Supplementary Table 1. PRISMA 2020 checklist.

Section/topic	Item n.°	Checklist item	Item location
TITLE			
Title	1	Identify the publication as a systematic review.	1
SUMMARY			
Structured summary	2	See the checklist for structured summaries of the PRISMA 2020 statement (table 2).	2
INTRODUCTION			
Justification	3	Describe the rationale for the review in the context of existing knowledge.	3
Objectives	4	Provide an explicit statement of the objectives or questions addressed by the review.	3
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the synthesis.	4-5
Sources of information	6	Specify all databases, registers, websites, organisations, reference lists and other search or query resources to identify studies. Especifique la fecha en la que cada recurso se buscó o consultó por última vez.	4
Search strategy	7	Submit full search strategies for all databases, registers and websites, including any filters and limits used.	4, Table S3
Study selection process	8	Specify the methods used to decide whether a study meets the review's inclusion criteria, including how many review authors screened each record and each retrieved publication, whether they worked independently and, if applicable, details of the automation tools used in the process.	4-5
Data extraction process	9	Indicate the methods used to extract data from reports or publications, including how many reviewers collected data from each publication, whether they worked independently, the processes for obtaining or confirming data by the study investigators, and, if applicable, details of any automation tools used in the process.	5
List of data	10a	List and define all outcomes for which data were sought. Specify whether all outcomes compatible with each outcome domain were sought (e.g. for all measurement scales, time points, analyses) and, if not, the methods used to decide which outcomes to collect.	5-6
	10b	List and define all other variables for which	5-6

		data were sought (e.g. participant and intervention characteristics, funding sources). Describe all assumptions made about any missing or uncertain information.	
Risk of bias assessment of individual studies	11	Specify the methods used to assess the risk of bias of the included studies, including details of the tools used, how many review authors assessed each study and whether they worked independently and, if applicable, details of the automation tools used in the process.	5
Measures of effect	12	Specify, for each outcome, the measures of effect (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	5-6
Synthesis methods	13a	Describe the process used to decide which studies were eligible for each synthesis (e.g. by tabulating the characteristics of the intervention studies and comparing them with the intended groups for each synthesis (item 5).	5-6
	13b	Describe any methods required to prepare data for presentation or synthesis, such as handling missing data in summary statistics or data conversions.	5-6
	13c	Describe the methods used to tabulate or visually present the results of individual studies and their synthesis.	9-10
	13d	Describe the methods used to synthesise the results and justify your choices. If a meta-analysis has been performed, describe the models, the methods for identifying the presence and extent of statistical heterogeneity, and the software used.	6
	13e	Describe the methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	6
	13f	Describe the sensitivity analyses that have been performed to assess the robustness of the synthesis results.	6
Assessment of publication bias	14	Describe the methods used to assess the risk of bias due to missing results in a synthesis (arising from publication biases).	6
Assessing the certainty of the evidence	15	Describe the methods used to assess the certainty (or confidence) in the body of evidence for each outcome.	NA
RESULTS			
Selection of studies	16a	Describe the results of the search and screening processes, from the number of records identified in the search to the number	6, Figure S1

		of studies included in the review, ideally using a flow chart (see figure 1).	
	16b	Cite studies that apparently met the inclusion criteria but were excluded, and explain why they were excluded.	6, Figura S1
Characteristics of the studies	17	Cite each study included and present its characteristics.	6-7, Table 1
Risk of bias of individual studies	18	Present the risk of bias assessments for each of the included studies.	7, Table S4
Results of individual studies	19	Present, for all outcomes and for each study: (a) summary statistics for each group (if applicable) and (b) the effect estimate and its precision (e.g. credible or confidence interval), ideally using structured tables or graphs.	7-8, Figure 1
Results of the synthesis	20a	For each synthesis, briefly summarise the characteristics and risk of bias among the contributing studies.	NA
	20b	Present the results of all statistical syntheses performed. If a meta-analysis has been performed, present for each meta-analysis the summary estimator and its precision (e.g. credible or confidence interval) and measures of statistical heterogeneity. If groups are compared, describe the direction of effect.	8
	20c	Present the results of all research on possible causes of heterogeneity between study results.	NA
	20d	Present the results of all sensitivity analyses performed to assess the robustness of the synthesised results.	8
Publication bias	21	Present assessments of the risk of bias due to missing results (arising from publication bias) for each synthesis assessed.	8
Certainty of evidence	22	Present the assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	NA
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	8-9
	23b	Argue the limitations of the evidence included in the review.	11-12
	23c	Argue the limitations of the review processes used.	11-12
	23d	Argue the implications of the results for practice, policy and future research.	11-12
OTHER INFORMATION			
Registration	24a	Provide the registration information for the	3-4

