Total and Different Dietary Fiber Sources and the Risk of All-cause, Cardiovascular, and Cancer Mortality: A Dose-Response Meta-Analysis of Prospective Cohort Studies

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Supplemental Materials including Supplemental Tables 1-6 and Supplemental Figures 1-24

Supplemental Table 1. List of studies excluded via full text screening (n=60).

Not relevant exposure (n=38) (1-38)
Not relevant outcome (n=7) (39-45)
Review (n=6) (46-51)
No risk estimate (n=4) (52-55)
Duplicate (4) (56-59)
In patients (n=1) (60)

Supplemental Table 2. Characteristics of prospective cohort studies included in meta-analysis of dietary fiber and risk of mortality.

Reference, year, Country	Study name	Follow-up (years)	Female (%)	Participants	Outcome (cases)	Exposure	Dietary assessment tool	Age range, mean age (years)	Adjustments
Atkins, 2014 (21), UK	The British Regional Heart Study	11.3	0%	3328	All-cause death (933) CVD death (327)	Total fiber	FFQ	60-79 (68)	Age, energy intake, smoking, alcohol, physical activity, social class, BMI, and a modified version of the HDI/EDI score not containing the individual component of interest.
Bazelmans, 2006 (22), Belgium	Belgian Interuniversity Research on Nutrition and Health' study	10	47%	11,193	All-cause death (1019)	Total fiber	One day food record	25-74 (49)	Age, educational level, antecedents of an infarction, hypertension, diabetes, tobacco addiction, alcohol consumption, cholesterol/HDL-C ratio and obesity
Dominguez, 2018 (23), Spain	Seguimiento Universidad de Navarra" (SUN) project	10.1	61%	19,703	All-cause death (323)	Total fiber, fruit fiber, vegetable fiber, legume fiber, cereal fiber, soluble fiber, insoluble fiber	FFQ	37.5	Age, sex, marital status, BMI, smoking, alcohol, physical activity, hours per day spent watching television, baseline hypercholesterolemia, baseline HTN, history of depression, history of CVD, history of cancer, history of diabetes, following special diets at baseline, snacking between meals, sugar-sweetened beverages consumption, and total energy intake
Katagiri, 2020 (24), Japan	Japan Public Health Center-based prospective study	16.8	54%	92,924	All-cause death (19,400), Cancer death (7080), CVD death (4900)	Total fiber, vegetable fiber, cereal fiber, fruit fiber, beans fiber, insoluble, soluble fiber	FFQ	45-74 (57)	Age, area, BMI, smoking status, alcohol intake, sports or physical exercise during leisure time, hypertension with medication, self-reported diabetes with and without medication, health check-up, amount of green tea intake, coffee intake, salt intake, menopausal status, and exogenous hormone use (yes or no, only for women).
Miyazawa, 2019 (25), Japan	NIPPON DATA80	24	56%	8925	CVD death (823)	Total fiber	Weighted food record	30-79 (50)	Age, smoking status, drinking status, BMI, medication of HTN, past history of diabetes mellitus, sodium, saturated fatty acids, long-chain n-3 poly-

									unsaturated fatty acids, and available carbohydrate
Partula, 2020 (26) France	NutriNet-Santé prospective cohort	5	78.7%	107,377	All-cause death (635)	Total fiber, soluble fiber, insoluble fiber, vegetable fiber, fruit fiber, legume fiber, cereal fiber	Dietary record	>18 (43)	Age, sex, educational level, BMI, physical activity, smoking status, alcohol intake, energy intake, and number of 24-h dietary records, for all-cause mortality: family history of cancer and CVD, and the personal history of cancer, CVD, and T2D.
Akbaraly, 2011 (41), UK	Whitehall II cohort	18	30.3%	7319	All-cause death (534) CVD death (141)	Total fiber	FFQ	39-63 (50)	Age, sex, ethnicity, occupational grade, marital status, smoking status, total energy intake, physical activity, BMI categories, prevalent CVD, type 2 diabetes, hypertension, dyslipidemia, metabolic syndrome, and inflammatory markers
Eshak, 2010 (42), Japan	Japan Collaborative Cohort Study	14	60%	58730	CVD death (2080)	Total fiber, soluble fiber, insoluble fiber, cereal fiber, vegetable fiber, fruit fiber	FFQ	40-79 (56)	Age, BMI, history of HTN, history of diabetes, alcohol consumption, smoking, education level, hours of exercise, hours of walking, perceived mental stress, sleep fish, SFA, (n-3) fatty acids, sodium, folate, and vitamin E, other types of dietary fiber (cereal, fruit, and vegetable fibers)
Baer, 2011 (43), US	The Nurses' Health Study	18	100%	50,112	All-cause death (4893) CVD death (1026) Cancer death (2361)	Cereal fiber	FFQ	30-55 (53)	Age, glycemic load, dietary cholesterol, systolic blood pressure, use of blood pressure medications, personal history of diabetes, parental MI before age 60 years, time since menopause, polyunsaturated fat nut consumption, BMI at age 18 years, weight change since age 18 years (per 23 kg), height, Smoking status, smoking status, physical activity, and alcohol intake
Bazzano, 2003 (44), US	The National Health and Nutrition Examination Survey I	19	61%	9776	All-cause death (2632) CVD death (1198)	Total fiber, soluble fiber	24-h dietary recall	25-74 (49)	Age, sex, race, educational level, systolic blood pressure, serum total cholesterol level, diabetes mellitus, physical activity, regular alcohol

	Epidemiologic Follow-up Study								consumption, smoking status, BMI and saturated fat intake
Buil-Cosiales, 2014 (45), Spain	Prevencio´ n con Dieta Mediterra´ nea (PREDIMED) study	5.9	57%	7216	All-cause death (425) CVD death (103) Cancer death (169)	Total fiber	FFQ	55-80 (67)	Age, sex, smoking status, diabetes, BMI, baseline systolic and diastolic arterial blood pressures, statins, alcohol intake, educational level, physical activity, and total energy intake
Buyken, 2010 (46), Australia	The Blue Mountains Eye Study	13	54%	2735	CVD death (260)	Total fiber, vegetable fiber, fruit fiber, cereal fiber	FFQ	>49 (64)	Women: Age, energy, dietary glycemic index residuals, alcohol consumption, current smoking, and presence of diabetes at baseline; Men: Age, energy, dietary glycemic index residual, total fat intake, whether underweight, current smoking, and use of corticosteroid drugs at baseline.
Chan, 2016 (47), US	The National Health and Nutrition Examination Survey III	13.74	53.4%	15,740	All-cause death (3164) Cancer death (656)	Total fiber, soluble fiber, insoluble fiber	24-h dietary recall	>20 (45)	Age, sex, race, marital status, education level, energy intake, folate intake, body mass index, alcohol consumption, smoking status and physical activity frequency per week
Chuang, 2012 (48), Europe	European Prospective Investigation into Cancer and Nutrition cohort	12.7	71%	452,717	All-cause death (23,552) cancer death (9614) CVD death (4604)	Total fiber, fruit fiber, vegetable fiber, cereal fiber	FFQ	25-70 (50)	Education, smoking, alcohol consumption, BMI, physical activity, and total energy intake and use of menopausal hormone therapy in women
Gopinath, 2016 (49), Australia	The Blue Mountains Eye Study	10	56%	1609	All-cause death (610)	Total fiber, vegetable fiber fruit fiber, cereal fiber	FFQ	>49 (64)	Age, sex, marital status, living status, smoking, weight status, and energy-adjusted total fiber intake
Huang, 2015 (50), USA	The NIH-AARP Diet and Health Study	14	43.9	367,442	All-cause death (46067) Cancer death (19043) CVD death (11283)	Cereal fiber	FFQ	50-71, 61.7	Age, sex, the number of cigarettes smoked per day, time of smoking cessation, race or ethnicity group, alcohol intake, education level, marital status, health status, obesity, physical activity, consumption of red meat, total fruit and total vegetables, total energy intake, and hormone usage.

Jacobs, 2000 (51), US	The Iowa Women's Health Study	11	100%	10,444	All-cause death (1240), CVD death (427) Cancer death (527)	Cereal fiber	FFQ	55-69, 61.6	Age, energy intake, educational status, marital status, HTN, diabetes, heart disease, cancer, BMI, WHR, age at first birth, physical activity score, ever smoker, pack years of cigarette smoking, alcohol intake, vitamin supplement use, hormone replacement therapy use, percent of energy from total fat, saturated fat, and carbohydrates, intake per 1000 kcal of fiber from non-grain sources, intake of red meat, and intake of fish and seafood.
Lubin, 2003 (52), Israel	Israel Glucose Intolerance, Obesity and Hypertension cohort study	18	52%	632	All-cause death (151) Cancer death (34) CVD death (38)	Total fiber	FFQ	41-70 (55)	Age, sex, ethnic origin, smoking status, systolic blood pressure, physical activity, BMI, cholesterol consumption, type of fatty acids, the percentage of energy intake from fat and total energy intake
Mann, 1997 (53), UK	the Vegetarian Society of the United Kingdom	13.3	62%	10,802	All-cause death (392)	Total fiber	FFQ	16-79 (33)	Age, sex, smoking and social class for subjects with no evidence of pre-existing disease at the time of recruitment, BMI
Nilsson, 2012 (54), Sweden	Va¨sterbotten Intervention Program (VIP) cohort	10	51.3%	77,319	All-cause death (2383)	Total fiber	FFQ	40-60 (49)	Age, BMI, sedentary lifestyle, education, current smoking, intake of alcohol and total energy remaining items in the traditional Sami diet score,
Park, 2011 (55), US	The NIH (National Institutes of Health)-AARP Diet and Health Study	9	43.5%	388,122	All-cause death (31756) CVD death (7665) Cancer death (13171)	Total fiber, vegetable fiber, fruit fiber, beans fiber	FFQ	50-71 (61)	Age; race/ethnicity; education; marital status; health status; body mass index; physical activity; smoking status; time since quitting ; smoking dose; alcohol consumption; and intakes of red meat, total fruits and vegetables, and total energy
Streppel, 2008 (56), Netherlands	The Zutphen Study	40	0%	1373	All-cause death (1048)	Total fiber, cereal fiber, vegetable fiber, fruit fiber, legume fiber	Cross check dietary history method	>49	Total energy, saturated fat, trans unsaturated fatty acid, and cis polyunsaturated fat intakes; alcohol intake; wine use; fish intake; prescribed diet; the number of cigarettes smoked; duration of cigarette smoking; cigar or

