

Online Supplementary Materials

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Fig. S1 The flowchart of article selection.

Fig. S2 Funnel plot for publication bias for risk of CVD mortality with highest versus lowest olive oil intake levels.

Fig. S3 Funnel plot for publication bias for risk of all-cause mortality with highest versus lowest olive oil intake levels.

Table S1 Systematic literature review search terms and strategy.

Search terms for PubMed (1,483)
<p>#1 ("Olive Oil"[MeSH Terms] OR "Olive Oil"[Title/Abstract] OR "oil, olive"[Title/Abstract] OR "oils, olive"[Title/Abstract] OR "olive oils"[Title/Abstract] OR "diet, Mediterranean"[Title/Abstract] OR "Mediterranean diet"[Title/Abstract])</p>
<p>#2 ("Cerebrovascular Disorders"[MeSH Terms] OR "Cardiovascular Diseases"[MeSH Terms] OR "Cerebrovascular Disorders"[Title/Abstract] OR "Cardiovascular Diseases"[Title/Abstract] OR "cardiovascular disease"[Title/Abstract] OR "CVD"[Title/Abstract] OR "coronary disease"[Title/Abstract] OR "coronary artery disease"[Title/Abstract] OR "coronary heart disease"[Title/Abstract] OR "CHD"[Title/Abstract] OR "ischemic heart disease"[Title/Abstract] OR "ischaemic heart disease"[Title/Abstract] OR "Stroke"[Title/Abstract] OR "ischemic stroke"[Title/Abstract] OR "haemorrhagic stroke"[Title/Abstract] OR "myocardial ischemia"[Title/Abstract] OR "MI"[Title/Abstract] OR "heart failure"[Title/Abstract] OR "cerebral vascular accident"[Title/Abstract] OR "CVA"[Title/Abstract] OR "Cardiovascular"[Title/Abstract] OR "Coronary"[Title/Abstract] OR "Myocardial"[Title/Abstract] OR "Neoplasms"[MeSH Terms] OR "Neoplasms"[Title/Abstract] OR "Neoplasm"[Title/Abstract] OR "Cancer"[Title/Abstract] OR "Tumor"[Title/Abstract] OR "carcinoma"[Title/Abstract] OR "Mortality"[MeSH Terms] OR "Death"[MeSH</p>

Terms] OR "Mortality"[Title/Abstract] OR "Death"[Title/Abstract] OR "fatal"[Title/Abstract] OR "deaths"[Title/Abstract])

#3 ("cohort Studies"[MeSH Terms] OR "follow-up"[Title/Abstract] OR "longitudinal"[Title/Abstract] OR "cohort"[Title/Abstract] OR "prospective"[Title/Abstract])

#1 AND #2 AND #3

Search terms for Embase (2,713)

#1 Olive Oil/ OR Mediterranean diet/ OR oil, olive.mp. OR olive oil.mp. OR oils, olive.mp. OR olive oils.mp. OR Mediterranean diet.mp. OR diet, Mediterranean.mp.

#2 cardiovascular disease/ OR coronary artery disease/ OR cerebrovascular accident/ OR brain hemorrhage/ OR heart failure/ OR ischemic heart disease/ OR cerebrovascular disorders.mp. OR cardiovascular diseases.mp. OR cardiovascular disease.mp. OR CVD.mp. OR coronary disease.mp. OR coronary artery disease.mp. OR coronary heart disease.mp. OR CHD.mp. OR ischaemic heart disease.mp. OR stroke.mp. OR ischemic stroke.mp. OR haemorrhagic stroke.mp. OR myocardial ischemia.mp. OR MI.mp. OR heart failure.mp. OR cerebral vascular accident.mp. OR CVA.mp. OR cardiovascular.mp. OR coronary.mp. OR myocardial.mp. OR Neoplasm/ OR carcinoma/ OR neoplasms.mp. OR neoplasm.mp. OR cancer.mp. OR tumor.mp. OR carcinoma.mp. OR mortality/ OR all cause mortality/ OR death/ OR mortality.mp. OR all cause mortality.mp. OR death.mp. OR deaths.mp. OR fatal.mp.

#3 cohort studies/ OR follow up/ OR prospective study/ OR longitudinal study/ OR follow-up.mp. OR cohort studies.mp. OR prospective cohort studies.mp. OR

cohort.mp. OR longitudinal.mp.

#1 AND #2 AND #3

Search terms for Web of Science (3,664)

#1 ("Olive Oil" OR "oil, olive" OR "oils, olive" OR "olive oils" OR "Mediterranean diet" OR "diet, Mediterranean")

#2 ("cerebrovascular Disorders" OR "Cardiovascular Diseases" OR "cardiovascular disease" OR "CVD" OR "coronary disease" OR "coronary artery disease" OR "coronary heart disease" OR "CHD" OR "ischemic heart disease" OR "ischaemic heart disease" OR "stroke" OR "ischemic stroke" OR "haemorrhagic stroke" OR "myocardial ischemia" OR "MI" OR "heart failure" OR "cerebral vascular accident" OR "CVA" OR "cardiovascular" OR "coronary" OR "myocardial" OR "neoplasms" OR "neoplasm" OR "cancer" OR "tumor" OR "carcinoma" OR "mortality" OR "death" OR "fatal" OR "deaths")

#3 ("cohort Studies" OR "follow-up" OR "longitudinal" OR "cohort" OR "prospective")

#1 AND #2 AND #3

Table S2 List of excluded studies and exclusion reason

Exclusion reason	Reference number
Exposure or outcome of no interest (n=9)	[1-9]
Not usable results (n=6)	[10-15]
Duplicate cohort studies (n=4)	[16-19]
Not prospective cohort (n=14)	[20-33]
Conference articles or comments (n=8)	[33-41]

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Table S3 Characteristics of studies included in the analysis.