		review, including the name and registration number, or state that the review has not been registered.	
and protocol	24b	Indicate where the protocol can be accessed, or state that no protocol has been drafted.	NA
	24c	Describe and explain any amendments to the information provided in the registry or protocol.	NA
Funding	25	Describe the sources of financial or non-financial support for the review and the role of funders or sponsors in the review.	12-13
Conflict of interest	26	Declare the conflicts of interest of the review authors.	13
Availability of data, codes and other materials	27	Specify which of the following are publicly available and where they can be found: data extraction form templates, data extracted from the included studies, data used for all analyses, analysis code, any other material used in the review.	NA

NA: Not applicable

Supplementary Table 2. MOOSE checklist.

Item	Recommendation	Reported on page nº
The background report should include		
1	Problem definition	3
2	Hypothesis statement	3
3	Description of the study results	3
4	Type of exposure or intervention used	3
5	Type of study designs used	3
6	Study population	3
The search strategy report should include		
7	Qualifications of searchers (e.g. librarians and researchers)	NA
8	Search strategy, including time period included in the synthesis and keywords	4
9	Effort to include all available studies, including contact with authors	4
10	Databases and records searched	4
11	Search software used, name and version, including special features used	6
12	Use of manual search (e.g. reference lists of retrieved articles)	4
13	List of citations located and excluded, including justification	4-5, Figure

		S1
14	Addressing method for articles published in languages other than English	4
15	Method of handling abstracts and unpublished studies	NA
16	Description of any contact with the authors	5
The methods report should include		
17	Description of the relevance or adequacy of the studies collected to assess the hypothesis to be tested	4-5
18	Rationale for data selection and coding (e.g. sound clinical principles or appropriateness)	4-5
19	Documentation of how data were classified and coded (e.g., multiple raters, blinding, inter-rater reliability)	4-5
20	Assessment of confounding factors (e.g., case-control comparability in studies where appropriate)	NA
21	Study quality assessment, including blinding of quality assessors, stratification or regression on possible predictors of study outcomes	5
22	Heterogeneity assessment	5-6
23	Description of statistical methods (e.g., full description of fixed or random effects models, justification of whether the chosen models take into account predictors of study outcomes, dose-response models or cumulative meta-analysis) in sufficient detail to be replicated	5-6
24	Provision of appropriate charts and graphs	4-5
The report of the results should include		
25	Graph summarising the individual study estimates and the overall estimate	6-8, Figure 1
26	Table with descriptive information on each study included	21-23, Table 1
27	Results of sensitivity tests (e.g., subgroup analysis)	8, Table S5
28	Indication of the statistical uncertainty of the results	7-8
The discussion report should include		
29	Quantitative assessment of bias (e.g. publication bias)	8
30	Justification for exclusion (e.g. exclusion of citations in languages other than English)	7-8
31	Quality assessment of included studies	7, Table S4
The report of the findings should include		
32	Consideration of alternative explanations for observed outcomes	8-9
33	Generalisation of conclusions (i.e. appropriate to the data presented and within the domain of the literature review).	8-12
34	Guidelines for future research	11-12
35	Disclosure of the source of funding	NA

NA: Not applicable

Supplementary Table 3. Search strategy for the Pubmed database.

1 adult [MeSH Terms] 2 adult [All Fields] 3 1 OR 2 4 olive oil [All Fields] 5 extra virgin olive oil [All Fields] 6 4 OR 5 7 3 AND 6 8 mortality [Subheading] 9 mortality [All Fields] 10 mortality [MeSH Terms] 11 8 OR 9 OR 10 12 all-cause mortality [All Fields]	13 11 OR 12 14 cardiovascular mortality [All Fields] 15 13 OR 14 16 cancer mortality [All Fields] 17 15 OR 16 18 death [MeSH Terms] 19 death [All Fields] 20 deaths [All Fields] 21 18 OR 19 O 20 22 17 OR 21 23 7 AND 22

Supplementary Table 4. Assessment of study quality using the National Heart, Lung, and Blood Institute's Observational Cohort and Cross-sectional Study Tool.

