

Table S1. Search strategy for the MEDLINE database.

Adults OR Young adults OR Older adults OR Elderly adults OR Adult population OR Adults subjects	AND	Vitamins OR Oral vitamins supplementation OR Vitamin B9 OR Folic acid OR Vitamin C OR Ascorbic acid OR Vitamin D OR Calciferol OR Vitamin D3 OR Cholecalciferol OR Vitamin D2 OR Ergocalciferol OR Vitamin E OR Tocopherol	AND	Arterial stiffness OR Aortic stiffness OR Pulse wave velocity OR PWv
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Table S2. Quality grading of evidence.

№ of studies	Study design	Risk of bias	Certainty assessment				№ of patients		Effect		Certainty	Importance
			Inconsistency	Indirectness	Imprecision	Other considerations	Oral vitamin supplements	placebo/oral vitamin supplements	Relative (95% CI)	Absolute (95% CI)		
Vitamin B9 versus Placebo												
2	randomised trials	serious ^a	not serious	not serious	not serious	none	25	25	-	SMD 0.14 SD lower (0.69 lower to 0.42 higher)	⊕⊕⊕○ Moderate	NOT IMPORTANT
Vitamin C versus Placebo												
2	randomised trials	serious ^a	not serious	serious ^b	not serious	none	42	33	-	SMD 0.17 SD higher (0.29 lower to 0.63 higher)	⊕⊕○○ Low	NOT IMPORTANT
Vitamin D versus Placebo												
1	randomised trials	serious ^a	not serious	not serious	not serious	none	39	40	-	SMD 0.04 SD lower (0.56 lower to 0.47 higher)	⊕⊕⊕○ Moderate	NOT IMPORTANT
Vitamin D2 versus Placebo												
2	randomised trials	serious ^a	not serious	not serious	not serious	none	132	132	-	SMD 0.24 SD lower (0.5 lower to 0.01 higher)	⊕⊕⊕○ Moderate	NOT IMPORTANT
Vitamin D3 versus Placebo												

15	randomised trials	serious ^a	not serious	not serious	not serious	none	1036	1037	-	SMD 0.08 SD lower (0.24 lower to 0.08 higher)	⊕⊕⊕○ Moderate	CRITICAL
Vitamin E versus Placebo												
2	randomised trials	serious ^c	not serious	serious	not serious	none	55	38	-	SMD 0.2 SD higher (0.17 lower to 0.58 higher)	⊕⊕○○ Low	NOT IMPORTANT
Vitamin D3 versus vitamin D												
1	randomised trials	serious ^a	not serious	not serious	not serious	none	40	39	-	SMD 0.32 SD lower (0.84 lower to 0.2 higher)	⊕⊕⊕○ Moderate	NOT IMPORTANT
Vitamin D3 versus vitamin D2												
2	randomised trials	serious ^a	not serious	not serious	not serious	none	154	152	-	SMD 0.25 SD lower (0.48 lower to 0.02 lower)	⊕⊕⊕○ Moderate	NOT IMPORTANT

a. Mainly some concerns based on RoB2

b. The direction of effect in controversy

c. 50% high risk of bias based on RoB2

CI: confidence interval; **SMD:** standardised mean difference

Table S3. Effectiveness ranking of different types of oral vitamin supplements on arterial stiffness.

	Rank statistics			Probabilities	
	Mean	Median	95% CIs	Best	SUCRA
Placebo	4.0	5.0	1.0-7.0	0.01	0.50
Vitamin B9	3.3	4.0	1.0-5.0	0.31	0.61
Vitamin C	5.5	6.0	1.0-7.0	0.05	0.24
Vitamin D	3.9	4.0	2.0-4.0	0.14	0.52
Vitamin D2	3.4	3.0	2.0-5.0	0.20	0.60
Vitamin D3	2.3	4.0	1.0-7.0	0.26	0.78
Vitamin E	5.5	6.0	1.0-7.0	0.03	0.25

Table S4. Heterogeneity statistics for each comparison.

	Q (df)	I²	τ²	p
Vitamin B9 vs Placebo	0.09 (1)	0.00 %	0.00	0.76
Vitamin C vs Placebo	0.09 (1)	0.00%	0.00	0.76
Vitamin D vs Placebo	0.00 (0)	-	0.00	-
Vitamin D2 vs Placebo	0.28 (1)	0.00 %	0.00	0.60
Vitamin D3 vs Placebo	40.94 (15)	63.40%	0.06	0.00
Vitamin E vs Placebo	2.03 (3)	0.00%	0.00	0.57
Vitamin D3 vs Vitamin D	0.00 (0)	-	0.00	-
Vitamin D3 vs Vitamin D2	0.56 (1)	0.00%	0.00	0.46

Table S5. Subgroup analysis according to mean age (<65 years or >65 years) by type of vitamin on arterial stiffness.