Author, publication year (region)	Study name	Sex	Age (years), mean or range	Follow up years or person-years	Sample size	Type of outcome	Cases	Exposure assessment	Outcome assessment	Covariates
Bonfiglio et al., 2023 (Italy)	Multicenter Italian study on Cholelithiasis (MICOL)	M/F	54.9	192,264.25	2754	All-cause mortality	675	FFQ	electronically linked with the database	sex, kcal without available fats, total cholesterol high-density lipoprotein cholesterol, aspartate transaminase, body mass index, diastolic blood pressure, relative Mediterranean Scoring System with no oil consumption and smoke adjusted for ethnicity,
Romanos-Nanclares et al., 2023 (USA)	Nurses' Health Study (NHS) and Nurses' Health Study II (NHS II)	F	47.1	3744068	164,625	Breast cancer incidence	9638	FFQ	confirmed via medical record review and self-reported cases confirmed by the nurse but lacking medical records	Southern European/Mediterranean ancestry, age at menarche, menopausal status and age at menopause, postmenopausal hormone use, oral contraceptive use history, parity and age at

Torres-Collado et al., 2022 (Spain)	Valencian Nutrition Survey (VNS)	M/F	45.9	18	1,567	all-cause mortality	317	FFQ	Verified through the National Death Index from the Mortality Registry (ICD-10)	first birth, breastfeeding history, family history of breast cancer, history of biopsy-confirmed benign breast disease, height, cumulatively updated total caloric intake, physical activity, neighborhood-based socio-economic status indicator, BMI at age 18 and AHEI-2010. age (in years), sex, educational level, BMI, smoking habit, TV watching, and self-reported diseases (diabetes and hypertension)
					1,365	CVD mortality	115			
					1,332	cancer mortality	82			
Guasch-Ferré et al., 2022 (USA)	Health Professionals Follow-up study (HPFS)	M	56	28	31,801	all-cause mortality	14,256	FFQ	determined by physician review of medical records, medical reports, autopsy reports, or death certificates (ICD-9)	age, calendar time, ethnicity, Southern European/Mediterranean ancestry, marital status, living alone, smoking status, alcohol intake, physical activity, family history of diabetes, family
						CVD mortality	4,084			
						cancer mortality	3,764			

	Nurses' Health Study (NHS)	F	56	28	60,582	all-cause mortality	22,768	FFQ	determined by physician review of medical records, medical reports, autopsy reports, or death certificates (ICD-8)	history of myocardial infarction or cancer, personal history of hypertension or hypercholesterolemia, multivitamin use, aspirin use, in women postmenopausal status and menopausal hormone use, total energy intake, and body mass index, intake of red meat, fruits and vegetables, nuts, soda, whole grains, and trans fats
						CVD mortality	4,737			
						cancer mortality	5,708			
Donat-Vargas et al., 2022 (Spain)	Nutrition and Cardiovascular Risk in Spain (ENRICA)	M/F	18-96	10.7	12,161	all-cause mortality	739	used a validated computer-based dietary history;	used the Spanish National Death Index that contains information on the vital status of all residents in Spain	age, sex, total energy intake, educational level, smoking status, BMI, physical activity, TV, alcohol consumption, fiber intake, Mediterranean diet, number of medications, hypertriglyceridemia, hypercholesterolemia, hypertension, diabetes, number of self-reported chronic conditions
				8.8		CVD mortality	143	structured questionnaire		
				8.8		cancer mortality	146			

Donat-Vargas et al., 2022 (Spain)	The Sun project	M/F	18-91	10.8	18,266	CVD incidence	150	FFQ	confirmed and adjudicated by a team of physicians of the SUN project after revision of the medical records of participants.	age, sex, total energy intake, stratified by calendar year of recruitment, years of university, smoking, number of cigarettes per day, physical activity, BMI, alcohol consumption, dietary fiber, fruits and vegetables, sodium intake, systolic and diastolic blood pressure, hypercholesterolemia, hypertension, and diabetes
	European Prospective Investigation into Cancer and Nutrition (EPIC)-Spain study	M/F	29-69	22.8	39,393	CVD incidence	2,159	used a validated computer-based dietary history	validated by hospital records, primary care records, and autopsy reports	age, sex, total energy intake, stratified by center, level of education, smoking, number of packs per day, physical activity, BMI, alcohol consumption, dietary fiber, fruits and vegetables, sodium intake, systolic and diastolic blood pressure, hypercholesterolemia, hypertension, and diabetes
						CHD incidence	1,300			
						stroke incidence	938			
						incidence				

Dianatinasab et al., 2022 (13 countries)	Bladder Cancer Epidemiology and Nutritional Determinants (BLEND)	M/F	60.4	11.4	547,183	bladder cancer incidence	1,425	FFQ	according to the International Classification of Diseases for Oncology (ICD-O-3 code C67) using population-based cancer registries, health insurance records or medical records	age, gender, total energy intake in kilocalories, smoking status, sugar and sugar products, beers, wine, dressing and plant-based and fruit intakes
Guasch-Ferré et al., 2021 (USA)	Health Professionals Follow-up study (HPFS)	M	65	24	31,797	CVD incidence	4,310	FFQ	confirmed through review of medical records	age, ethnicity; Southern European and/or Mediterranean ancestry; smoking status; alcohol intake; physical activity; family history of diabetes; family history of myocardial infarction; cancer; baseline diabetes mellitus; hypertension or antihypertensive medication use; hypercholesterolemia or
						CHD incidence	3,152			
						stroke incidence	1,158			
	Nurses' Health Study (NHS)	F	67	24	61,181	CVD incidence	5,487	FFQ	confirmed through review of medical records	

