

Table S1. Search string used in the systematic review by database.

Database	Search string
PUBMED	<p>#1 "Severe Acute Respiratory Syndrome Coronavirus 2" OR "SARS Coronavirus" OR "SARS Coronavirus 2" OR "SARS-CoV-2" OR "SARS-COV-2" OR "SARS CoV 2" OR "SARS COV 2" OR "SARS-CoV2" OR "SARS CoV2" OR "SARS-CoV" OR "SARS-CoV" OR "Novel Coronavirus" OR "nCoV" OR "2019 Novel Coronavirus" OR "2019-nCoV" OR "Wuhan Coronavirus" OR "COVID-19 " OR "COVID 19" OR "COVID19" OR "Coronavirus Disease" OR "coronavirus disease" OR "Coronavirus Disease 2019" OR "coronavirus disease 2019" OR "Coronavirus Disease-19" OR "coronavirus disease-19" OR "Coronavirus Disease 19" OR "coronavirus disease 19" OR "Novel Coronavirus Disease" OR "novel coronavirus disease" OR "Wuhan Seafood Market Pneumonia" OR "Wuhan seafood market pneumonia" OR "Coronavirus Infection" OR "coronavirus infection" OR "Novel Coronavirus Infection" OR "novel coronavirus infection" OR "SARS Coronavirus 2 Infection" OR "SARS coronavirus 2 infection" OR "SARS-CoV-2 Infection" OR "SARS-CoV-2 infection" OR "SARS-COV-2 Infection" OR "SARS-COV-2 infection" OR "SARS CoV 2 Infection" OR "SARS CoV 2 infection" OR "SARS COV 2 Infection" OR "SARS COV 2 infection" OR "nCoV Infection" OR "nCoV infection" OR "COVID-19"[Mesh] OR "SARS-CoV-2"[Mesh]</p> <p>AND</p> <p>#2 vitamin* OR provitamin* OR micronutrient* OR "vitamin A" OR "carotenoids" OR "beta carotene" OR "β carotene" OR "carotene" OR "retinol" OR "vitamin D" OR "vitamin D2" OR "vitamin D3" OR "ergocalciferol" OR "paricalcitol" OR "cholecalciferol" OR "calcitriol" OR "calcifediol" OR "vitamin E" OR "tocopherol" OR "alpha tocopherol" OR "beta tocopherol" OR "gamma tocopherol" OR "tocotrienol" OR "vitamin K" OR "vitamin K1" OR "phytonadione" OR "vitamin K2" OR "menaquinone" OR "vitamin K3" OR "menadione" OR "vitamin B" OR "B complex" OR "vitamin B1" OR "thiamine" OR "vitamin B2" OR "riboflavin" OR "vitamin G" OR "vitamin B3" OR "niacin" OR "niacinamide" OR "nicotinic acid" OR "vitamin PP" OR "vitamin B5" OR "pantothenic acid" OR "pantothenate" OR "vitamin B6" OR "pyridoxine" OR "pyridoxal" OR "pyridoxamine" OR "vitamin B7" OR "biotin" OR "vitamin H" OR "vitamin B9" OR "folate" OR "folic acid" OR "l-methylfolate" OR "vitamin M" OR "vitamin B12" OR "cyanocobalamin" OR "methylcobalamin" OR "hydroxocobalamin" OR "vitamin C" OR "ascorbic acid" OR "ascorbate" OR "choline" OR "carnitine" OR "L-carnitine" OR "levocarnitine" OR "Vitamins"[Mesh] OR "Provitamins"[Mesh] OR "Micronutrients"[Mesh] OR "Vitamin A"[Mesh] OR "Carotenoids"[Mesh] OR "Vitamin D"[Mesh] OR "Vitamin E"[Mesh] OR "Vitamin K"[Mesh] OR "Vitamin B Complex"[Mesh] OR "Thiamine"[Mesh] OR "Riboflavin"[Mesh] OR "Niacinamide"[Mesh] OR "Pantothenic Acid"[Mesh] OR "Vitamin B 6"[Mesh] OR "Biotin"[Mesh] OR "Folic Acid"[Mesh] OR "Vitamin B 12"[Mesh] OR "Ascorbic Acid"[Mesh] OR "Choline"[Mesh] OR "Carnitine"[Mesh]</p>
SCOPUS	<p>TITLE-ABS-KEY("Severe Acute Respiratory Syndrome Coronavirus 2" OR "SARS Coronavirus" OR "SARS Coronavirus 2" OR "SARS-CoV-2" OR "SARS-COV-2" OR "SARS CoV 2" OR "SARS COV 2" OR "SARS-CoV2" OR "SARS CoV2" OR "SARS-CoV" OR "SARS-CoV" OR "Novel Coronavirus" OR "nCoV" OR "2019 Novel Coronavirus" OR "2019-nCoV" OR "Wuhan Coronavirus" OR "COVID-19 " OR "COVID 19" OR "COVID19" OR "Coronavirus Disease" OR "coronavirus disease" OR "Coronavirus Disease 2019" OR "coronavirus disease 2019" OR "Coronavirus Disease-19" OR "coronavirus disease-19" OR "Coronavirus Disease 19" OR "coronavirus disease 19" OR "Novel Coronavirus Disease" OR "novel coronavirus disease" OR "Wuhan Seafood Market Pneumonia" OR "Wuhan seafood market pneumonia" OR "Coronavirus Infection" OR "coronavirus infection" OR "Novel Coronavirus Infection" OR "novel coronavirus infection" OR "SARS Coronavirus 2 Infection" OR "SARS coronavirus 2 infection" OR "SARS-CoV-2 Infection" OR "SARS-CoV-2 infection" OR "SARS-COV-2 Infection" OR "SARS-COV-2 infection" OR "SARS CoV 2 Infection" OR "SARS CoV 2 infection" OR "SARS COV 2 Infection" OR "SARS COV 2 infection" OR "nCoV Infection" OR "nCoV infection") AND TITLE-ABS-KEY(vitamin* OR provitamin* OR micronutrient* OR "vitamin A" OR "carotenoids" OR "beta carotene" OR "β carotene" OR "carotene" OR "retinol" OR "vitamin D" OR "vitamin D2" OR "vitamin D3" OR "ergocalciferol" OR "paricalcitol" OR "cholecalciferol" OR "calcitriol" OR "calcifediol" OR "vitamin E" OR "tocopherol" OR "alpha tocopherol" OR "beta tocopherol" OR "gamma tocopherol" OR "tocotrienol" OR "vitamin K" OR "vitamin K1" OR "phytonadione" OR "vitamin K2" OR "menaquinone" OR "vitamin K3" OR "menadione" OR "vitamin B" OR "B complex" OR "vitamin B1" OR "thiamine" OR "vitamin B2" OR "riboflavin" OR "vitamin G" OR "vitamin B3" OR "niacin" OR "niacinamide" OR "nicotinic acid" OR "vitamin PP" OR "vitamin B5" OR "pantothenic acid" OR "pantothenate" OR "vitamin B6" OR "pyridoxine" OR "pyridoxal" OR "pyridoxamine" OR "vitamin B7" OR "biotin" OR "vitamin H" OR "vitamin B9" OR "folate" OR "folic acid" OR "l-methylfolate" OR</p>