Reference	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**Quality**
D'Amicis et al. 1999 (24)	Y	N	NR	N	NR	Y	NA	N	Y	NA	Y	NR	NA	Y	Poor
Barzi et al. 2003 (25)	Y	Y	NR	Y	Y	Y	Y	Y	Y	Y	Y	NR	NR	Y	Good
Naska et al. 2009 (26)	Y	N	NR	N	NR	Y	NR	NR	Y	N	Y	NR	NR	Y	Poor
Buckland et al. 2011 (27)	Y	Y	Y	N	Y	Y	Y	Y	Y	N	Y	NR	NR	Y	Good
Regidor et al. 2012 (28)	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	NR	NR	Y	Good
Buckland et	Y	Y	Y	Y	Y	Y	Y	N	Y	N	Y	NR	NR	Y	Good

al. 2012 (29)															
Guasch-Ferré et al. 2014 (30)	Y	Y	NR	Y	Y	Y	Y	Y	Y	N	Y	Y	NR	Y	Good
Prinelli et al. 2015 (31)	Y	Y	Y	Y	Y	Y	Y	N	Y	N	Y	NR	NR	Y	Good
Stefler et al. 2017 (32)	Y	Y	Y	N	Y	Y	Y	N	Y	N	Y	NR	NR	Y	Fair
Sadeghi et al. 2021 (33)	Y	Y	NR	Y	Y	Y	Y	Y	Y	N	Y	NR	NR	Y	Good
Zhang et al. 2021 (34)	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	NR	Y	Y	Good
Guasch-Ferré et al. 2022 (35)	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	NR	NR	Y	Good
Donat-Vargas et al. 2023 (36)	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	NR	NR	Y	Good
Bonfiglio et al. 2023 (37)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	NR	Y	NR	Good

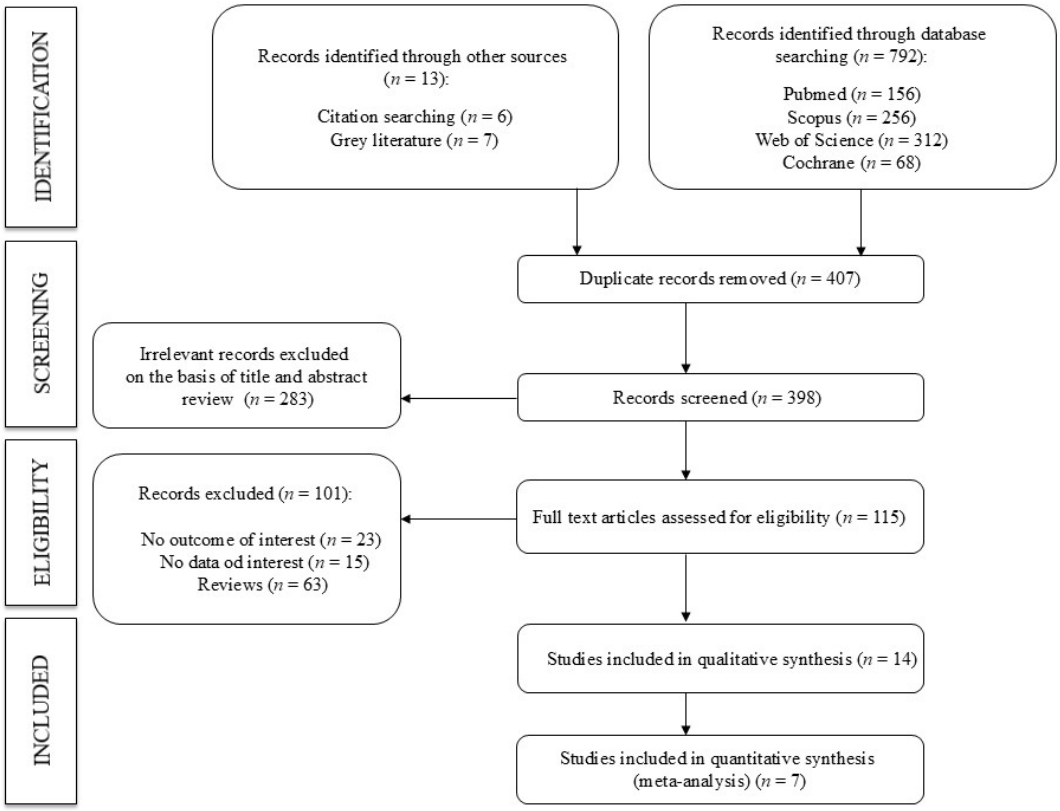
Items: 1. Was the research question or objective in this paper clearly stated?; 2. Was the study population clearly specified and defined?; 3. Was the participation rate of eligible persons at least 50%?; 4. Were all the subjects selected or recruited from the same or similar populations (including the same time period)? Were inclusion and exclusion criteria for being in the study