						CHD incidence	2,882			medication use; multivitamin use; aspirin use; in women, postmenopausal status and menopausal hormone use; total energy intake; and body mass index
						stroke incidence	2,644			
Zhang et al., 2021 (USA)	National Institutes of Health-American Association of Retired Persons (NIH-AARP) Diet and Health Study	M/F	50-71	16	521,120	all-cause mortality	129,328	FFQ	identified by annual linkage to the Social Security Administration Death Master searches of the National Death Index Plus File and confirmed by follow-up (ICD-9, ICD-10)	age, sex, BMI, race, education, marital status, household income, alcohol, vigorous physical activity, usual activity at work, perceived health condition, history of heart disease, stroke, diabetes, and cancer at baseline
						CVD mortality	38,747			
						stroke mortality	5,605			
						cancer mortality	45,783			
Sadeghi et al., 2021 (Iran)	Isfahan Cohort Study (ICS)	M/F	≥35	11.25	5,432	all-cause mortality	458	FFQ	verified by medical records, hospital records, death certificates, and verbal	age, sex, education, residency, smoking status, daily physical activity, family history of cardiovascular disease,
						CVD mortality	179			

CVD
incidence 751
stroke
incidence 157
IHD
incidence 245
MI
incidence 156

hypertension,
hypercholesterolemia,
aspirin use, post
menopause in women,
BMI, dietary factor

Mahamat-Saleh et al., 2021 (France)	Etude Epidémiologique auprès de femmes de la Mutuelle Générale de l'Education Nationale (E3N) cohort	F	52.4	18	67,332	skin cancer	2,003	self-administered food questionnaire	confirmed through pathology reports	age, skin sensitivity to sun exposure, number of nevi, number of freckles, skin color, hair color, family history of skin cancer, levels of residential sun exposure at birth and at baseline, BMI, physical activity, smoking status, education level, and energy intake, coffee intake, and other dietary components of the MD score
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Kouli et al., 2019 (Greece)	ATTICA study	M/F	45	8.41	2,020	CVD incidence	317	FFQ	medical records	age, sex, BMI, smoking habits, physical activity, education level, history of hypertension, hypercholesterolemia, diabetes, metabolic syndrome, fibrinogen
Stefler et al., 2017 (Eastern Europe)	Health Alcohol and Psychosocial Factors in Eastern Europe (HAPIEE) project	M/F	57	7	19,333	all-cause mortality	1,314	FFQ	linkage with death registers	age, sex, cohort, education, marital status, household amenities score, smoking, physical activity, total energy intake and vitamin supplement intake
					19,263	CVD mortality	438			
					19,263	CHD mortality	226			
					19,263	Stroke mortality	109			
Letois et al., 2016 (France)	Three-City cohort	M/F	74.2	9	8,937	all-cause mortality	2,016	FFQ	ascertained from the civil registry by systematic request for all subjects not included in follow-up visits ICD-10	sex, center, education, income, occupation, smoking, alcohol consumption, history of cardiovascular disease, BMI, depression, diabetes, hypertension, hypercholesterolemia,

										dependence, self-rated health, self-rated diet quality, number of drugs, number of chronic diseases
Chrysohoou et al., 2016 (Greece)	Ikaria study of the Blue Zones	M/F	65	4	673	all-cause mortality	53	FFQ	NA	age, history of hypertension, SBP, DBP, history of hypercholesterolemia, total cholesterol levels, triglycerides, HDL-C, LDL-C, history of diabetes mellitus, glucose levels, history of CVD, metabolic syndrome, waist, obesity, BMI, creatinine clearance, GDS-score, current smoker, education level, physical inactivity, MedDietscore
Atkins, et al., 2014 (UK)	British Regional Heart Study	M	60-79	11.3	3,269	all-cause mortality	907	FFQ	collected through National Health Service Central Registers (ICD-9)	age, energy intake, smoking, alcohol, physical activity, social class, BMI, and a modified version of the HDI/EDI score not
						CVD mortality	317			

						CVD incidence	570			component of interest.
						CHD incidence	301			
Guasch-Ferré et al., 2014 (Spain)	PREvención con Dieta MEDiterránea (PREDIMED) study	M/F	67	4.8	7,216	all-cause mortality	323	FFQ	verified by medical records	age, sex, the intervention group, body mass index (BMI), smoking status, alcohol intake, educational level, leisure time physical activity, prevalence of diabetes, prevalence of hypertension, prevalence of hypercholesterolemia, use of antihypertensive medication, use of statins, Mediterranean diet adherence
						CVD mortality	81			
						cancer mortality	130			
						CVD incidence	277			
Gnagnarella et al., 2013 (Italy)	Continuous Observation of Smoking Subjects (COSMOS study)	M/F	57	5.7	4,336	lung cancer incidence	178	FFQ	NA	baseline risk probability and total energy adjusted using the nutrient-density method; fruits and vegetables, fish, red meat, tea and wine intake

