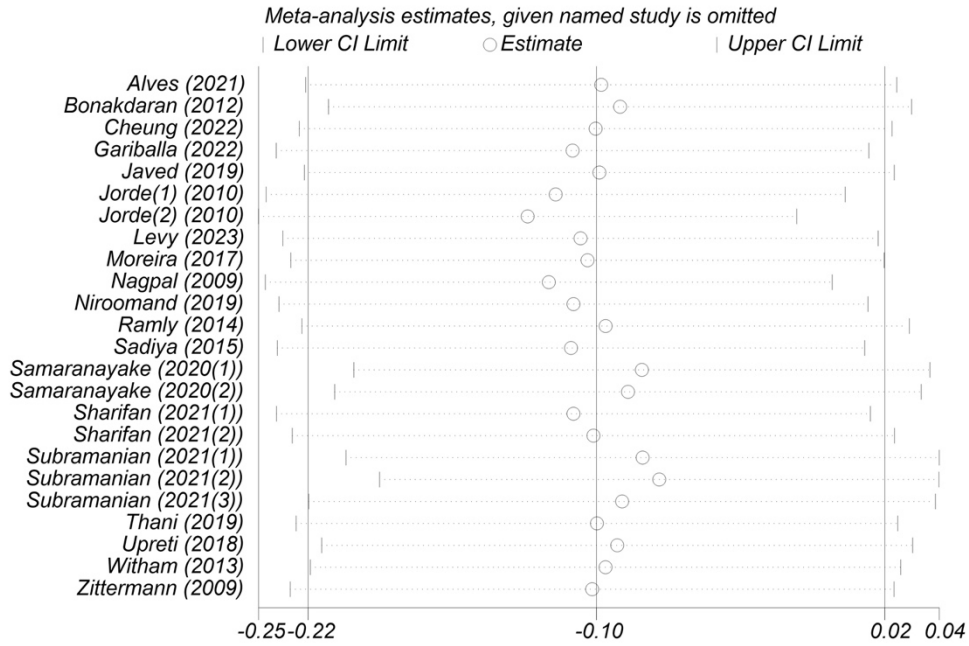


Figure S4-11 Sensitivity analysis of the systematic removal of each study for SBP in participants aged < 50.

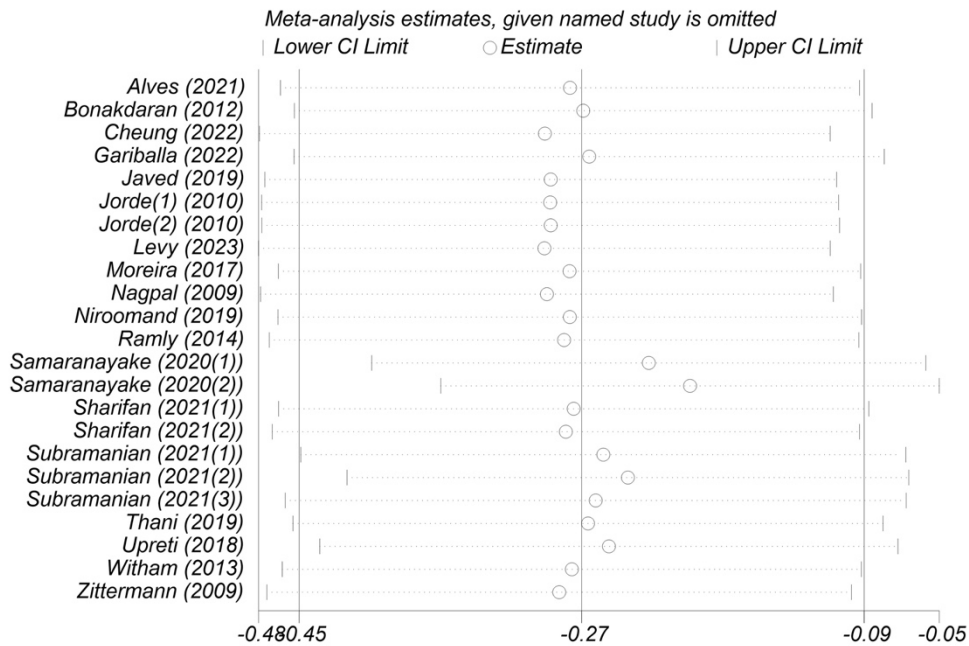


Figure S4-12 Sensitivity analysis of the systematic removal of each study for DBP in participants aged < 50.