	Adults <65 years				Older Adults >65 years			
	n (samples)	ES (95% CIs)	I ²	%Change (m/s)	n (samples)	ES (95% CIs)	I ²	%Change (m/s)
Vitamin B9 vs Placebo	2 (2)	-0.14 (-0.69, 0.42)	0.00%	-26.0%	-	-	-	-
Vitamin C vs Placebo	2 (2)	0.17 (-0.29, 0.63)	0.00%	48.0%	-	-	-	-
Vitamin D vs Placebo	-	-	-	-	1 (1)	-0.04 (-0.56, 0.47)	-	-
Vitamin D2 vs Placebo	2 (2)	-0.24 (-0.50, 0.01)	0.00%	-44.0%	-	-	-	-
Vitamin D3 vs Placebo	5 (5)	-0.26 (-0.61, 0.09)	66.10%	-71.0%	8 (11)	-0.01 (-0.15, 0.13)	40.80%	-15.0%
Vitamin E vs Placebo	1 (3)	-0.04 (-0.57, 0.50)	0.00%	-3.0%	1 (1)	0.43 (-0.10, 0.96)	-	-
Vitamin D3 vs Vitamin D	-	-	-	-	1 (1)	-0.32 (-0.84, 0.20)	-	-
Vitamin D3 vs Vitamin D2	1 (1)	-0.30 (-0.57, -0.03)	-	-	1 (1)	-0.10 (-0.55, 0.35)	-	-

Table S6. Subgroup analysis according to length of intervention by type of vitamin on arterial stiffness.

	Intervention <12 weeks				Intervention >12 weeks			
	n (samples)	ES (95%CI)	I ²	%Change (m/s)	n (samples)	ES (95%CI)	I ²	%Change (m/s)
Vitamin B9 vs Placebo	2 (2)	-0.14 (-0.69, 0.42)	0.00%	-25.0%	-	-	-	-
Vitamin C vs Placebo	2 (2)	0.17 (-0.29, 0.63)	0.00%	48.0%	-	-	-	-
Vitamin D vs Placebo	-	-	-	-	1 (1)	-0.04 (-0.55, 0.47)	-	-
Vitamin D2 vs Placebo	-	-	-	-	2 (2)	-0.24 (-0.50, 0.01)	0.00%	-45.0%
Vitamin D3 vs Placebo	3 (3)	0.34 (-0.30, 0.98)	80.60%	11.0%	11 (13)	-0.15 (-0.30, -0.00)	53.10%	-60.0%
Vitamin E vs Placebo	2 (4)	0.20 (-0.17, 0.58)	0.00%	-3.0%	-	-	-	-
Vitamin D3 vs Vitamin D	-	-	-	-	1 (1)	-0.32 (-0.84, 0.20)	-	-
Vitamin D3 vs Vitamin D2	-	-	-	-	2 (2)	-0.25 (-0.48, -0.02)	0.00%	-52.0%

Table S7. Subgroup analysis according to type of pulse wave velocity by type of vitamin.

	Central PWv				Peripheral PWv			
	n (samples)	ES (95%CI)	I ²	%Change (m/s)	n (samples)	ES (95%CI)	I ²	%Change (m/s)
Vitamin B9 vs Placebo	2 (2)	-0.14 (-0.69, 0.42)	0.00%	-25.0%	-	-	-	-
Vitamin C vs Placebo	-	-	-	-	2 (2)	0.17 (-0.29, 0.63)	0.00%	48.0%
Vitamin D vs Placebo	1 (1)	-0.04 (-0.56, 0.47)	-	-	-	-	-	-

Vitamin D2 vs Placebo	2 (2)	-0.24 (-0.50, 0.01)	0.00%	-43.0%	-	-	-	-
Vitamin D3 vs Placebo	13 (15)	-0.10 (-0.26, 0.07)	64.40%	-85.0%	1 (1)	0.25 (-0.31, 0.81)	-	-
Vitamin E vs Placebo	2 (4)	0.20 (-0.17, 0.58)	0.00%	55.0%	-	-	-	-
Vitamin D3 vs Vitamin D	1 (1)	-0.32 (-0.84, 0.20)	-	-	-	-	-	-
Vitamin D3 vs Vitamin D2	2 (2)	-0.25 (-0.48, -0.02)	0.00%	-36.0%	-	-	-	-

Table S8. Subgroup analysis according to type of vitamin (water-soluble or fat-soluble) on arterial stiffness.

Water-soluble vitamins				Fat-soluble vitamins			
n (samples)	ES (95%CI)	I²	%Change (m/s)	n (samples)	ES (95%CI)	I²	%Change (m/s)
4 (4)	0.04 (-0.31, 0.40)	0.00%	17.0%	17 (22)	-0.09 (-0.21, 0.02)	47.20%	-73.0%

Table S9. Meta-regression according to mean age and length of intervention for vitamin D3 vs Placebo on arterial stiffness.