Buckland et al., 2013 (10 European countries)	European Prospective Investigation into Cancer and Nutrition (EPIC)	F	50.8	11.0	335,062	breast cancer incidence	10,225	FFQ or diet history questionnaire	ICD-10	body mass index, height, education level, physical activity, smoking status, menopausal status, age at menarche, oral contraception use, breastfeeding, age at first full-term pregnancy, use of hormone replacement therapy, saturated fat intake, alcohol intake, total energy intake and mutually adjusted for the other arMED components
Agnoli et al., 2013 (Italy)	European Prospective Investigation into Cancer and Nutrition (EPIC)-Italy Study	M/F	50	11.28	45,275	colorectal cancer incidence	435	FFQ	linkage to the regional archive of hospital discharges, and by direct telephone contact where necessary	non-alcoholic energy intake, gender (analysis of entire cohort only), age, BMI, smoking, education, and total physical activity
Dilis et al., 2012 (Greece)	European Prospective Investigation into Cancer and	M	20-86	10	9,740	CHD mortality	NA	FFQ	confirmed through hospital discharge data, medical records	age, energy intake, BMI, height, physical activity, years of schooling, alcohol consumption, smoking

	Nutrition (EPIC)-Greece Study	F			14,189	CHD incidence	NA		or death certificates, and was classified according to the 10 th revision of the International Classification of Diseases (ICD-10)	status, arterial blood pressure.
						CHD mortality	NA			
						CHD incidence	NA			
Misirl et al., 2012 (Greece)	European Prospective Investigation into Cancer and Nutrition (EPIC)	M/F	20-86	10.6	23,601	cerebrovascular mortality	196	FFQ	ICD-10	age, sex, education, smoking status, body mass index (BMI), height, level of physical activity, hypertension, diabetes, and total energy intake
						cerebrovascular incidence	395			
Buckland et al., 2012 (Spain)	European Prospective Investigation into Cancer and Nutrition (EPIC)-Spanish Study	M/F	29-69	13.4	40,622	all-cause mortality	1,915	electronic dietary history questionnaire	ICD-9, ICD-10	age, sex, physical activity, BMI, waist circumference, educational level, smoking status, intake of energy, alcohol, fruit, vegetables, meat, and dairy
						CVD mortality	416			
						cancer mortality	956			

Buckland et al., 2012 (Spain, Greece, and Italy)	European Prospective Investigation into Cancer and Nutrition (EPIC)-Spain, Greece, and Italy Study	F	NA	9	62,284	Breast cancer incidence	1,256	questionnaire	identified by population cancer registries, and pathology and medical reports, discharge diagnoses or death certificates	educational level, BMI, height, physical activity, smoking status, alcohol consumption and energy intake excluding alcohol, fruit, vegetables, meat, and saturated fat.
Samieri et al., 2011 (France)	The Three-City study	M/F	73.8	5.25	7,625	stroke incidence	148	24-hour dietary recall performed during a face-to-face interview administered by trained dietitians	face-to-face interview or by self-questionnaire	age, sex, education, and center, consumption of fish, meat, pulses, raw vegetables, raw fruits, cooked fruits and vegetables, cereals, regular use of omega-3 rich oils, omega-6 rich oils, butter, goose, or duck fat, alcohol consumption, physical activity, risk factors for stroke (systolic blood pressure, antihypertensive therapy, diabetes, smoking, history of cardiovascular disease, atrial fibrillation), body mass index,

Bendinelli et al., 2010 (Italy)	European Prospective Investigation into Cancer and Nutrition (EPIC)-Italy Study	F	50	7.85	29,689	CHD incidence	154	FFQ and semiquantitative	death certificates were obtained from the Mortality Registries, and linkage with the hospital discharge files	triglyceridemia, and hypercholesterolemia energy intake, educational level, smoking status, alcohol consumption, body height, body weight, waist circumference, daily non-alcohol caloric intake, hypertension (yes or no), menopausal status, total physical activity index, total meat consumption, vegetable consumption in analyses for fruit, and fruit consumption in analyses for vegetables.
Buckland et al., 2010 (10 European countries)	European Prospective Investigation into Cancer and Nutrition (EPIC)	M/F	35-70	8.9	485,028	gastric adenocarcinoma incidence	449	questionnaires	periodic linkage to regional and national mortality registries	sex, BMI, educational level, smoking status, cigarette smoking intensity, and total energy intake

Benetou et al., 2008 (Greece)	European Prospective Investigation into Cancer and Nutrition (EPIC)-Greece Study	M/F	NA	7.9	25,623	cancer incidence	851	FFQ	verified through pathology reports, medical records, discharge diagnoses or death certificates	age, years of schooling, smoking status, body mass index, height, physical activity, ethanol intake, supplement use and total energy intake except for the model for energy intake
Trichopoulou et al., 2003 (Greece)	European Prospective Investigation into Cancer and Nutrition (EPIC)-Greece Study	M/F	20-86	3.7	9,389	all-cause mortality	275	FFQ	verified by death certificates and other official sources (ICD-9)	age, sex, waist-to-hip ratio, energy-expenditure score, years of education, smoking status, BMI, and total energy intake
Barzi et al., 2003 (Italy)	GISSI-Prevenzione Study	M/F	19-90	3.5	11,246	all-cause mortality	1,660	dietary questionnaire	NA	age, sex, hypertension, HDL-cholesterol, diabetes, smoking, claudication, electrical instability, left ventricular dysfunction, residual myocardial ischemia, dietary supplementation, pharmacological therapies, fish, fruit, raw vegetables, cooked vegetables

BMI, body mass index; CHD, coronary heart disease; CVD, cardiovascular disease; F, female; FFQ, food frequency questionnaire; ICD, international classification of diseases; IHD, ischemic heart disease; M, male; MI, myocardial infarction; NA, not available.