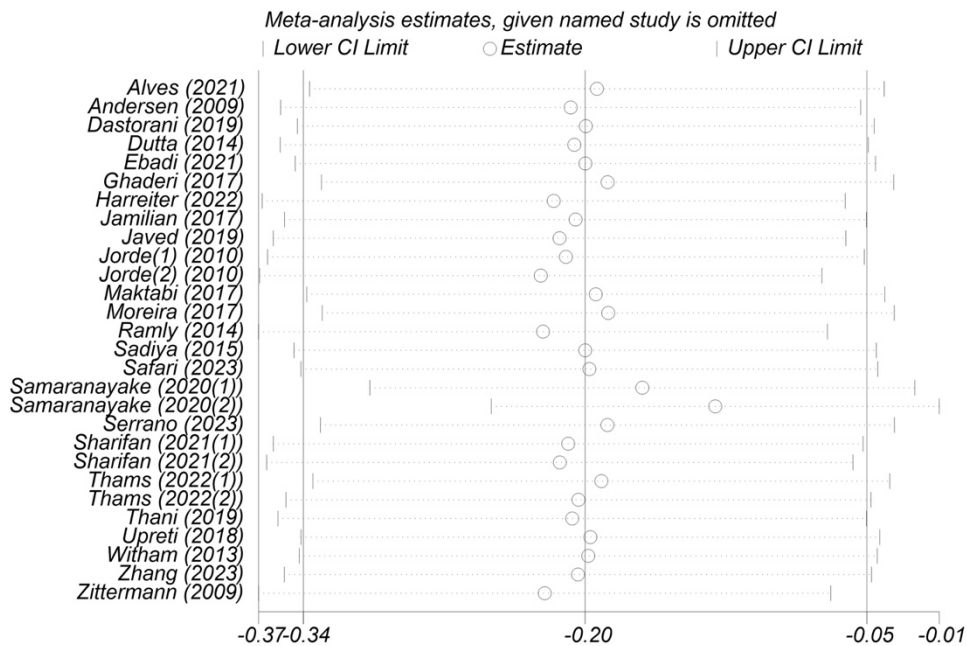


Figure S4-13 Sensitivity analysis of the systematic removal of each study for LDL-C in participants aged < 50.