Vitamin D3 vs Placebo	Coefficient	95%ICs	P value
Mean age	0.01	-0.01, 0.03	0.235
Length	-0.01	-0.03, 0.02	0.622

Figure S1. Quality assessment using the Cochrane Collaboration’s tool for assessing risk of bias in randomized clinical trials (RoB2) for each study.

Reference	D1	D2	D3	D4	D5	Overall	
Mangoni et al, 2002	+	!	+	+	+	!	+
Mangoni et al, 2005	+	!	+	+	+	!	!
Nightingale et al, 2003	!	!	!	!	+	!	-
Nightingale et al, 2007	!	!	+	!	+	!	
Dreyer et al, 2014	+	+	!	!	+	!	D1 Randomisation process
Kovesdy et al, 2012	+	!	+	!	+	!	D2 Deviations from the intended interventions
Forouhi et al, 2016	+	!	+	+	+	!	D3 Missing outcome data
Larsen et al, 2012	+	+	!	+	+	!	D4 Measurement of the outcome
Marckmann et al, 2012	+	+	+	+	+	+	D5 Selection of the reported result
Hewitt et al, 2013	+	+	+	!	+	!	
Witham et al, 2013	+	+	+	+	+	+	
Mose et al, 2014	+	+	!	+	+	!	
Pilz et al, 2015	+	!	+	+	+	!	
Witham et al, 2015	+	+	!	+	+	!	
Bressendorff et al, 2016	+	+	!	!	+	!	
Kumar et al, 2017	+	+	+	+	+	+	
Sluyter et al, 2017	+	!	!	+	+	!	
Gepner et al, 2012	+	!	+	+	+	!	
Levin et al, 2017	+	!	!	!	+	!	
Tomson et al, 2017	+	+	+	+	+	+	
Rasool et al, 2006	!	!	+	!	+	!	
Stonehouse et al, 2016	+	+	+	+	+	+	

Figure S2. Overall quality assessment using the Cochrane Collaboration’s tool for assessing risk of bias in randomized clinical trials (RoB2).



Figure S3. Rankogram for each of different types of oral vitamin supplements on arterial stiffness.

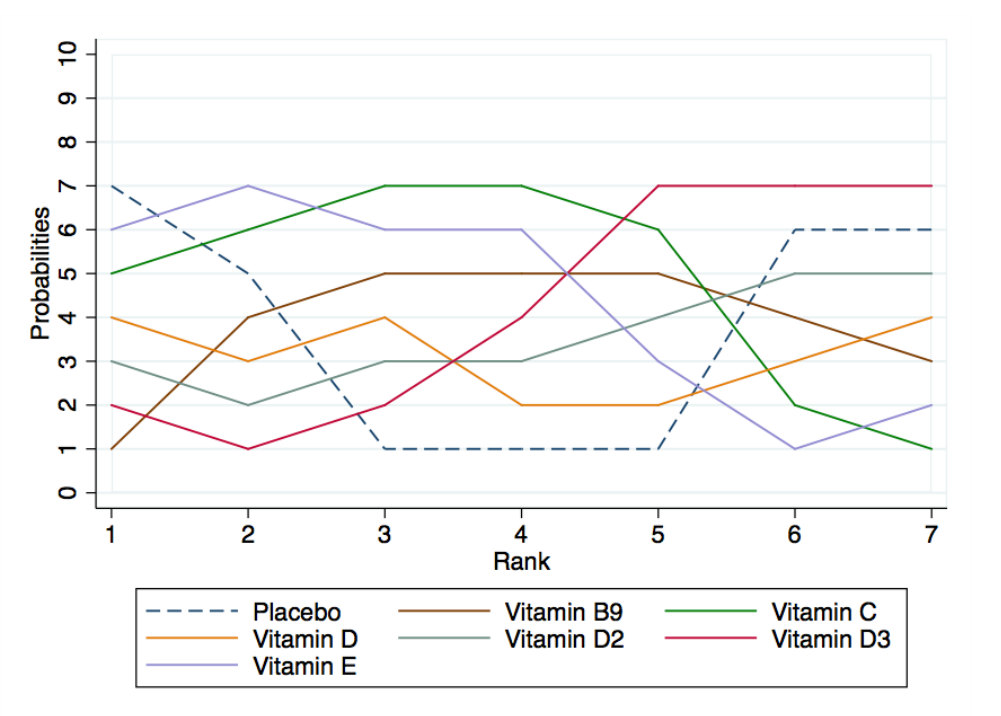


Figure S4. Funnel plot for comparison-specific pooled mean differences.