Buckland et al. (2012)	1	1	1	1	0	1	1	1	0	7
Samieri et al. (2011)	1	1	1	1	1	1	1	1	1	9
Bandinelli et al. (2010)	1	1	1	1	0	0	1	1	0	6
Buckland et al. (2010)	1	1	1	1	0	1	1	1	0	8
Benetou et al. (2008)	1	1	1	1	1	1	1	1	0	8
Trichopoulou et al. (2003)	1	1	1	0	1	1	1	0	0	6
Barzi et al. (2003)	0	1	1	1	1	0	0	0	0	4

a Representativeness of the exposed cohort

b Selection of the non-exposed cohort

c Ascertainment of exposure

d Demonstration that outcome of interest was not present at start of study

e Comparability of cohorts on the basis of the design or analysis (adjusted for age)

f Comparability of cohorts on the basis of the design or analysis (adjusted for other factors)

g Assessment of outcome

h Was follow-up long enough for outcomes to occur?

i Adequacy of follow-up of cohort

Table S5 Sensitivity analyses by systematic removal of each study (highest versus lowest category).

Excluded study	RR	95% CI	
CVD incidence			
All included:	0.85	0.77	0.93
Donat-Vargas et al. The Sun project, M/F (2022)	0.85	0.76	0.94
Donat-Vargas et al. EPIC-Spain, M/F (2022)	0.82	0.73	0.91
Guasch-Ferré et al. HPFS, M (2021)	0.84	0.74	0.95
Guasch-Ferré et al. NHS, F (2021)	0.82	0.71	0.94
Kouli et al. M/F (2019)	0.85	0.77	0.94
Sadeghi et al. M/F (2021)	0.83	0.74	0.93
Atkins, et al. M (2014)	0.87	0.80	0.94
Guasch-Ferré et al. M/F (2014)	0.87	0.79	0.95
CHD incidence			
All included:	0.84	0.71	0.98
Donat-Vargas et al. EPIC-Spain, M/F (2022)	0.79	0.66	0.95
Guasch-Ferré et al. HPFS, M (2021)	0.87	0.73	1.05
Guasch-Ferré et al. NHS, F (2021)	0.81	0.64	1.01
Sadeghi et al. M/F (2021)	0.81	0.69	0.96
Atkins, et al. M (2014)	0.87	0.74	1.01
Bandinelli et al. F (2010)	0.86	0.74	1.01
Stroke incidence			
All included:	0.93	0.80	1.09
Donat-Vargas et al. EPIC-Spain, M/F (2022)	0.95	0.76	1.19

Guasch-Ferré et al. HPFS, M (2021)	0.90	0.75	1.07
Guasch-Ferré et al. NHS, F (2021)	0.94	0.74	1.19
Sadeghi et al. M/F (2021)	0.91	0.79	1.05
Samieri et al. M/F (2011)	0.96	0.85	1.07
Cancer incidence			
All included:	1.00	0.96	1.04
Romanos-Nanclares et al. (2023)	0.99	0.94	1.05
Dianatinasab et al. M/F (2022)	1.01	0.97	1.05
Mahamat-Saleh et al. F (2021)	0.99	0.94	1.04
Gnagnarella et al. M/F (2013)	1.01	0.97	1.04
Buckland et al. F (2013)	0.99	0.93	1.06
Agnoli et al. M/F (2013)	1.01	0.97	1.05
Buckland et al. M/F (2010)	1.00	0.96	1.04
CVD mortality			
All included:	0.77	0.67	0.88
Torres-Collado et al. M/F (2022)	0.79	0.69	0.90
Guasch-Ferré et al. HPFS, M (2022)	0.76	0.64	0.89
Guasch-Ferré et al. NHS, F (2022)	0.73	0.61	0.87
Donat-Vargas et al. M/F (2022)	0.79	0.69	0.90
Zhang et al. M/F (2021)	0.73	0.62	0.85
Sadeghi et al. M/F (2021)	0.76	0.66	0.87
Stefler et al. M/F (2017)	0.75	0.65	0.86
Atkins, et al. M (2014)	0.79	0.70	0.90
Guasch-Ferré et al. M/F (2014)	0.79	0.69	0.90
Buckland et al. M/F (2012)	0.90	0.70	0.91
Cancer mortality			
All included:	0.89	0.79	1.00

Torres-Collado et al. M/F (2022)	0.91	0.81	1.02
Guasch-Ferré et al. HPFS, M (2022)	0.91	0.80	1.04
Guasch-Ferré et al. NHS, F (2022)	0.90	0.77	1.04
Donat-Vargas et al. M/F (2022)	0.88	0.78	1.00
Zhang et al. M/F (2021)	0.85	0.80	0.91
Guasch-Ferré et al. M/F (2014)	0.89	0.78	1.01
Buckland et al. M/F (2012)	0.89	0.77	1.02
All-cause mortality			
All included:	0.85	0.81	0.89
Bonfiglio et al. M/F (2023)	0.86	0.82	0.90
Torres-Collado et al. M/F (2022)	0.86	0.82	0.90
Guasch-Ferré et al. HPFS, M (2022)	0.85	0.81	0.90
Guasch-Ferré et al. NHS, F (2022)	0.87	0.84	0.91
Donat-Vargas et al. M/F (2022)	0.85	0.81	0.89
Zhang et al. M/F (2021)	0.82	0.77	0.88
Sadeghi et al. M/F (2021)	0.85	0.81	0.88
Stefler et al. M/F (2017)	0.84	0.80	0.88
Letois et al. M/F (2016)	0.85	0.81	0.90
Chrysohoou et al. M/F (2016)	0.82	0.76	0.89
Atkins, et al. M (2014)	0.85	0.82	0.90
Guasch-Ferré et al. M/F (2014)	0.85	0.81	0.90
Buckland et al. M/F (2012)	0.86	0.82	0.90
Barzi et al. M/F (2003)	0.86	0.82	0.90

CHD, coronary heart disease; CI, confidence interval; CVD, cardiovascular disease; F, female; M, male; RR, relative risk.