									pipe smoking; BMI; and socioeconomic status
Threapleton, 2013 (57), UK	The United Kingdom Women's Cohort Study	14.3	100%	31,036	CVD death (258)	Total fiber, cereal fiber, vegetable fiber, fruit fiber, legume fiber, soluble fiber, insoluble fiber	FFQ,	35-69 (50)	Age, BMI, calories from carbohydrate, fat and protein, ethanol intake, METS, smoking status, and socio-economic status
Todd, 1999 (58), UK	Scottish Heart Health Study	7.7	50.5%	11,629	All-cause death (591)	Total fiber	FFQ	40-59 (50)	Age, serum total cholesterol, systolic blood pressure, energy, previous medical diagnosis of diabetes, body mass index, the Bortner personality score, triglycerides, high density lipoprotein cholesterol, fibrinogen, a self-reported measure of activity in leisure, and alcohol consumption
Xu, 2014 (59), Sweden	Uppsala Longitudinal Study of Adult Men	10	0%	1110	All-cause death (300) Cancer death (111) CVD death (138)	Total fiber	7-day dietary record	70-71 (71)	Age, protein intake, body mass index, smoking, physical activity, education, CVD, diabetes, hyperlipidemia, hypertension, eGFR, UAER, and CRP (cancer history was additionally included in the cancer-related mortality analysis)
Kwon, 2022 (60), Korea	Korean genome and epidemiology study	10.1	64%	143,050	All-cause death (5436) CVD death (985)	Total fiber	FFQ	>40 (53.9)	Age, sex, body mass index, smoking, alcohol intake, exercise, total calories, hypertension, diabetes, and dyslipidemia
Xu, 2022 (61), US	Prostate, Lung, Colorectal, and Ovarian Cancer (PLCO) Screening Trial	17.1	46%	86,642	All-cause death (17,536) CVD death (4842) Cancer death (5760)	Total fiber, soluble fiber, insoluble fiber	Dietary history questionnaire	55-74	Age, sex, race, body mass index, education, smoking status, marital status, alcohol drinking status, and total energy intake
You, 2022 (62), Malaysia	Neuroprotective Model for Healthy Longevity	5	52%	2322	All-cause death (336)	Total fiber	Dietary history questionnaire	>60	Age, sex, marital status and years of education

Abbreviations: BMI, body mass index; CVD, cardiovascular disease; CRP, C-reactive protein; FFQ, food frequency questionnaire; GFR, glomerular filtration rate; HDL, high density lipoprotein cholesterol; HTN, hypertension; MI, myocardial infarction; SFA, saturated fat; UAER, urinary albumin exertion ratio.

Supplemental Table 3. Quality assessment of prospective cohort studies included in the systematic review and meta-analysis based on ROBINS tool.

Study	Bias due to confounding	Bias due to selection of participants	Bias due to exposure assessment	Bias due to misclassification during follow-up	Bias due to missing data	Bias due to measurement of the outcome	Bias due to selective reporting of the results	Overall judgement
Atkins, 2014 UK	Moderate	Low	Moderate	Low	Low	Low	Low	Moderate
Bazelmans, 2006, Belgium	Serious	Low	Low	Low	Low	Low	Low	Serious
Dominguez, 2018, Spain	Moderate	Low	Moderate	Low	Low	Low	Low	Moderate
Katagiri, 2020, Japan	Moderate	Low	Moderate	Low	Low	Low	Low	Moderate
Miyazawa, 2019, Japan	Serious	Low	Low	Low	Low	Low	Low	Serious
Partula, 2020 France	Moderate	Low	Low	Low	Low	Low	Low	Moderate
Akbaraly, 2011 UK	Serious	Low	Moderate	Low	Low	Low	Low	Serious
Eshak, 2010 Japan	Serious	Low	Moderate	Low	Low	Low	Low	Serious
Baer, 2011 US	Serious	Low	Moderate	Low	Low	Low	Low	Serious
Bazzano, 2003, US	Serious	Low	Low	Low	Low	Low	Low	Serious
Buil-Cosiales, 2014 Spain	Moderate	Low	Moderate	Low	Low	Low	Low	Moderate
Buyken, 2010 Australia	Serious	Low	Moderate	Low	Low	Low	Low	Serious
Chan, 2016 US	Moderate	Low	Low	Low	Low	Low	Low	Moderate

Study	Bias due to confounding	Bias due to selection of participants	Bias due to exposure assessment	Bias due to misclassification during follow-up	Bias due to missing data	Bias due to measurement of the outcome	Bias due to selective reporting of the results	Overall judgement
Chuang, 2012 Europe	Moderate	Low	Moderate	Low	Low	Low	Low	Moderate
Gopinath, 2016 Australia	Serious	Low	Moderate	Low	Low	Low	Low	Serious
Huang, 2015 USA	Moderate	Low	Moderate	Low	Low	Low	Low	Moderate
Jacobs, 2000 US	Moderate	Low	Moderate	Low	Low	Low	Low	Moderate
Lubin, 2003 Israel	Serious	Low	Moderate	Low	Low	Low	Low	Serious
Mann, 1997 UK	Serious	Serious	Moderate	Low	Low	Low	Low	Serious
Nilsson, 2012 Sweden	Moderate	Low	Moderate	Low	Low	Low	Low	Moderate
Park, 2011 US	Moderate	Low	Moderate	Low	Low	Low	Low	Moderate
Streppel, 2008 Netherlands	Serious	Low	Low	Low	Low	Low	Low	Serious
Threapleton, 2013 UK	Serious	Low	Moderate	Low	Low	Low	Low	Serious
Todd, 1999 UK	Serious	Low	Moderate	Low	Low	Low	Low	Serious
Xu, 2014 Sweden	Serious	Low	Low	Low	Low	Low	Low	Serious
Xu, 2022 US	Serious	Low	Serious	Low	Low	Low	Low	Serious
Kwon, 2022 Korea	Moderate	Low	Moderate	Low	Low	Low	Low	Moderate
You, 2022 Malaysia	Serious	Low	Serious	Low	Low	Low	Low	Serious

Supplemental Table 4. Subgroup analyses of dietary fiber and the risk of all-cause mortality (highest versus lowest category meta-analysis).

	n	HR (95%CI)	I^2, $P_{heterogeneity}$	$P_{interaction}$
All studies	21	0.83 (0.78, 0.88)	83%, <0.001	-
Sex				<0.001
Men	3	0.95 (0.86, 1.05)	19%, 0.29	
Both	17	0.79 (0.75, 0.84)	81%, <0.001	
Women	1	0.99 (0.89, 1.09)	-	
Geographical region				0.32
US	3	0.79 (0.70, 0.88)	86%, 0.001	
Europe	13	0.81 (0.72, 0.90)	84%, <0.001	
Asia	5	0.86 (0.79, 0.93)	72%, 0.007	
Number of cases				0.52
<1000	11	0.83 (0.75, 0.92)	63%, 0.002	
>1000	10	0.81 (0.76, 0.87)	86%, <0.001	
Follow-up duration				0.07
<10 years	5	0.79 (0.69, 0.90)	82%, <0.001	
>10 years	16	0.83 (0.78, 0.89)	84%, <0.001	
Dietary assessment method				0.95
FFQ	14	0.82 (0.77, 0.87)	75%, <0.001	
Other	7	0.84 (0.74, 0.95)	90%, <0.001	
Adjustments				
Smoking status				0.10
Yes	19	0.82 (0.77, 0.87)	81%, <0.001	
No	2	0.79 (0.52, 1.06)	84%, 0.01	
Physical activity				0.77
Yes	14	0.82 (0.77, 0.87)	70%, <0.001	
No	7	0.85 (0.73, 0.96)	92%, <0.001	
Energy intake				0.46
Yes	17	0.83 (0.78, 0.89)	79%, <0.001	
No	4	0.80 (0.67, 0.93)	92%, <0.001	
Body mass index				0.34
Yes	19	0.82 (0.77, 0.87)	82%, <0.001	
No	2	0.91 (0.86, 0.96)	0%, 0.90	
Alcohol drinking				0.47
Yes	15	0.81 (0.76, 0.86)	84%, <0.001	
No	6	0.89 (0.82, 0.96)	28%, 0.23	
Smoking, Alcohol, body mass index, physical activity and energy intake				0.60
Yes	9	0.83 (0.77, 0.90)	74%, <0.001	
No	12	0.82 (0.74, 0.89)	87%, <0.001	

Abbreviations: FFQ, food frequency questionnaire.