prespecified and applied uniformly to all participants?; 5. Was a sample size justification, power description, or variance and effect estimates provided?; 6. For the analyses in this paper, were the exposure(s) of interest measured prior to the outcome(s) being measured?; 7. Was the timeframe sufficient so that one could reasonably expect to see an association between exposure and outcome if it existed?; 8. For exposures that can vary in amount or level, did the study examine different levels of the exposure as related to the outcome (e.g., categories of exposure, or exposure measured as continuous variable)?; 9. Were the exposure measures (independent variables) clearly defined, valid, reliable, and implemented consistently across all study participants?; 10. Was the exposure(s) assessed more than once over time?; 11. Were the outcome measures (dependent variables) clearly defined, valid, reliable, and implemented consistently across all study participants?; 12. Were the outcome assessors blinded to the exposure status of participants?; 13. Was loss to follow-up after baseline 20% or less?; 14. Were key potential confounding variables measured and adjusted statistically for their impact on the relationship between exposure(s) and outcome(s)?; CD, cannot determine; N: no; NA, not applicable; NR: not reported; Y: yes.

Supplementary Table 5. Meta-regresion models as a function of mean age, percentage of women and intervention follow-up for all-cause, cardiovascular and cancer mortality.

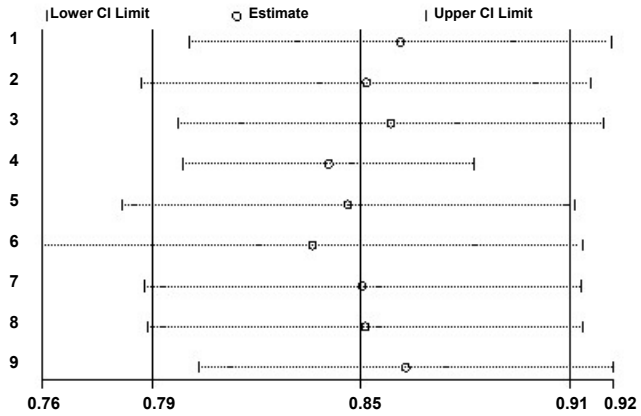
	Coeficient	**95% CI**	***p* valor**
All-cause mortality			
Mean age	-0.0006	-0.015, 0.013	0.905
Percentage of women	-0.0005	-0.002, 0.001	0.363
Years of follow-up	0.0024	-0.007, 0.011	0.551
Cardiovascular mortality			
Mean age	-0.0208	-0.175, 0.134	0.337
Percentage of women	-0.0008	0.497, 1.229	0.736
Years of follow-up	0.0027	-0.022, 0.027	0.778
Cancer mortality			
Mean age	0.0075	-0.193, 0.208	0.718
Percentage of women	0.0001	-0.003, 0.003	0.869
Years of follow-up	-0.0045	-0.018, 0.009	0.300

CI: Confidence Interval

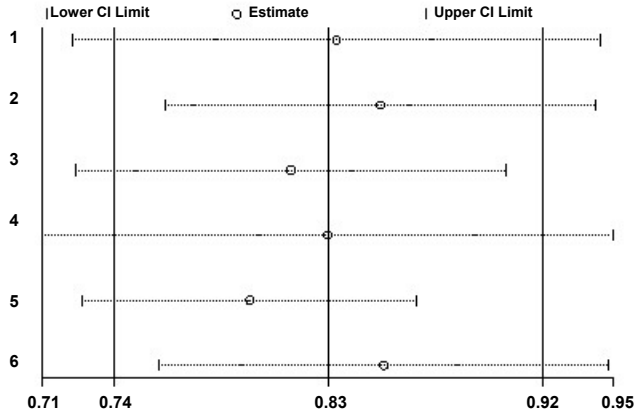


Supplementary Figure 1. Flow chart: search strategy.