Bold: The bold results indicate differences from the main results obtained when all studies were included.

Table S6 Sensitivity analyses by systematic removal of each study (per 10 g/d olive oil intake)

Excluded study	RR	95% CI	
CVD incidence			
All included:	0.93	0.88	0.98
Donat-Vargas et al. The Sun project, M/F (2022)	0.93	0.88	0.98
Donat-Vargas et al. EPIC-Spain, M/F (2022)	0.91	0.84	0.98
Guasch-Ferré et al. HPFS, M (2021)	0.94	0.89	0.99
Guasch-Ferré et al. NHS, F (2021)	0.93	0.88	0.99
Guasch-Ferré et al. M/F (2014)	0.95	0.85	0.97
Misirl et al. M/F (2012)	0.91	0.85	0.97
CHD incidence			
All included:	0.96	0.90	1.02
Donat-Vargas et al. EPIC-Spain, M/F (2022)	0.94	0.86	1.03
Guasch-Ferré et al. HPFS, M (2021)	0.98	0.92	1.04
Guasch-Ferré et al. NHS, F (2021)	0.98	0.91	1.04
Bendinelli et al. (2010)	0.97	0.91	1.04
Dilis et al. M (2012)	0.93	0.86	1.01
Dilis et al. F (2012)	0.94	0.87	1.01
Stroke incidence			
All included:	0.95	0.92	0.98
Donat-Vargas et al. EPIC-Spain, M/F (2022)	0.94	0.90	0.99
Guasch-Ferré et al. HPFS, M (2021)	0.93	0.90	0.97
Guasch-Ferré et al. NHS, F (2021)	0.95	0.90	0.99
Misirl et al. M/F (2012)	0.97	0.93	1.00

Cancer incidence			
All included:	0.99	0.97	1.01
Romanos-Nanclares et al. (2023)	0.99	0.96	1.02
Dianatinasab et al. M/F (2022)	0.99	0.97	1.01
Gnagnarella et al. M/F (2013)	0.99	0.98	1.01
Agnoli et al. M/F (2013)	0.99	0.96	1.02
Buckland et al. F (2012)	0.99	0.97	1.01
Buckland et al. M/F (2010)	0.99	0.97	1.01
Benetou et al. M/F (2008)	0.99	0.97	1.02
CVD mortality			
All included:	0.92	0.87	0.97
Torres-Collado et al. M/F (2022)	0.92	0.87	0.98
Guasch-Ferré et al. HPFS, M (2022)	0.91	0.86	0.97
Guasch-Ferré et al. NHS, F (2022)	0.91	0.85	0.97
Donat-Vargas et al. M/F (2022)	0.92	0.87	0.97
Zhang et al. M/F (2021)	0.93	0.88	0.98
Guasch-Ferré et al. M/F (2014)	0.93	0.88	0.97
Buckland et al. M/F (2012)	0.93	0.88	0.98
Misirl et al. M/F (2012)	0.91	0.87	0.94
Cancer mortality			
All included:	0.96	0.91	1.00
Torres-Collado et al. M/F (2022)	0.97	0.93	1.01
Guasch-Ferré et al. HPFS, M (2022)	0.97	0.93	1.01
Guasch-Ferré et al. NHS, F (2022)	0.95	0.90	1.01
Donat-Vargas et al. M/F (2022)	0.95	0.91	1.00
Zhang et al. M/F (2021)	0.94	0.91	0.98
Guasch-Ferré et al. M/F (2014)	0.96	0.91	1.00

Buckland et al. M/F (2012)	0.95	0.90	1.01
All-cause mortality			
All included:	0.92	0.90	0.94
Bonfiglio et al. M/F (2023)	0.92	0.90	0.94
Torres-Collado et al. M/F (2022)	0.92	0.90	0.94
Guasch-Ferré et al. HPFS, M (2022)	0.92	0.90	0.93
Guasch-Ferré et al. NHS, F (2022)	0.93	0.91	0.94
Donat-Vargas et al. M/F (2022)	0.92	0.90	0.94
Zhang et al. M/F (2021)	0.92	0.91	0.94
Guasch-Ferré et al. M/F (2014)	0.92	0.90	0.94
Buckland et al. M/F (2012)	0.92	0.90	0.94
Trichopoulou et al. M/F (2003)	0.92	0.90	0.93

CHD, coronary heart disease; CI, confidence interval; CVD, cardiovascular disease; F, female; M, male; RR, relative risk.

Bold: The bold results indicate differences from the main results obtained when all studies were included.

Table S7 GRADE evidence table for the association of olive oil intake with the risk of cardiovascular disease, cancer, and all-cause mortality.