Supplemental Table 5. Subgroup analyses of total dietary fiber and the risk of cardiovascular mortality (highest versus lowest category meta-analysis).

	n	HR (95%CI)	I^2, $P_{heterogeneity}$	$P_{interaction}$
All studies	14	0.79 (0.74, 0.85)	42%, 0.03	-
Sex				0.31
Men	2	1.05 (0.83, 1.27)	0%, 0.67	
Women	2	0.82 (0.57, 1.08)	0%, 0.69	
Both	10	0.75 (0.71, 0.80)	38%, 0.10	
Geographical region				0.42
US	3	0.77 (0.68, 0.85)	56%, 0.10	
Europe	6	0.83 (0.69, 0.98)	53%, 0.06	
Asia	5	0.75 (0.67, 0.82)	21%, 0.28	
Number of cases				0.90
<1000	8	0.79 (0.65, 0.93)	57%, 0.02	
>1000	6	0.76 (0.72, 0.80)	12%, 0.34	
Follow-up duration				0.16
<10 years	2	0.65 (0.41, 0.89)	55%, 0.14	
>10 years	12	0.79 (0.73, 0.85)	39%, 0.08	
Assessment method				0.50
FFQ	11	0.76 (0.70, 0.82)	34%, 0.13	
Other	3	0.87 (0.67, 1.06)	69%, 0.04	
Adjustments				
Smoking status				-
Yes	14	0.77 (0.72, 0.83)	41%, 0.05	
No	-	-	-	
Physical activity				0.46
Yes	10	0.79 (0.72, 0.86)	57%, 0.01	
No	4	0.73 (0.66, 0.81)	0%, 0.86	
Energy intake				0.24
Yes	10	0.76 (0.69, 0.83)	47%, 0.05	
No	4	0.80 (0.72, 0.87)	22%, 0.28	
Body mass index				0.51
Yes	13	0.77 (0.72, 0.83)	45%, 0.04	
No	1	0.86 (0.56, 1.16)	-	
Alcohol drinking				0.11
Yes	11	0.76 (0.71, 0.81)	40%, 0.08	
No	3	0.92 (0.76, 1.08)	0%, 0.47	
Smoking, Alcohol, body mass index, physical activity and energy intake				0.11
Yes	5	0.78 (0.63, 0.83)	60%, 0.04	
No	9	0.80 (0.74, 0.85)	18%, 0.29	

Abbreviations: FFQ, food frequency questionnaire.

Supplemental Table 6. GRADE evidence table for the association of dietary fibers and the risk of total and cause-specific mortality.

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Question: Is there an association between fiber intake and mortality risk?

Setting: General population

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Populations	Events (%)	Relative (95% CI)	Absolute (95% CI)		
Total Fiber and All-cause Mortality												
21	observational studies	serious[a]	not serious[b]	not serious	serious[c]	dose response gradient	1,451,903	103,165 (7.1%)	**HR 0.83** (0.78 to 0.88)	**15 fewer per 1,000** (from 15 fewer to 8 fewer)	⊕⊕⊕◯ MODERATE	CRITICAL
Total Fiber and Cardiovascular Mortality												
14	observational studies	serious[d]	not serious	not serious	serious[e]	dose response gradient	1,293,630	28,324 (2.2%)	**HR 0.79** (0.74 to 0.85)	**6 fewer per 1,000** (from 8 fewer to 5 fewer)	⊕⊕⊕◯ MODERATE	CRITICAL
Total Fiber and Cancer Mortality												
7	observational studies	serious[f]	not serious	not serious	Serious[g]	dose response gradient	1,044,471	36,561 (3.5%)	**HR 0.85** (0.80 to 0.90)	**5 fewer per 1,000** (from 7 fewer to 3 fewer)	⊕⊕⊕◯ MODERATE	CRITICAL

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Populations	Events (%)	Relative (95% CI)	Absolute (95% CI)		
Cereal Fiber and All-cause Mortality												
9	observational studies	serious[h]	serious[i]	not serious	serious[j]	dose response gradient	1,103,701	97,768 (8.9%)	**HR 0.86** (0.80 to 0.92)	**10 fewer per 1,000** (from 14 fewer to 6 fewer)	⨁⨁◯◯ LOW	CRITICAL
Cereal Fiber and Cardiovascular Mortality												
8	observational studies	serious[k]	serious[l]	not serious	serious[m]	dose response gradient	1,066,140	24,838 (2.3%)	**HR 0.87** (0.81 to 0.95)	**4 fewer per 1,000** (from 6 fewer to 2 fewer)	⨁⨁◯◯ LOW	CRITICAL
Cereal Fiber and Cancer Mortality												
5	observational studies	serious[n]	serious[o]	not serious	serious[p]	dose response gradient	973,639	38,625 (4.0%)	**HR 0.89** (0.83 to 0.95)	**4 fewer per 1,000** (from 6 fewer to 2 fewer)	⨁⨁◯◯ LOW	CRITICAL

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Populations	Events (%)	Relative (95% CI)	Absolute (95% CI)		
Fruit Fiber and All-cause Mortality												
7	observational studies	serious[q]	serious[r]	not serious	serious[s]	dose response gradient	1,063,825	77,324 (7.3%)	**HR 0.97** (0.88 to 1.04)	**2 fewer per 1,000** (from 8 fewer to 2 more)	⨁⨁◯◯ LOW	CRITICAL
Fruit Fiber and Cardiovascular Mortality												
6	observational studies	serious[t]	serious[u]	not serious	serious[v]	dose response gradient	1,026,264	19,767 (1.9%)	**HR 0.80** (0.68 to 0.95)	**6 fewer per 1,000** (from 10 fewer to 2 fewer)	⨁⨁◯◯ LOW	CRITICAL
Fruit Fiber and Cancer Mortality												
3	observational studies	serious[w]	not serious	not serious	serious[x]	none	933,763	29,865 (3.2%)	**HR 0.99** (0.96 to 1.02)	**0 fewer per 1,000** (from 1 fewer to 1 more)	⨁⨁◯◯ LOW	CRITICAL

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Populations	Events (%)	Relative (95% CI)	Absolute (95% CI)		
Vegetable Fiber and All-cause Mortality												
7	observational studies	serious[y]	serious[z]	not serious	serious[x]	dose response gradient	1,063,825	77,324 (7.3%)	**HR 0.91** (0.85 to 0.98)	**6 fewer per 1,000** (from 11 fewer to 1 fewer)	⊕⊕◯◯ LOW	CRITICAL
Vegetable Fiber and Cardiovascular Mortality												
6	observational studies	serious[aa]	not serious	not serious	serious[p]	dose response gradient	1,026,264	19,767 (1.9%)	**HR 0.93** (0.89 to 0.97)	**2 fewer per 1,000** (from 3 fewer to 1 fewer)	⊕⊕⊕◯ MODERATE	CRITICAL
Vegetable Fiber and Cancer Mortality												
3	observational studies	serious[ab]	not serious	not serious	serious[p]	dose response gradient	933,763	29,865 (3.2%)	**HR 0.95** (0.92 to 0.98)	**2 fewer per 1,000** (from 3 fewer to 1 fewer)	⊕⊕⊕◯ MODERATE	CRITICAL
Legumes Fiber and All-cause Mortality												
5	observational studies	serious[ac]	not serious	not serious	serious[p]	none	609,499	53,162 (8.7%)	**HR 0.93** (0.89 to 0.96)	**5 fewer per 1,000** (from 8 fewer to 3 fewer)	⊕⊕◯◯ LOW	CRITICAL

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Populations	Events (%)	Relative (95% CI)	Absolute (95% CI)		
Legumes Fiber and Cardiovascular Mortality												
3	observational studies	serious[ad]	not serious	not serious	serious[p]	dose response gradient	512,802	12,823 (2.5%)	**HR 0.88** (0.84 to 0.94)	**4 fewer per 1,000** (from 5 fewer to 5 fewer)	⨁⨁⨁◯ MODERATE	CRITICAL
Legumes Fiber and Cancer Mortality												
2	observational studies	serious[ae]	not serious	not serious	serious[x]	none	481,046	20,251 (4.2%)	**HR 1.00** (0.96 to 1.05)	**0 fewer per 1,000** (from 2 fewer to 2 more)	⨁⨁◯◯ LOW	CRITICAL
Soluble Fiber and All-cause Mortality												
6	observational studies	serious[af]	serious[ag]	not serious	serious[x]	dose response gradient	332,162	43,690 (13.2%)	**HR 0.85** (0.75 to 0.96)	**11 fewer per 1,000** (from 18 fewer to 3 fewer)	⨁⨁◯◯ LOW	CRITICAL

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Populations	Events (%)	Relative (95% CI)	Absolute (95% CI)		
Soluble Fiber and Cardiovascular Mortality												
2	observational studies	serious[af]	not serious	not serious	serious[p]	dose response gradient	176,408	7180 (4.1%)	**HR 0.79** (0.71 to 0.87)	**6 fewer per 1,000** (from 9 fewer to 4 fewer)	⨁⨁⨁◯ MODERATE	CRITICAL
Soluble Fiber and Cancer Mortality												
1	observational studies	serious[af]	not serious	not serious	very serious[ah]	dose response gradient	102,382	6416 (6.3%)	**HR 0.97** (0.63 to 1.51)	**1 more per 1,000** (from 13 fewer to 17 more)	⨁⨁◯◯ LOW	CRITICAL
Insoluble Fiber and All-cause Mortality												
4	observational studies	serious[aj]	serious[ak]	not serious	not serious	dose response gradient	322,386	41,058 (12.7%)	**HR 0.77** (0.71 to 0.84)	**16 fewer per 1,000** (from 21 fewer to 11 fewer)	⨁⨁⨁◯ MODERATE	CRITICAL
Insoluble Fiber and Cardiovascular Mortality												
3	observational studies	serious[af]	not serious	not serious	serious[x]	dose response gradient	176,408	7180 (4.1%)	**HR 0.74** (0.67 to 0.81)	**8 fewer per 1,000** (from 10 fewer to 6 fewer)	⨁⨁⨁◯ MODERATE	CRITICAL

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Populations	Events (%)	Relative (95% CI)	Absolute (95% CI)		
Insoluble Fiber and Cancer Mortality												
2	observational studies	serious[af]	not serious	not serious	serious[p]	dose response gradient	102,382	6416 (6.3%)	**HR 0.81** (0.72 to 0.91)	**6 fewer per 1,000** (from 9 fewer to 3 fewer)	⨁⨁⨁◯ MODERATE	CRITICAL

CI: Confidence interval; **HR:** Hazard Ratio.