	"vitamin M" OR "vitamin B12" OR "cyanocobalamin" OR "methylcobalamin" OR "hydroxocobalamin" OR "vitamin C" OR "ascorbic acid" OR "ascorbate" OR "choline" OR "carnitine" OR "L-carnitine" OR "levocarnitine")
WEB OF SCIENCE	<p>#1 TS=(("Severe Acute Respiratory Syndrome Coronavirus 2" OR "SARS Coronavirus" OR "SARS Coronavirus 2" OR "SARS-CoV-2" OR "SARS-COV-2" OR "SARS CoV 2" OR "SARS COV 2" OR "SARS-CoV2" OR "SARS CoV2" OR "SARS-CoV" OR "SARS-CoV" OR "Novel Coronavirus" OR "nCoV" OR "2019 Novel Coronavirus" OR "2019-nCoV" OR "Wuhan Coronavirus" OR "COVID-19 " OR "COVID 19" OR "COVID19" OR "Coronavirus Disease" OR "coronavirus disease" OR "Coronavirus Disease 2019" OR "coronavirus disease 2019" OR "Coronavirus Disease-19" OR "coronavirus disease-19" OR "Coronavirus Disease 19" OR "coronavirus disease 19" OR "Novel Coronavirus Disease" OR "novel coronavirus disease" OR "Wuhan Seafood Market Pneumonia" OR "Wuhan seafood market pneumonia" OR "Coronavirus Infection" OR "coronavirus infection" OR "Novel Coronavirus Infection" OR "novel coronavirus infection" OR "SARS Coronavirus 2 Infection" OR "SARS coronavirus 2 infection" OR "SARS-CoV-2 Infection" OR "SARS-CoV-2 infection" OR "SARS-COV-2 Infection" OR "SARS-COV-2 infection" OR "SARS CoV 2 Infection" OR "SARS CoV 2 infection" OR "SARS COV 2 Infection" OR "SARS COV 2 infection" OR "nCoV Infection" OR "nCoV infection")</p> <p>AND</p> <p>#2 TS=(vitamin* OR provitamin* OR micronutrient* OR "vitamin A" OR "carotenoids" OR "beta carotene" OR "β carotene" OR "carotene" OR "retinol" OR "vitamin D" OR "vitamin D2" OR "vitamin D3" OR "ergocalciferol" OR "paricalcitol" OR "cholecalciferol" OR "calcitriol" OR "calcifediol" OR "vitamin E" OR "tocopherol" OR "alpha tocopherol" OR "beta tocopherol" OR "gamma tocopherol" OR "tocotrienol" OR "vitamin K" OR "vitamin K1" OR "phytonadione" OR "vitamin K2" OR "menaquinone" OR "vitamin K3" OR "menadione" OR "vitamin B" OR "B complex" OR "vitamin B1" OR "thiamine" OR "vitamin B2" OR "riboflavin" OR "vitamin G" OR "vitamin B3" OR "niacin" OR "niacinamide" OR "nicotinic acid" OR "vitamin PP" OR "vitamin B5" OR "pantothenic acid" OR "pantothenate" OR "vitamin B6" OR "pyridoxine" OR "pyridoxal" OR "pyridoxamine" OR "vitamin B7" OR "biotin" OR "vitamin H" OR "vitamin B9" OR "folate" OR "folic acid" OR "l-methylfolate" OR "vitamin M" OR "vitamin B12" OR "cyanocobalamin" OR "methylcobalamin" OR "hydroxocobalamin" OR "vitamin C" OR "ascorbic acid" OR "ascorbate" OR "choline" OR "carnitine" OR "L-carnitine" OR "levocarnitine")</p>
MEDRXIV	<p>topic1 <- c("Severe Acute Respiratory Syndrome Coronavirus 2","SARS Coronavirus","SARS Coronavirus 2","SARS-CoV-2","SARS-COV-2","SARS CoV 2","SARS COV 2","SARS-CoV2","SARS CoV2","SARS-CoV","SARS-CoV","Novel Coronavirus","nCoV","2019 Novel Coronavirus","2019-nCoV","Wuhan Coronavirus","COVID-19 ","COVID 19","COVID19","Coronavirus Disease","coronavirus disease","Coronavirus Disease 2019","coronavirus disease 2019","Coronavirus Disease-19","coronavirus disease-19","Coronavirus Disease 19","coronavirus disease 19","Novel Coronavirus Disease","novel coronavirus disease","Wuhan Seafood Market Pneumonia","Wuhan seafood market pneumonia","Coronavirus Infection","coronavirus infection","Novel Coronavirus Infection","novel coronavirus infection","SARS Coronavirus 2 Infection","SARS coronavirus 2 infection","SARS-CoV-2 Infection","SARS-CoV-2 infection","SARS-COV-2 Infection","SARS-COV-2 infection","SARS CoV 2 Infection","SARS CoV 2 infection","SARS COV 2 Infection","SARS COV 2 infection","nCoV Infection","nCoV infection")</p> <p>topic2 <- c("vitamin*","provitamin*","micronutrient*","vitamin A","carotenoids","beta carotene","β carotene","carotene","retinol","vitamin D","vitamin D2","vitamin D3","ergocalciferol","paricalcitol","cholecalciferol","calcitriol","calcifediol","vitamin E","tocopherol","alpha tocopherol","beta tocopherol","gamma tocopherol","tocotrienol","vitamin K","vitamin K1","phytonadione","vitamin K2","menaquinone","vitamin K3","menadione","vitamin B","B complex","vitamin B1","thiamine","vitamin B2","riboflavin","vitamin G","vitamin B3","niacin","niacinamide","nicotinic acid","vitamin PP","vitamin B5","pantothenic acid","pantothenate","vitamin B6","pyridoxine","pyridoxal","pyridoxamine","vitamin B7","biotin","vitamin H","vitamin B9","folate","folic acid","l-methylfolate","vitamin M","vitamin B12","cyanocobalamin","methylcobalamin","hydroxocobalamin","vitamin C","ascorbic acid","ascorbate","choline","carnitine","L-carnitine","levocarnitine")</p> <p>query <- list(topic1, topic2)</p>