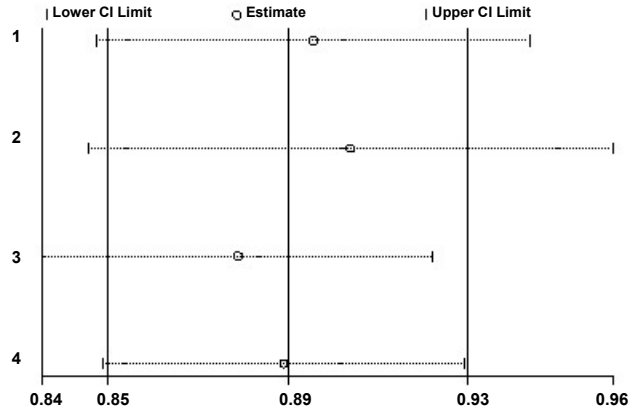
A



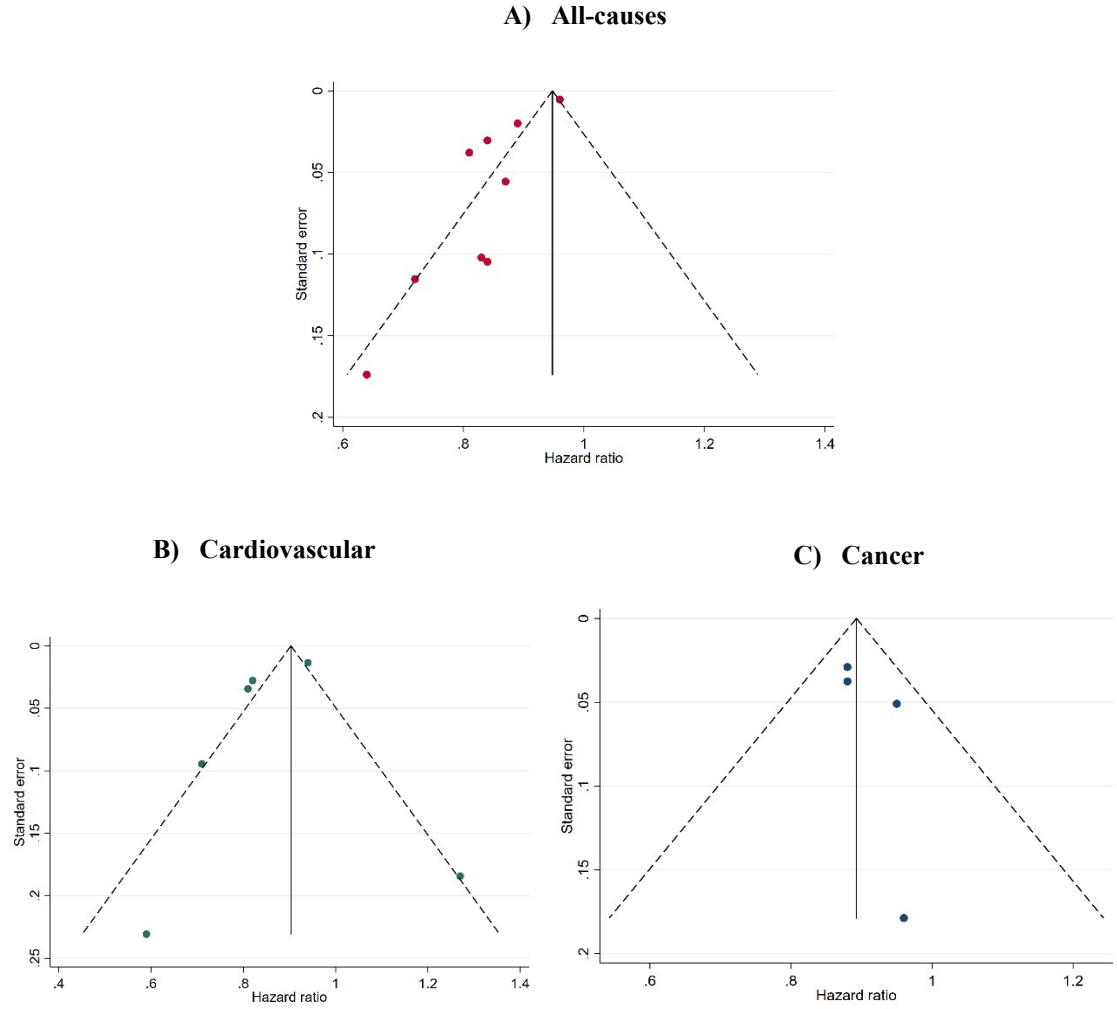
B



C



Supplementary Figure 2. Sensivity analysis. **A)** Studies on all-cause mortality. **B)** Cardiovascular mortality studies. **C)** Cancer mortality studies.



Supplementary Figure 3. Assessment of meta-analysis publication bias by *funnel plots*. **A)** Studies on all-cause mortality. **B)** Cardiovascular mortality studies. **C)** Cancer mortality studies.