Explanations:

a. Downgraded since 8 studies with low weighting (41%) judged as serious risk of bias based on ROBINS-I was included in the meta-analysis and residual confounding cannot be ruled out.

b. Serious inconsistency since I^2 = 83%, Phet<0.001; however, a subgroup analysis by adjustment for alcohol drinking partly explained the heterogeneity. Not downgraded.

c. Serious imprecision sine 95%CI overlapped MCID threshold (±1%). Downgraded.

d. Downgraded since 6 studies with moderate weighting (50.5%) judged as serious risk of bias based on ROBINS-I was included in the meta-analysis and residual confounding cannot be ruled out.

e. Serious imprecision sine point estimate was lower than MCID threshold. Downgraded.

f. Downgraded since 2 studies with low weighting (21%) judged as serious risk of bias based on ROBINS-I was included in the meta-analysis and residual confounding cannot be ruled out.

g. Serious imprecision sine point estimate was lower than MCID threshold. Downgraded.

h. Downgraded since 3 studies with low weighting (18.5%) judged as serious risk of bias based on ROBINS-I was included in the meta-analysis and residual confounding cannot be ruled out.

i. Serious inconsistency since I^2 = 89%. Downgraded.

j. Serious imprecision sine 95%CI overlapped MCID threshold (±1%). Downgraded.

k. Downgraded since 3 studies with low weighting (29.6%) judged as serious risk of bias based on ROBINS-I was included in the meta-analysis and residual confounding cannot be ruled out.

l. Serious inconsistency since I^2 = 72%. Downgraded.

m. Serious imprecision sine point estimate was lower than MCID threshold. Downgraded.

n. Downgraded since 1 study with low weighting (9.3%) judged as serious risk of bias based on ROBINS-I was included in the meta-analysis and residual confounding cannot be ruled out.

o. Serious inconsistency since I^2 = 80%. Downgraded.

p. Serious imprecision sine point estimate was lower than MCID threshold. Downgraded.

q. Downgraded since 2 studies with low weighting (22.3%) judged as serious risk of bias based on ROBINS-I was included in the meta-analysis and residual confounding cannot be ruled out.

r. Serious inconsistency since I^2 = 86%. Downgraded.

s. Serious imprecision sine 95%CI overlapped MCID threshold (±1%). Downgraded.

t. Downgraded since 2 studies with low weighting (35.6%) judged as serious risk of bias based on ROBINS-I was included in the meta-analysis and residual confounding cannot be ruled out.

u. Serious inconsistency since I^2 = 90%. Downgraded.

v. Serious imprecision sine 95%CI overlapped MCID threshold (±1%). Downgraded.

w. Downgraded since 1 study with moderate weighting (45.3%) judged as serious risk of bias based on ROBINS-I was included in the meta-analysis and residual confounding cannot be ruled out.

x. Serious imprecision sine 95%CI overlapped MCID threshold (±1%). Downgraded.

y. Downgraded since 2 studies with low weighting (27.0%) judged as serious risk of bias based on ROBINS-I was included in the meta-analysis and residual confounding cannot be ruled out.

z. Serious inconsistency since I^2 = 82%. Downgraded.

aa. Downgraded since 2 studies with low weighting (33.9%) judged as serious risk of bias based on ROBINS-I was included in the meta-analysis and residual confounding cannot be ruled out.

ab. Downgraded since 1 study with low weighting (38.9%) judged as serious risk of bias based on ROBINS-I was included in the meta-analysis and residual confounding cannot be ruled out.

ac. Downgraded since 1 study with low weighting (12%) judged as serious risk of bias based on ROBINS-I was included in the meta-analysis and residual confounding cannot be ruled out.

ad. Downgraded since 1 study with low weighting (22%) judged as serious risk of bias based on ROBINS-I was included in the meta-analysis and residual confounding cannot be ruled out.

ae. Residual confounding cannot be ruled out.

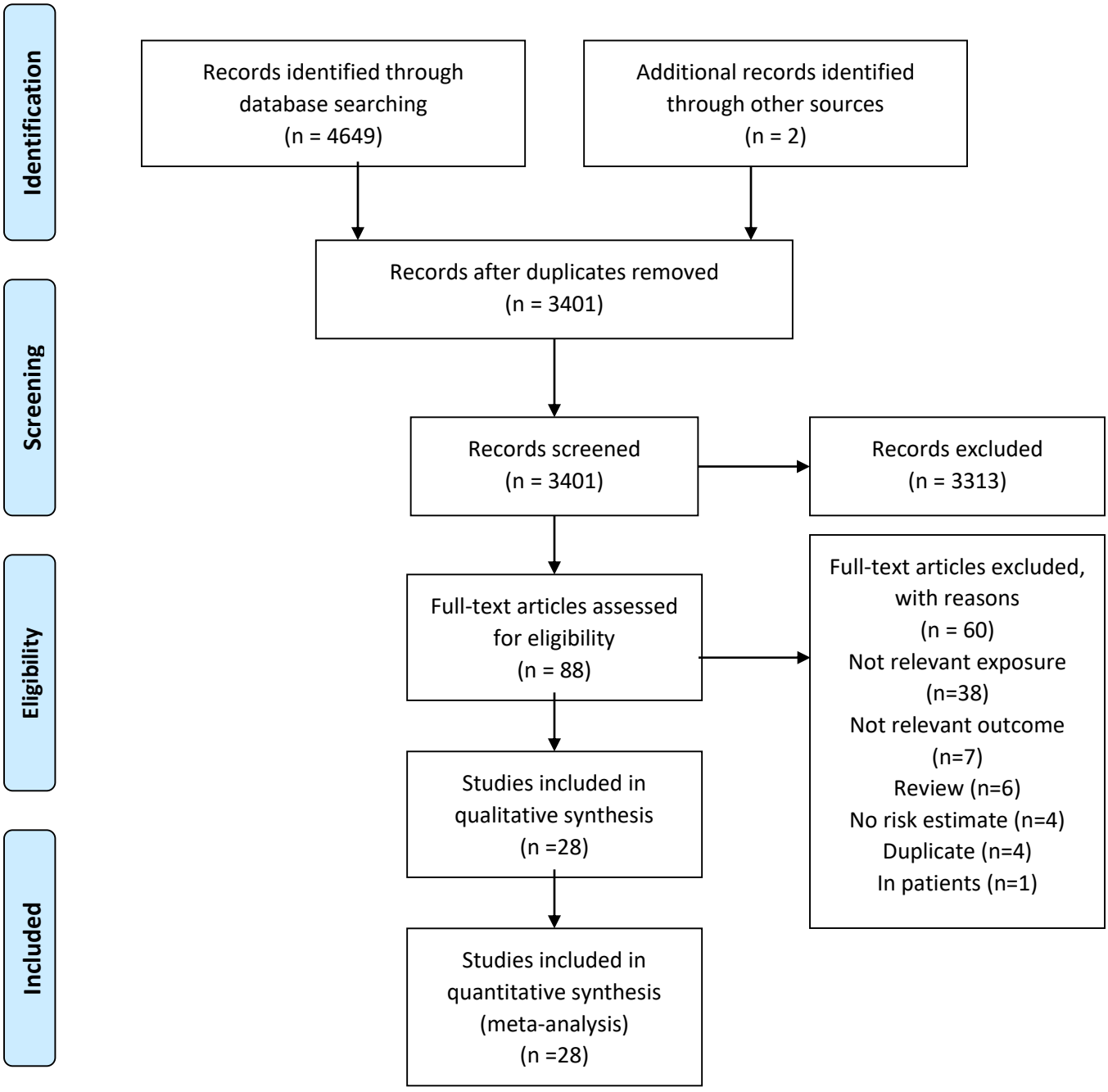
af. Residual confounding cannot be ruled out.

ag. Serious inconsistency since I^2 = 88%. Downgraded.