BIORXIV	<pre> topic1 <- c("Severe Acute Respiratory Syndrome Coronavirus 2","SARS Coronavirus","SARS Coronavirus 2","SARS-CoV-2","SARS-COV-2","SARS CoV 2","SARS COV 2","SARS-CoV2","SARS CoV2","SARS-CoV","SARS-CoV","Novel Coronavirus","nCoV","2019 Novel Coronavirus","2019-nCoV","Wuhan Coronavirus","COVID-19 ","COVID 19","COVID19","Coronavirus Disease","coronavirus disease","Coronavirus Disease 2019","coronavirus disease 2019","Coronavirus Disease-19","coronavirus disease-19","Coronavirus Disease 19","coronavirus disease 19","Novel Coronavirus Disease","novel coronavirus disease","Wuhan Seafood Market Pneumonia","Wuhan seafood market pneumonia","Coronavirus Infection","coronavirus infection","Novel Coronavirus Infection","novel coronavirus infection","SARS Coronavirus 2 Infection","SARS coronavirus 2 infection","SARS-CoV-2 Infection","SARS-CoV-2 infection","SARS-COV-2 Infection","SARS-COV-2 infection","SARS CoV 2 Infection","SARS CoV 2 infection","SARS COV 2 Infection","SARS COV 2 infection","nCoV Infection","nCoV infection") topic2 <- c("vitamin*","provitamin*","micronutrient*","vitamin A","carotenoids","beta carotene","β carotene","carotene","retinol","vitamin D","vitamin D2","vitamin D3","ergocalciferol","paricalcitol","cholecalciferol","calcitriol","calcifediol","vitamin E","tocopherol","alpha tocopherol","beta tocopherol","gamma tocopherol","tocotrienol","vitamin K","vitamin K1","phytonadione","vitamin K2","menaquinone","vitamin K3","menadione","vitamin B","B complex","vitamin B1","thiamine","vitamin B2","riboflavin","vitamin G","vitamin B3","niacin","niacinamide","nicotinic acid","vitamin PP","vitamin B5","pantothenic acid","pantothenate","vitamin B6","pyridoxine","pyridoxal","pyridoxamine","vitamin B7","biotin","vitamin H","vitamin B9","folate","folic acid","l-methylfolate","vitamin M","vitamin B12","cyanocobalamin","methylcobalamin","hydroxocobalamin","vitamin C","ascorbic acid","ascorbate","choline","carnitine","L-carnitine","levocarnitine") query <- list(topic1, topic2) </pre>
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Table S2. Quality assessment of the articles included in the systematic review by alphabetic order. Revised Cochrane risk-of-bias tool for randomized trials (RoB2) was used.