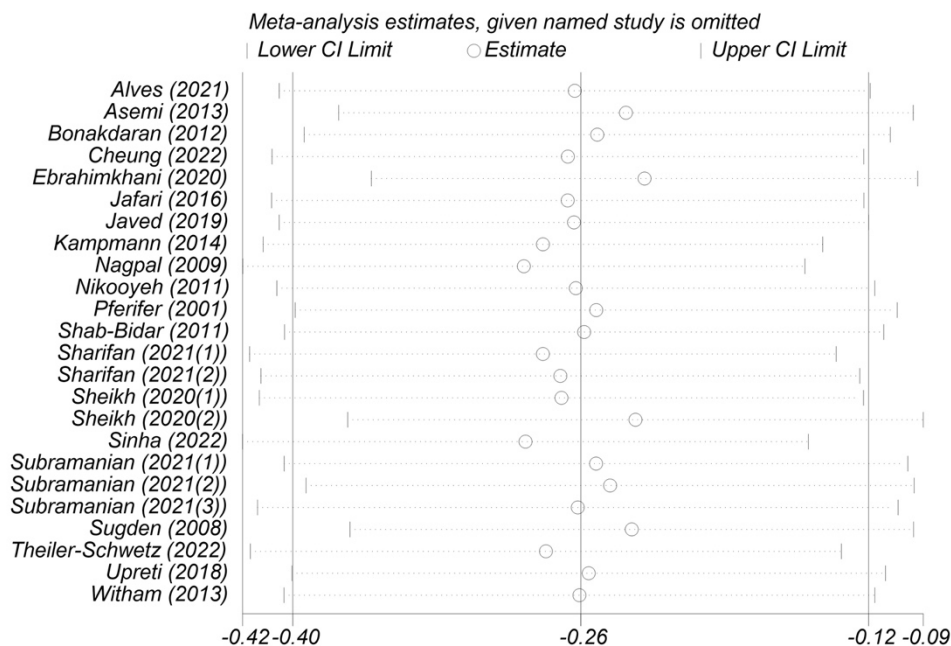


Figure S4-14 Sensitivity analysis of the systematic removal of each study for SBP in participants with intervention duration < 3 months.

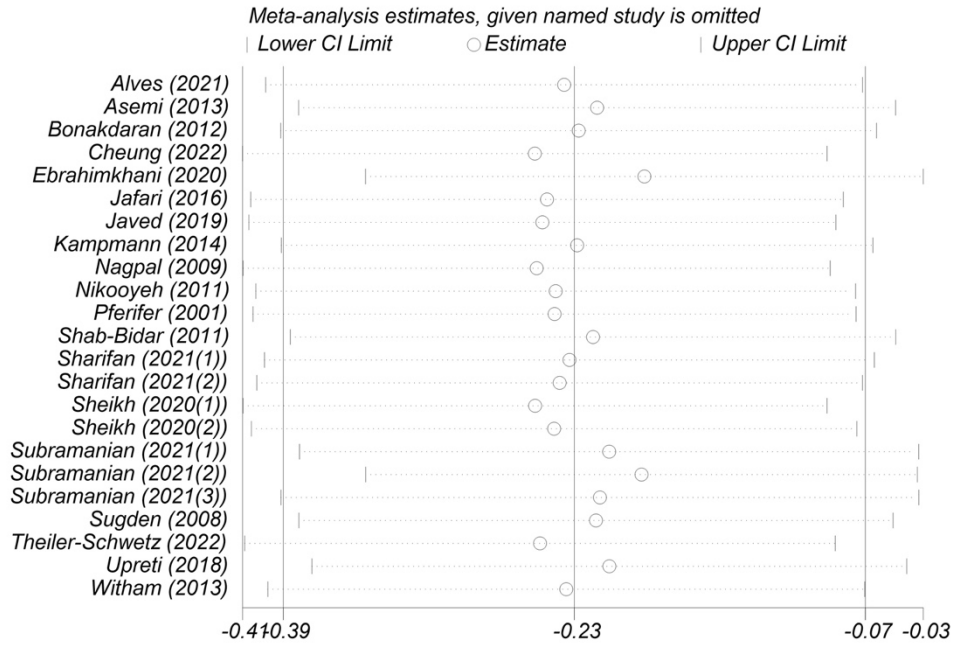


Figure S4-15 Sensitivity analysis of the systematic removal of each study for DBP in participants with intervention duration < 3 months.