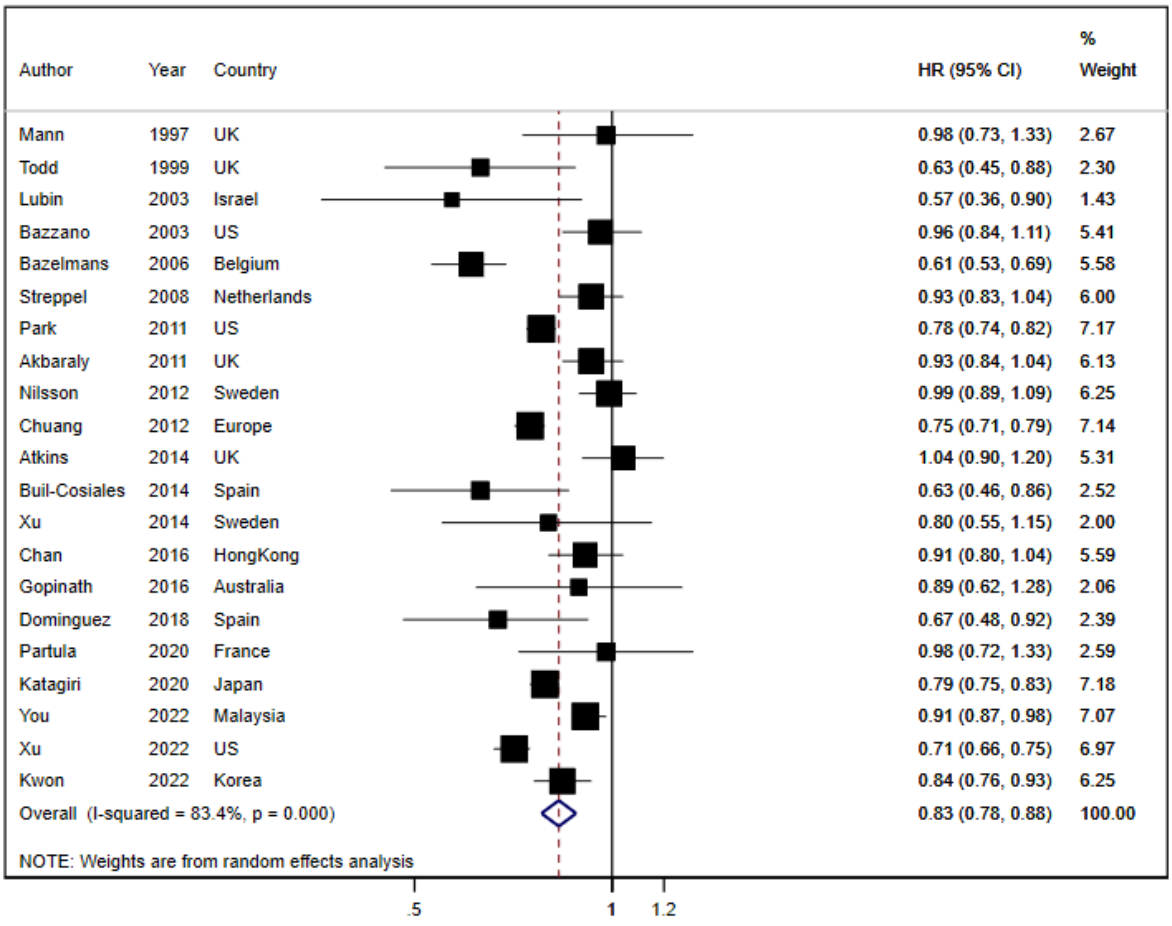
ah. Very serious imprecision since 95%CI overlapped the MCID threshold and surpassed important harm (+1%). Downgraded to two levels.

aj. Downgraded since 1 study with low weighting (29%) judged as serious risk of bias based on ROBINS-I was included in the meta-analysis and residual confounding cannot be ruled out.

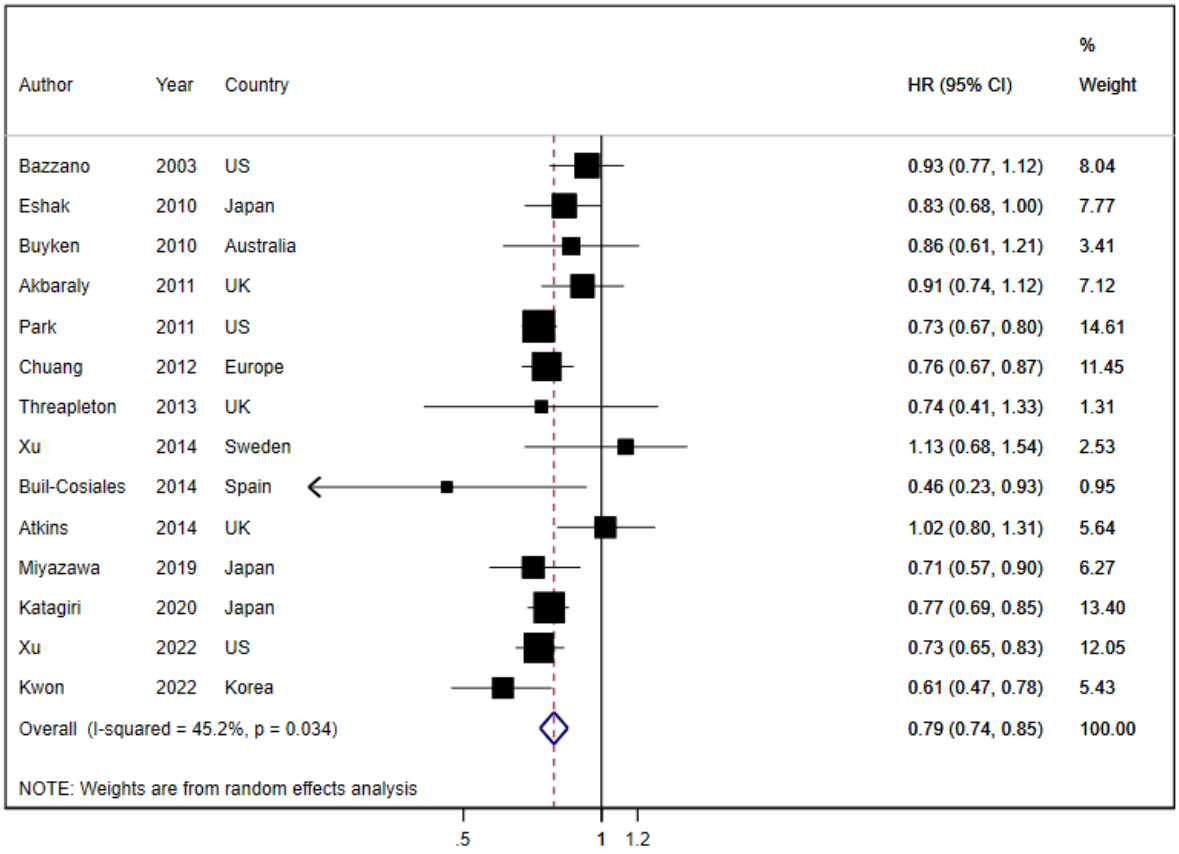
ak. Serious inconsistency since I^2 = 67%. Downgraded.



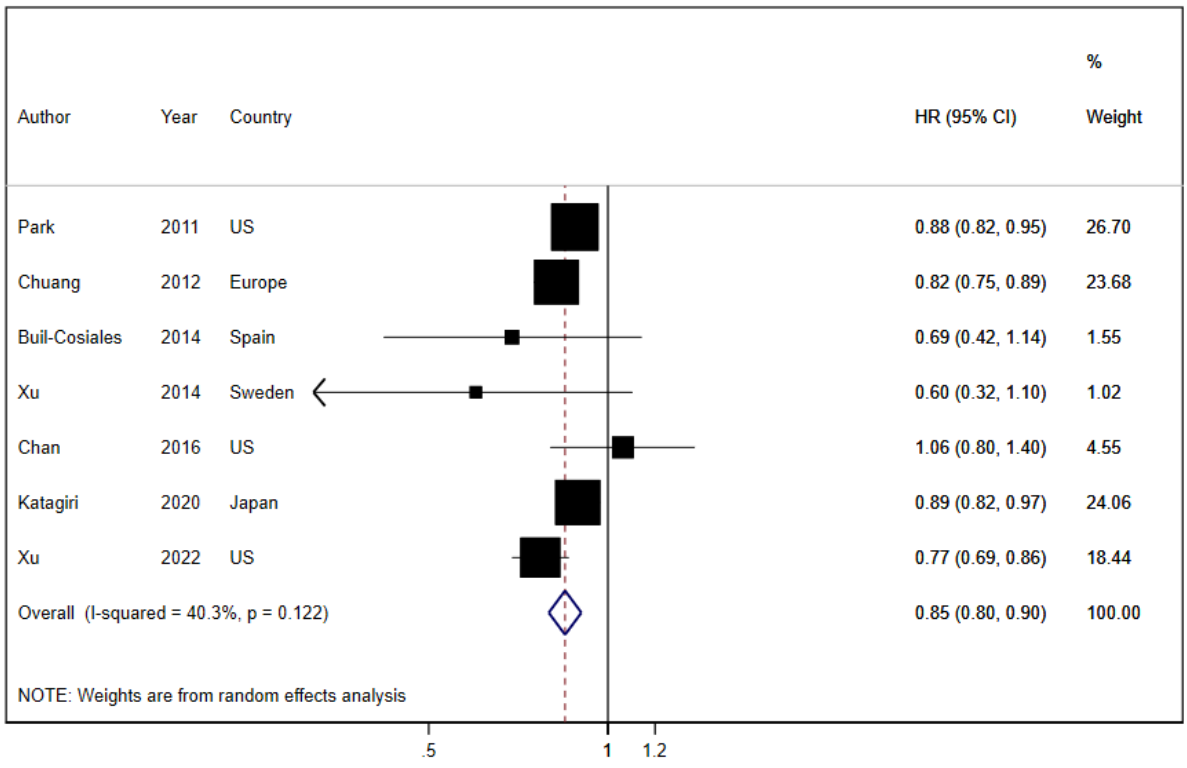
Supplemental Figure 1. Literature search and study selection process.