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Participants	Case (event rate)	Relative (95% CI)	Absolute		
CVD incidence												
8	Observational studies	No serious	No serious	No serious	No serious	Dose-response gradient	168,574	14,021	RR 0.85 (0.77 to 0.93)	-	⊕⊕⊕O MODERATE	IMPORTANT
								8.32%		-		
CHD incidence												
5	Observational studies	No serious	Serious ¹	No serious	No serious	Dose-response gradient	170,761	8,190	RR 0.84 (0.71 to 0.98)	-	⊕⊕OO LOW	IMPORTANT
								4.80%		-		
Stroke incidence												
5	Observational studies	No serious	No serious	No serious	Serious ²	Dose-response gradient	145,428	5,045	RR 0.93 (0.80 to 1.09)	-	⊕⊕OO LOW	IMPORTANT
								3.47%		-		

Cancer incidence												
7	Observational studies	No serious	No serious	No serious	Serious ²	Dose-response gradient	1,648,841	24,353	RR 1.00 (0.96 to 1.04)	-	⊕⊕○○ LOW	IMPORTANT
								0.99%		-		
CVD mortality												
10	Observational studies	No serious	Serious ¹	No serious	No serious	Dose-response gradient	702,831	49,257	RR 0.77 (0.67 to 0.88)	-	⊕⊕○○ LOW	IMPORTANT
								7.01%		-		
CHD mortality												
1	Observational studies	No serious	Undetected ³	Serious ⁴	Serious ²	No dose-response gradient	19,263	226	RR 1.23 (0.71 to 2.16)	-	⊕○○○ VERY LOW	IMPORTANT
								1.17%		-		
Stroke mortality												
2	Observational studies	No serious	No serious	Serious ⁵	Serious ²	No dose-response gradient	540,381	5,714	RR 1.04 (0.67 to 1.62)	-	⊕○○○ VERY LOW	IMPORTANT
								1.06%		-		
Cancer mortality												
7	Observational studies	No serious	No serious ⁶	No serious	Serious ²	Dose-response	674,834	56,569	RR 0.89	-	⊕⊕○○	IMPORTANT

	1 studies					gradient		8.38%	(0.79 to 1.00)	-	LOW	NT
All-cause mortality												
14	Observational studies	No serious	Serious ¹	No serious	No serious	Dose-response gradient	723,224	176,729	RR 0.85 (0.82 to 0.89)	-	⊕⊕○○ LOW	IMPORTANT
								24.4%		-		

CHD, coronary heart disease; CI, confidence interval; CVD, cardiovascular disease; F, female; M, male; RR, relative risk

¹ Downgrade for substantial heterogeneity.

² Downgrade for serious imprecision, as the upper bound of the 95% CI includes the null value and bounds of 95% CI reaching the level of clinical significance.

³ Only one study contributed to the data.

⁴ Downgrade for serious indirectness as only one study contributed to the data.

⁵ Downgrade for serious indirectness as only two studies contributed to the data.

⁶ No downgrade for inconsistency. Although $I^2 = 79.1\%$, the value of I^2 was decreased to 0.0% after removing the study by Zhang et al. ($I^2 = 0.0\%$, $P = 0.575$).

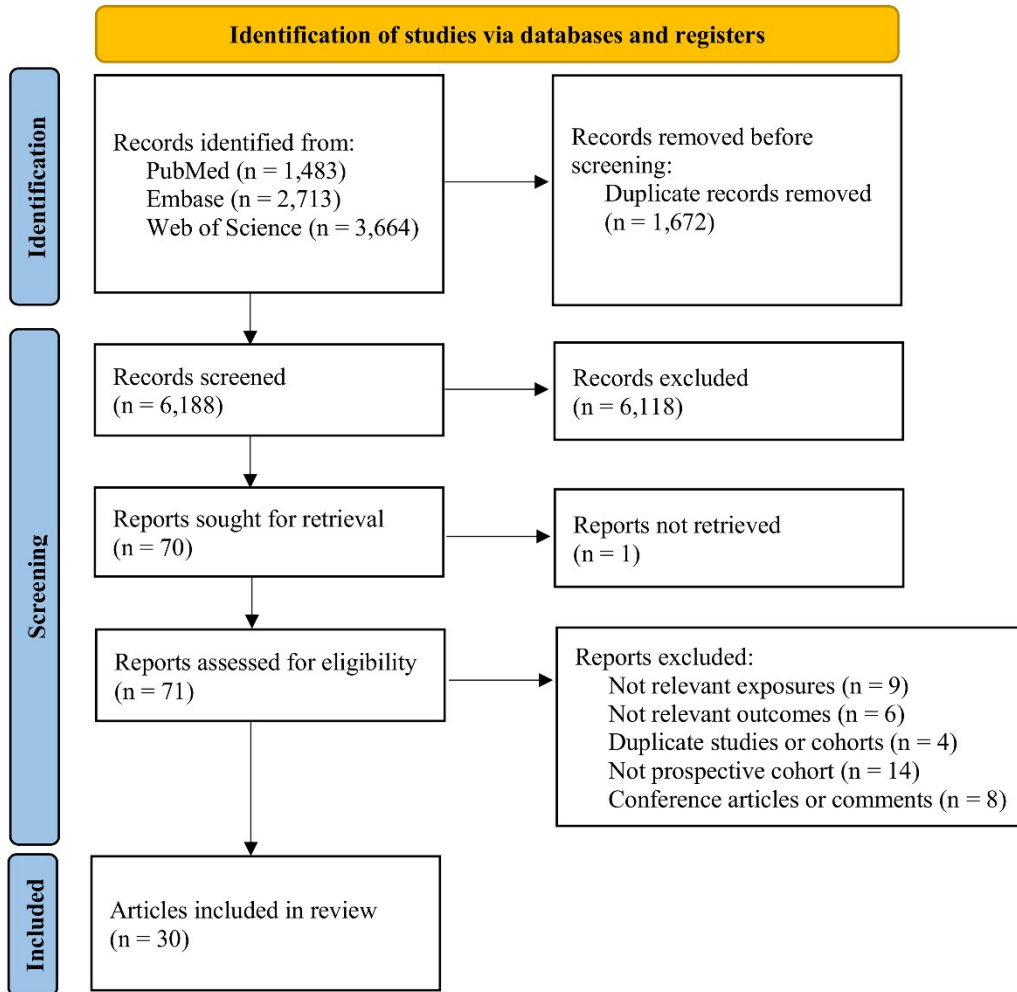


Fig. S1 The flowchart of article selection.