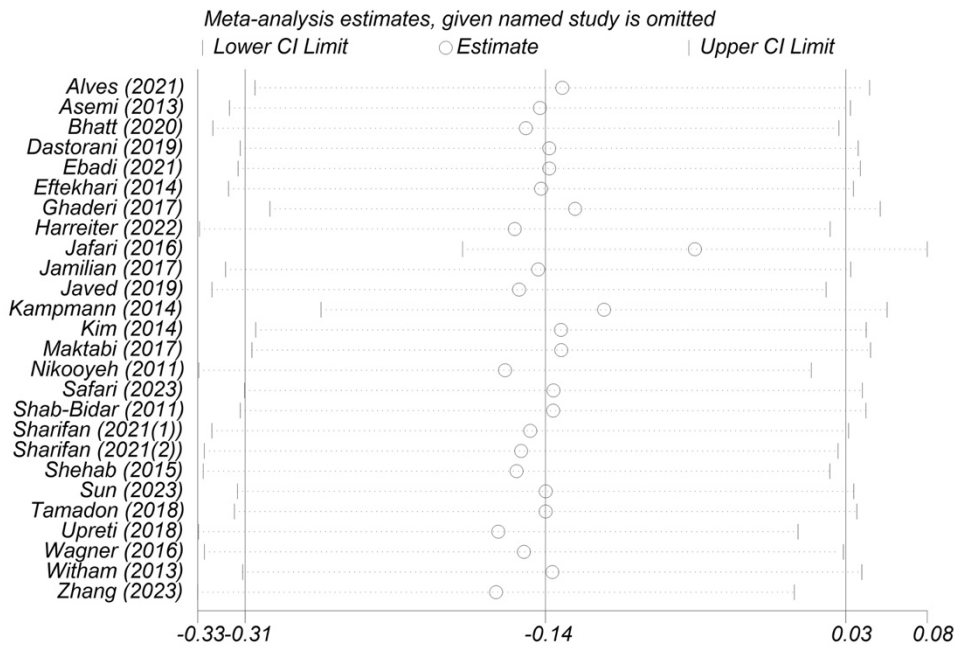


Figure S4-16 Sensitivity analysis of the systematic removal of each study for LDL-C in participants with intervention duration < 3 months.

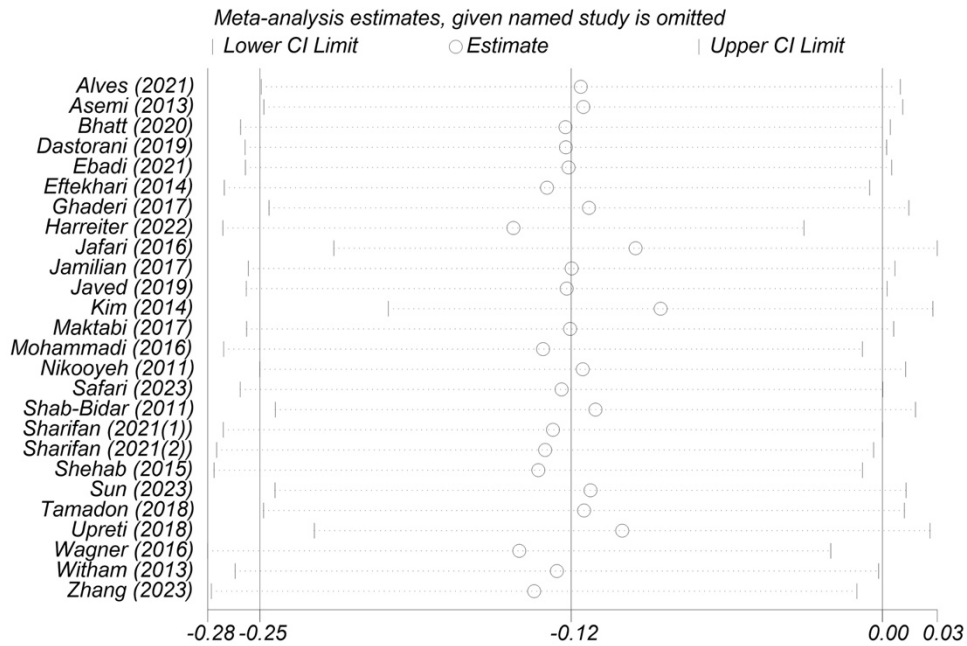


Figure S4-17 Sensitivity analysis of the systematic removal of each study for TG in participants with intervention duration < 3 months.