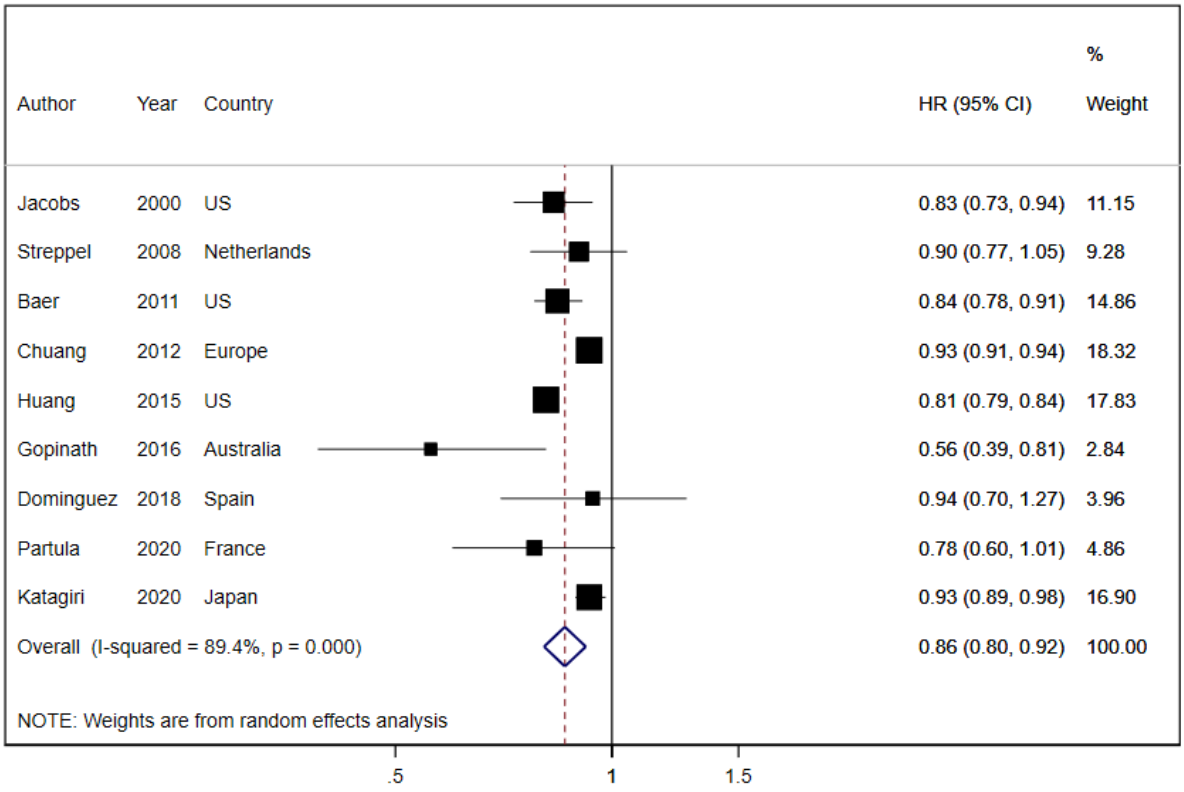
Supplemental Figure 2. Hazard ratio of all-cause mortality for the highest compared with the lowest category of total fiber intake. HR, hazard ratio.



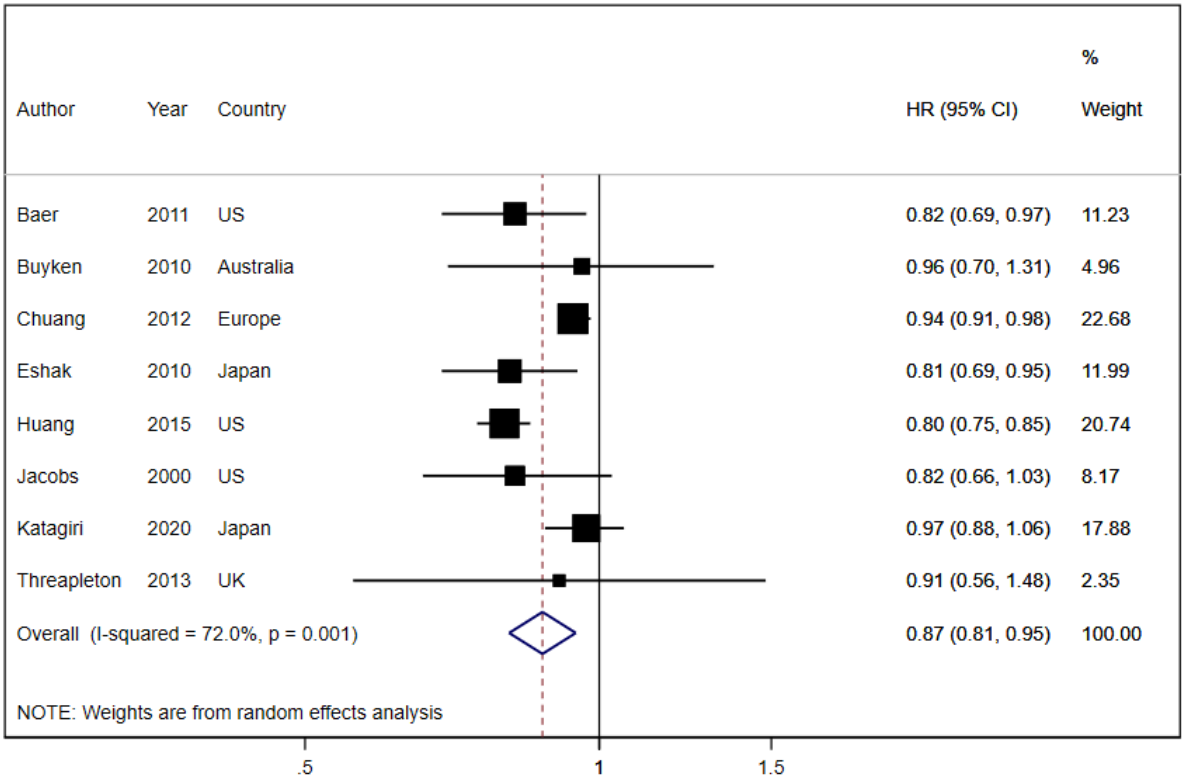
Supplemental Figure 3. Hazard ratio of cardiovascular mortality for the highest compared with the lowest category of dietary fiber intake. HR, hazard ratio.



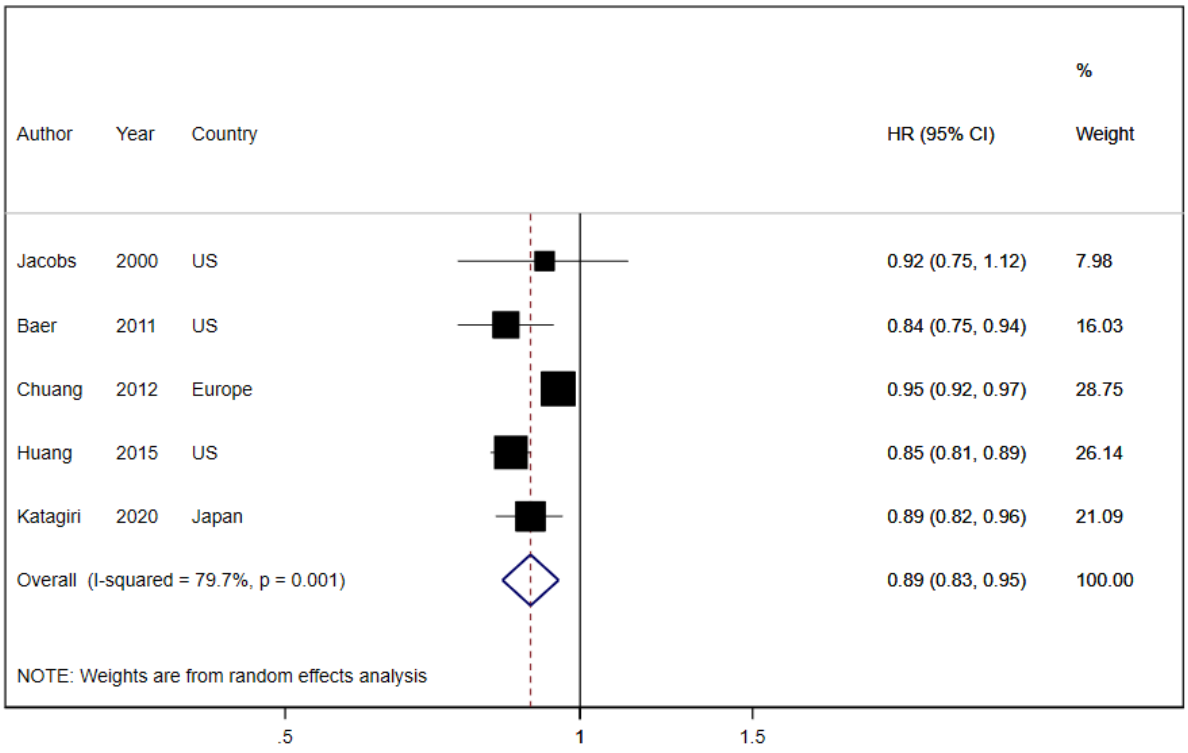
Supplemental Figure 4. Hazard ratio of cancer mortality for the highest compared with the lowest category of dietary fiber intake. HR, hazard ratio.