Author, year	DOMAIN 1	DOMAIN 2		DOMAIN 3	DOMAIN 4	DOMAIN 5	Overall risk of bias
	Risk of bias arising from the randomization process	Risk of bias due to deviations from the intended interventions (effect of assignment to intervention)	Risk of bias due to deviations from the intended interventions (effect of adhering to intervention)	Missing outcome data	Risk of bias in measurement of the outcome	Risk of bias in selection of the reported result	
Abroug, 2023	Low	Low	Some concerns	Low	Low	Low	Some concerns
Beigmohammadi, 2021	Low	Low	Low	Some concerns	Low	Low	Some concerns
Bishop, 2022	Low	Low	Some concerns	Low	Low	High	High
Bugarin, 2023	Some concerns	Some concerns	Low	Low	Low	Low	Some concerns
Bychinin, 2022	Low	Low	Low	Low	Low	Low	Low
Cannata-Andía, 2022	Low	Low	Some concerns	Low	Low	Low	Some concerns
Coppock, 2022	Low	Low	Low	Low	Low	Low	Low
De Niet, 2022	Low	Low	Low	Some concerns	Low	Low	Some concerns
Entrenas Castillo, 2020	Low	Low	Low	Low	Low	Low	Low
Elamir, 2022	Low	Low	Some concerns	Low	Low	Low	Some concerns
Fernandes, 2022	Some concerns	Low	Low	High	High	Some concerns	High
Fogleman, 2022	Low	Some concerns	Some concerns	Some concerns	Some concerns	Some concerns	High
Hakamifard, 2022	Some concerns	High	High	Some concerns	High	High	High
Hu, 2022	Low	Low	Some concerns	Low	Some concerns	Some concerns	High
Jamali Moghadam Siahkali, 2021	Some concerns	Some concerns	Some concerns	Some concerns	High	High	High
Jolliffe, 2022	High	Low	Some concerns	Low	Low	Low	High
Karonova, 2022	Some concerns	Low	Low	Low	Low	Some concerns	Some concerns
Kumar, 2022	Low	Low	Low	Low	Low	Low	Low
Kumari, 2020	High	High	High	High	High	High	High
Labani-Mothlag, 2022	Low	Low	Low	Low	Low	Low	Low
Leal-Martínez, 2022	Low	Low	Low	Low	Low	Low	Low
Maghbooli, 2021	High	Some concerns	High	Some concerns	Some concerns	High	High
Majidi, 2021	Some concerns	Some concerns	Some concerns	Some concerns	Some concerns	Some concerns	High
Majidi, 2022	Low	Low	Some concerns	Low	Low	Some concerns	Some concerns
Mariani, 2022	Low	Some concerns	Some concerns	Some concerns	Some concerns	Some concerns	High
Murai, 2021 A	Low	Low	Low	Low	Low	Low	Low