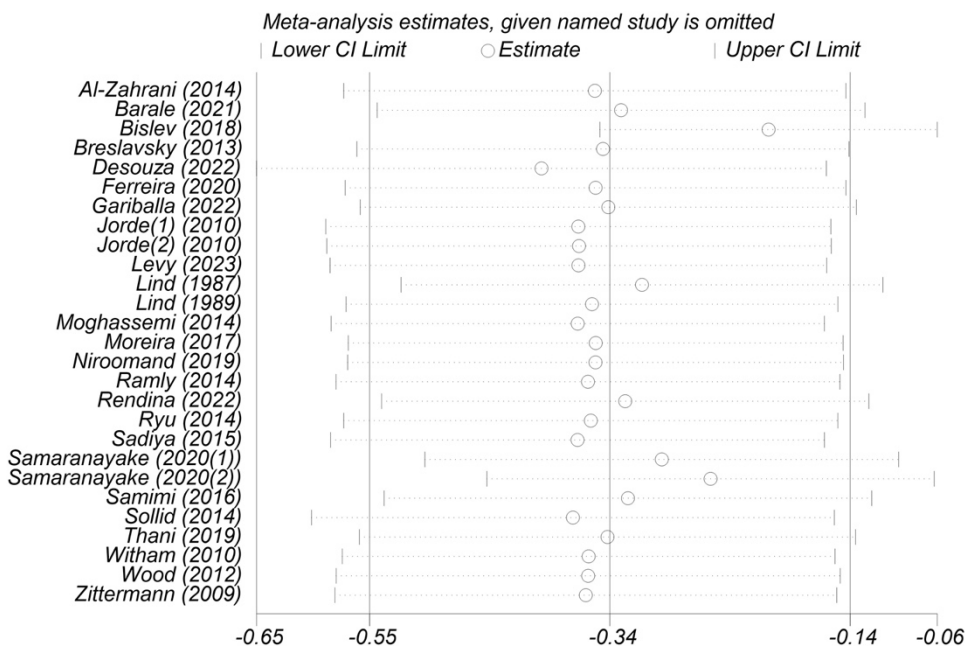


Figure S4-18 Sensitivity analysis of the systematic removal of each study for DBP in participants with intervention duration ≥ 3 months.

Appendix 7 – PRISMA Checklist

Topic	No.	Item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review.	Page 3
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist	
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	Page 5
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	Page 6
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	Page 7
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	Page 6-7
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	Page 6-7
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	Page 7

Topic	No.	Item	Location where item is reported
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	Page 7-8
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	Page 7-8
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	Page 7-8
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	Page 8
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	Page 8
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item 5)).	Page 8

Topic	No. Item	Location where item is reported
	13b Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	Page 8
	13c Describe any methods used to tabulate or visually display results of individual studies and syntheses.	Page 8
	13d Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	Page 8
	13e Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	Page 8
	13f Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	Page 8
Reporting assessment	bias 14 Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	Page 8 & Appendix 3
Certainty assessment	15 Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	Page 8
RESULTS		
Study selection	16a Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	Page 9 & Figure 1

Topic	No. Item	Location where item is reported
	16b Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	Page 9 & Figure 1
Study characteristics	17 Cite each included study and present its characteristics.	Appendix 1
Risk of bias in studies	18 Present assessments of risk of bias for each included study.	Appendix 3
Results of individual studies	19 For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	Appendix 2 & 4
Results of syntheses	20a For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	Appendix 3
	20b Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	Appendix 2 & Figures 2-4
	20c Present results of all investigations of possible causes of heterogeneity among study results.	Appendix 4 & Figures 2-4
	20d Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	Appendix 6
Reporting biases	21 Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	Appendix 4 & Figures 2-4

Topic	No. Item	Location where item is reported
Certainty of evidence	22 Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	Appendix 5
DISCUSSION		
Discussion	23a Provide a general interpretation of the results in the context of other evidence.	Page 9-11
	23b Discuss any limitations of the evidence included in the review.	Page 13
	23c Discuss any limitations of the review processes used.	Page 13
	23d Discuss implications of the results for practice, policy, and future research.	Page 13
OTHER INFORMATION		
Registration and protocol	24a Provide registration information for the review, including register name and registration number, or state that the review was not registered.	Page 6
	24b Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	Page 6
	24c Describe and explain any amendments to information provided at registration or in the protocol.	Page 6
Support	25 Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	Figure 3
Competing interests	26 Declare any competing interests of review authors.	Page 3

Topic	No. Item	Location where item is reported
Availability of data, code and other materials	27 Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	Page 3