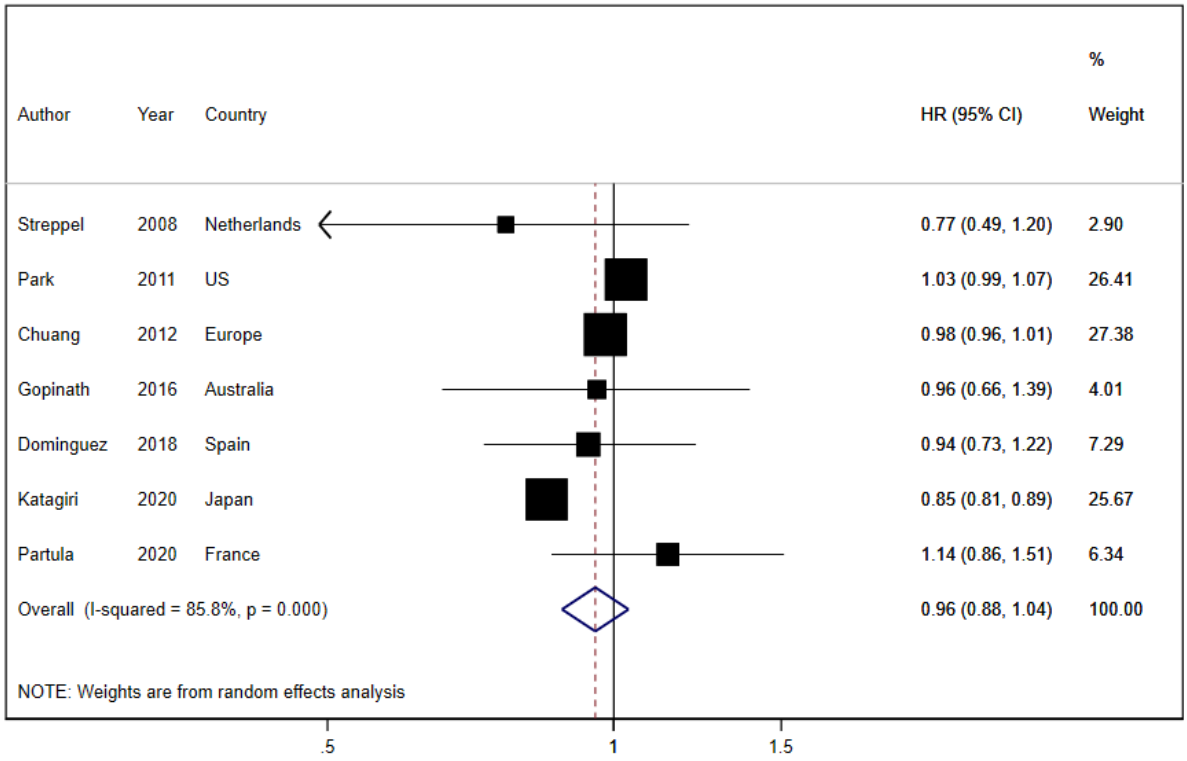
Supplemental Figure 5. Hazard ratio of all-cause mortality for the highest compared with the lowest category of cereal fiber intake. HR, hazard ratio.



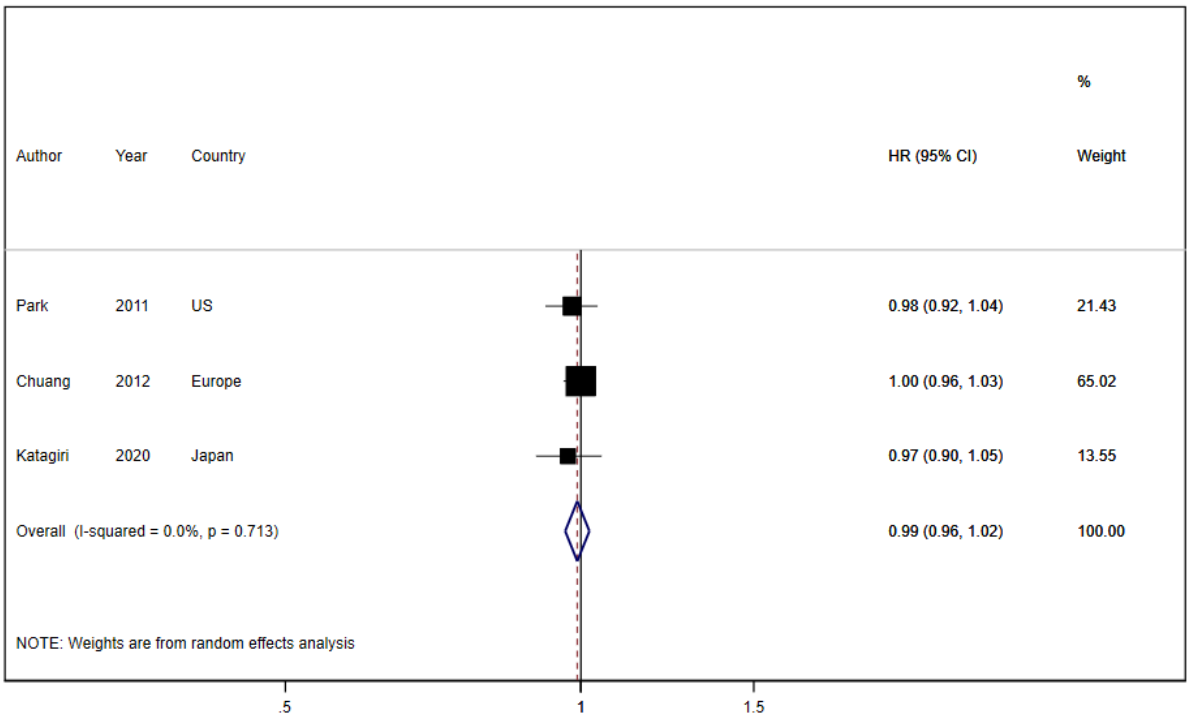
Supplemental Figure 6. Hazard ratio of cardiovascular mortality for the highest compared with the lowest category of cereal fiber intake. HR, hazard ratio.



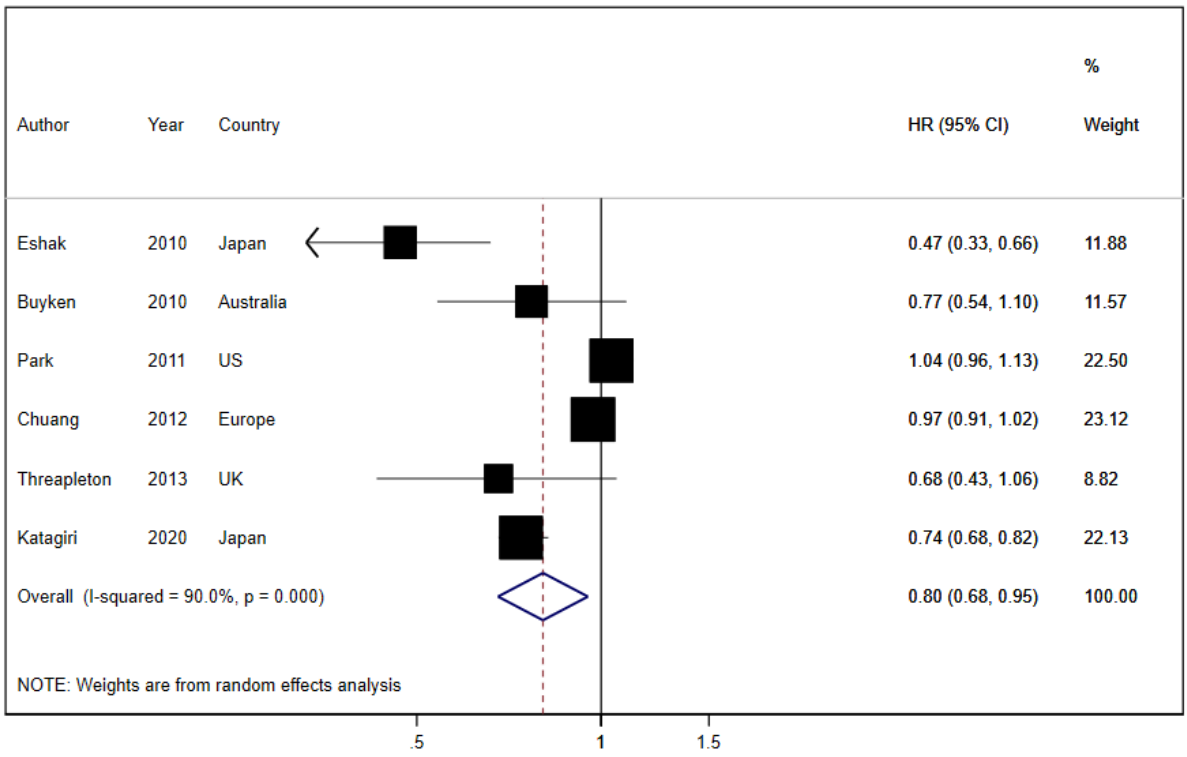
Supplemental Figure 7. Hazard ratio of cancer mortality for the highest compared with the lowest category of cereal fiber intake. HR, hazard ratio.