Murai, 2021 B	Some concerns	Some concerns	Some concerns	Some concerns	Low	Low	High
Rastogi, 2021	High	Low	Low	Low	Low	Some concerns	High
Ried, 2021	High	Some concerns	Low	Low	High	High	High
Rohani, 2022	Low	Low	Low	Low	Some concerns	Some concerns	Some concerns
Sánchez-Zuno, 2021	Low	Low	NA	Low	Low	Low	Some concerns
Somi, 2022	Low	Low	Low	Low	Low	Low	Low
Tehrani, 2021	High	Some concerns	Low	Low	High	High	High
Thomas, 2021	Some concerns	Low	Some concerns	Low	Low	Low	Some concerns
Villasís-Keever, 2022	Some concerns	Low	Some concerns	Low	Low	Some concerns	High
Zhang, 2021	Low	Low	Low	Low	Low	Some concerns	Some concerns
Zurita-Cruz, 2022	High	High	Some concerns	Low	Low	High	High

Figure S1. Funnel plot of randomized controlled trials comparing all-cause mortality between patients receiving Vitamin C vs. placebo or standard of care

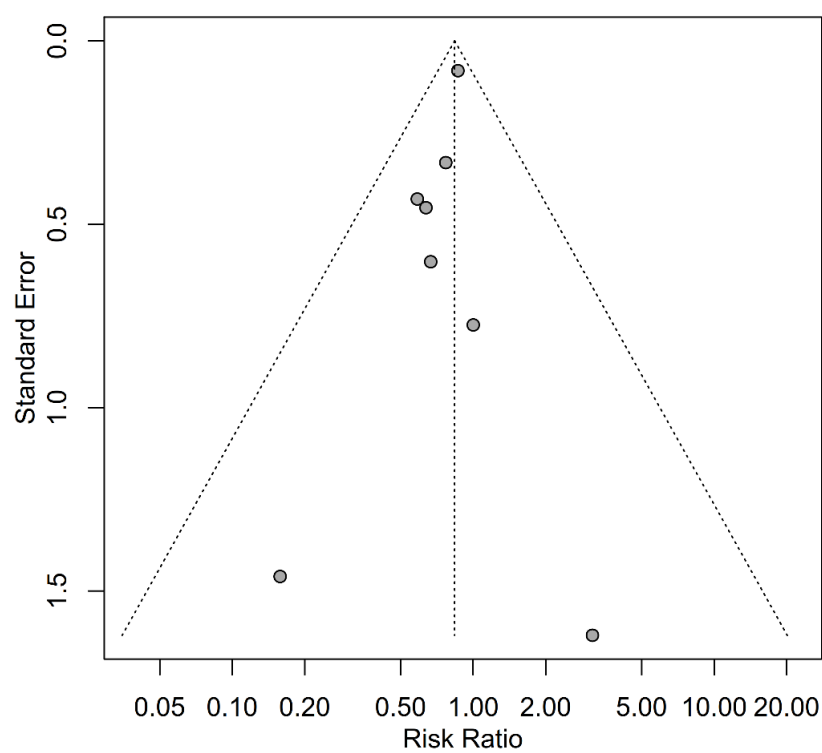


Figure S2 Funnel plot of randomized controlled trials comparing all-cause mortality between patients receiving Vitamin D vs. placebo or standard of care.