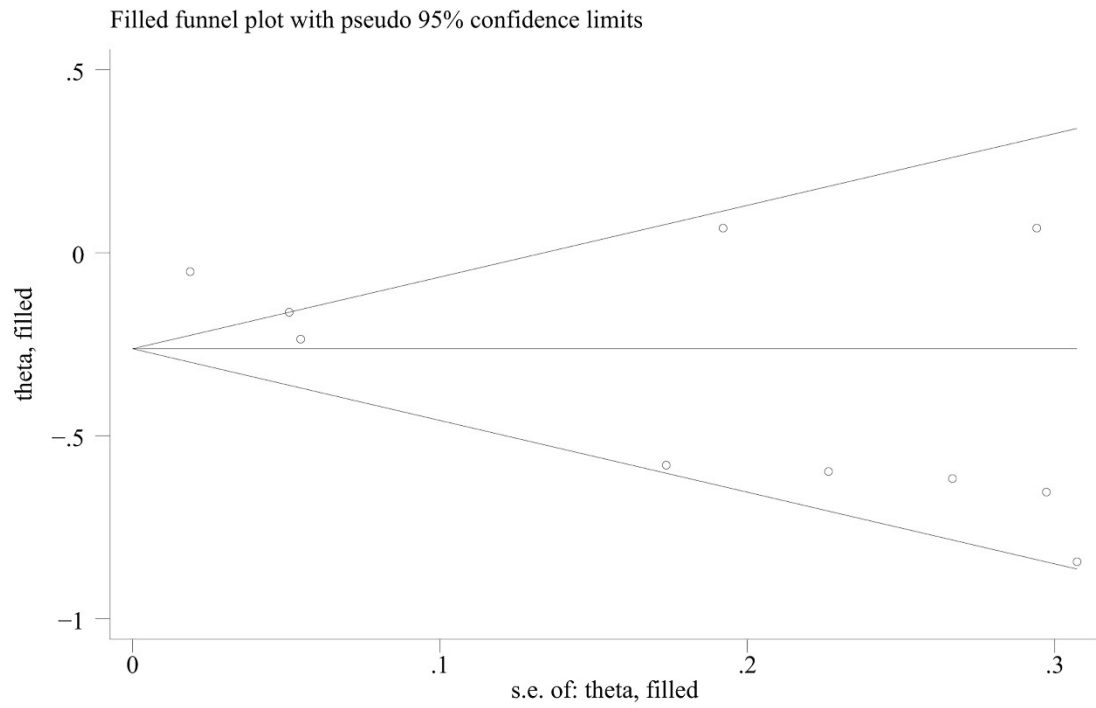


Fig. S2 Funnel plot for publication bias for risk of CVD mortality with highest versus lowest olive oil intake levels.

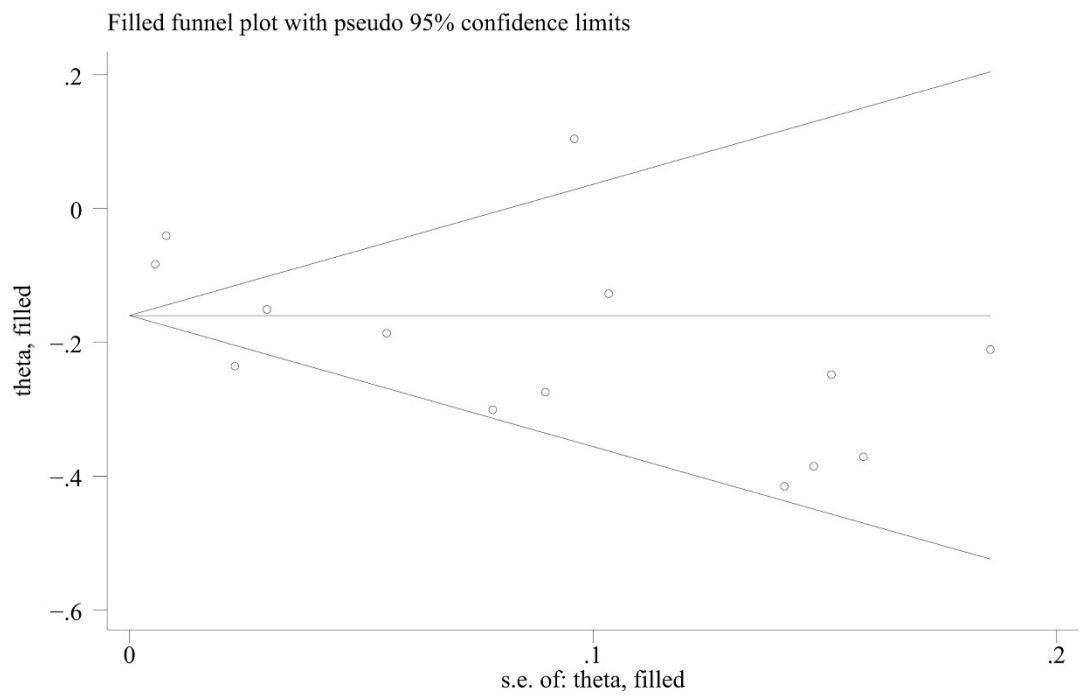


Fig. S3 Funnel plot for publication bias for risk of all-cause mortality with highest versus lowest olive oil intake levels.