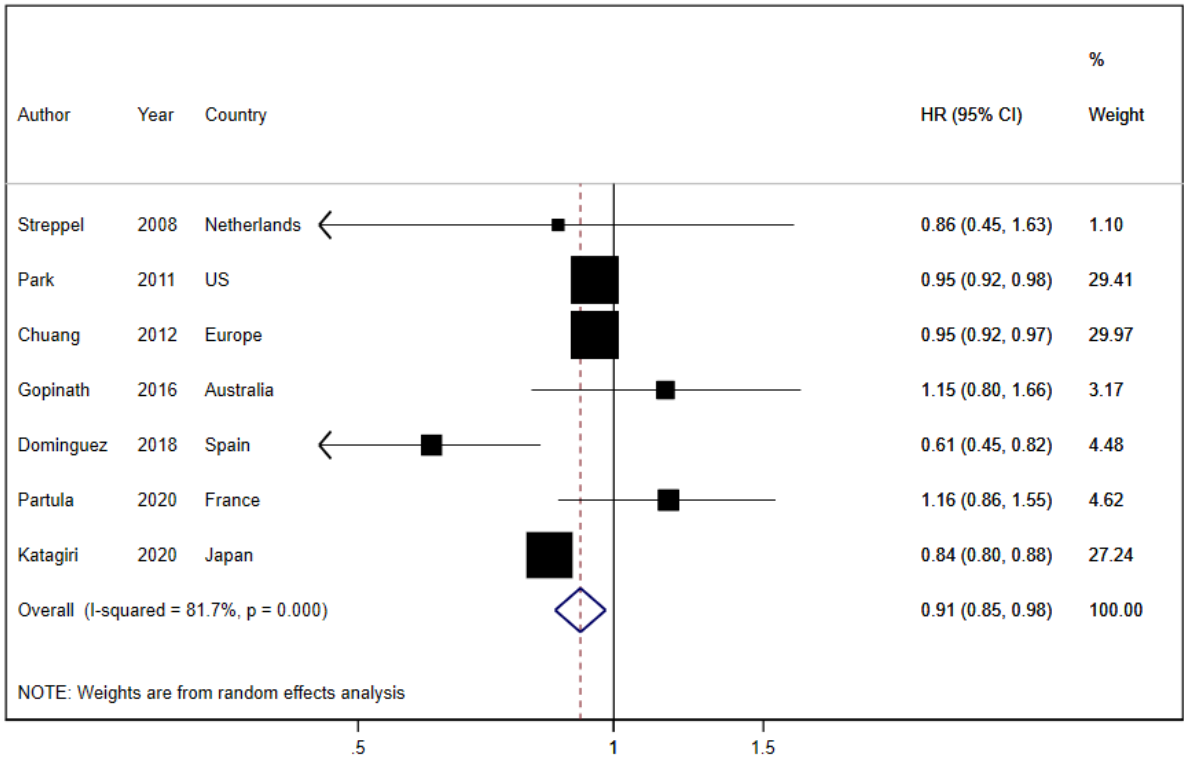
Supplemental Figure 8. Hazard ratio of all-cause mortality for the highest compared with the lowest category of fruit fiber intake. HR, hazard ratio.



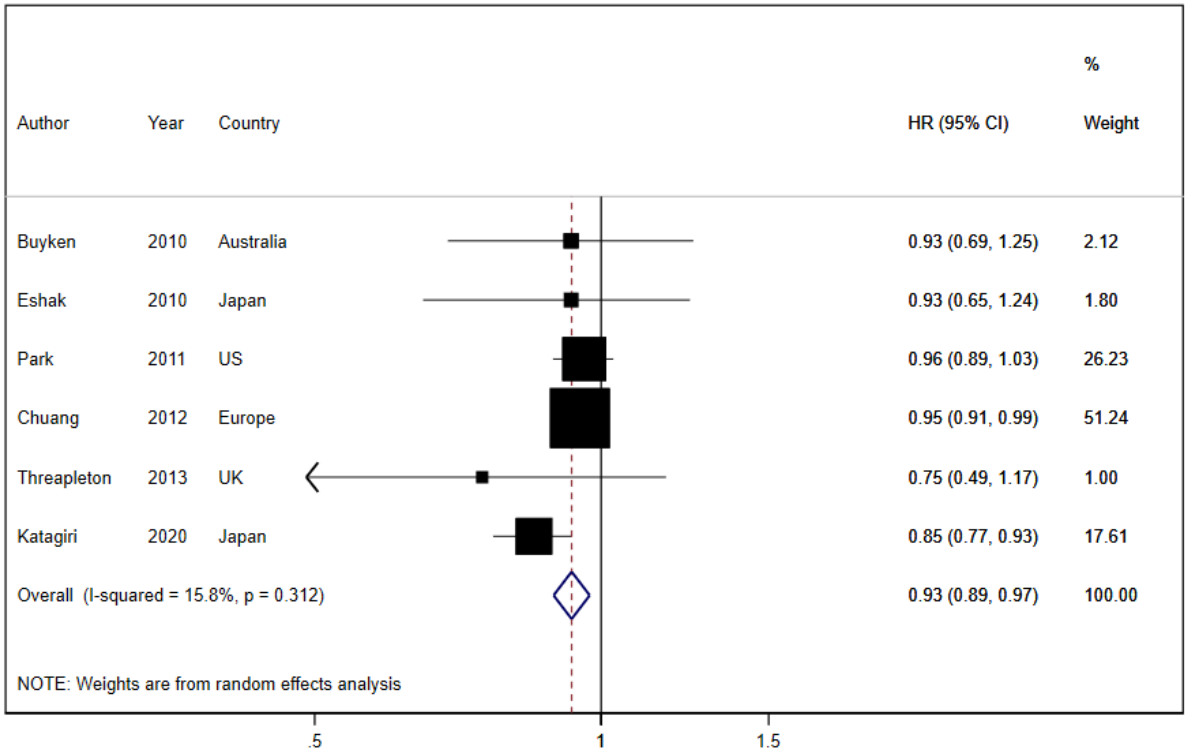
Supplemental Figure 9. Hazard ratio of cancer mortality for the highest compared with the lowest category of fruit fiber intake. HR, hazard ratio.



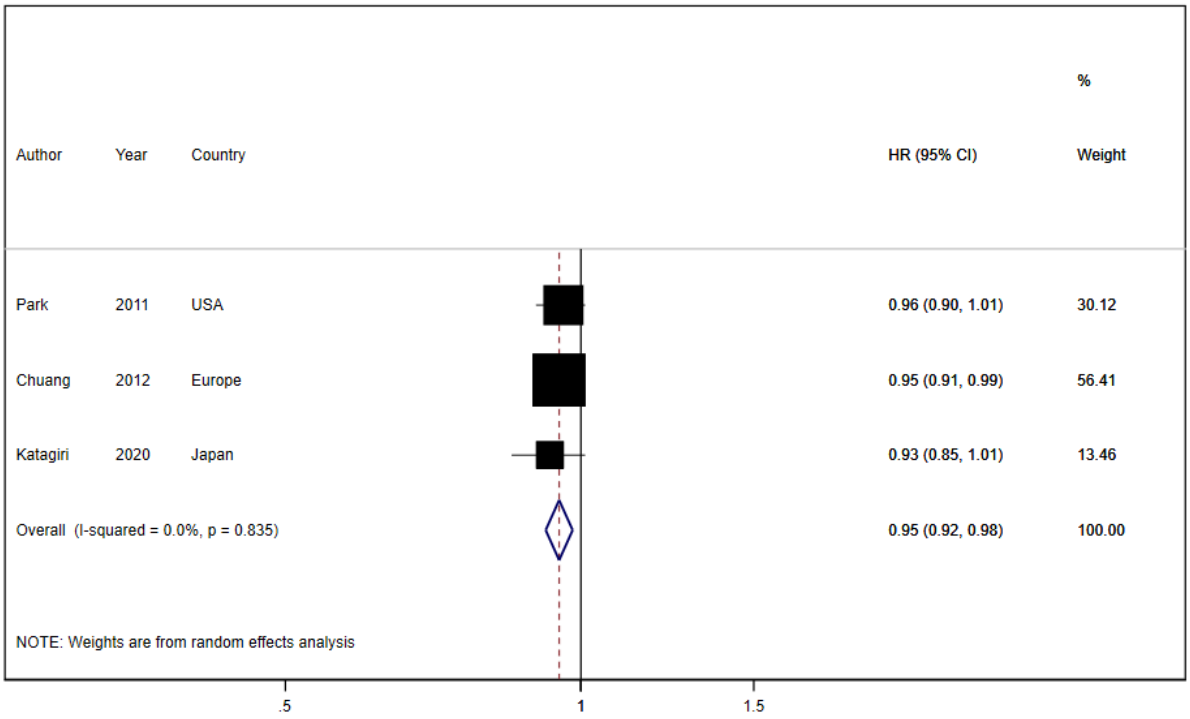
Supplemental Figure 10. Hazard ratio of cardiovascular mortality for the highest compared with the lowest category of fruit fiber intake. HR, hazard ratio.



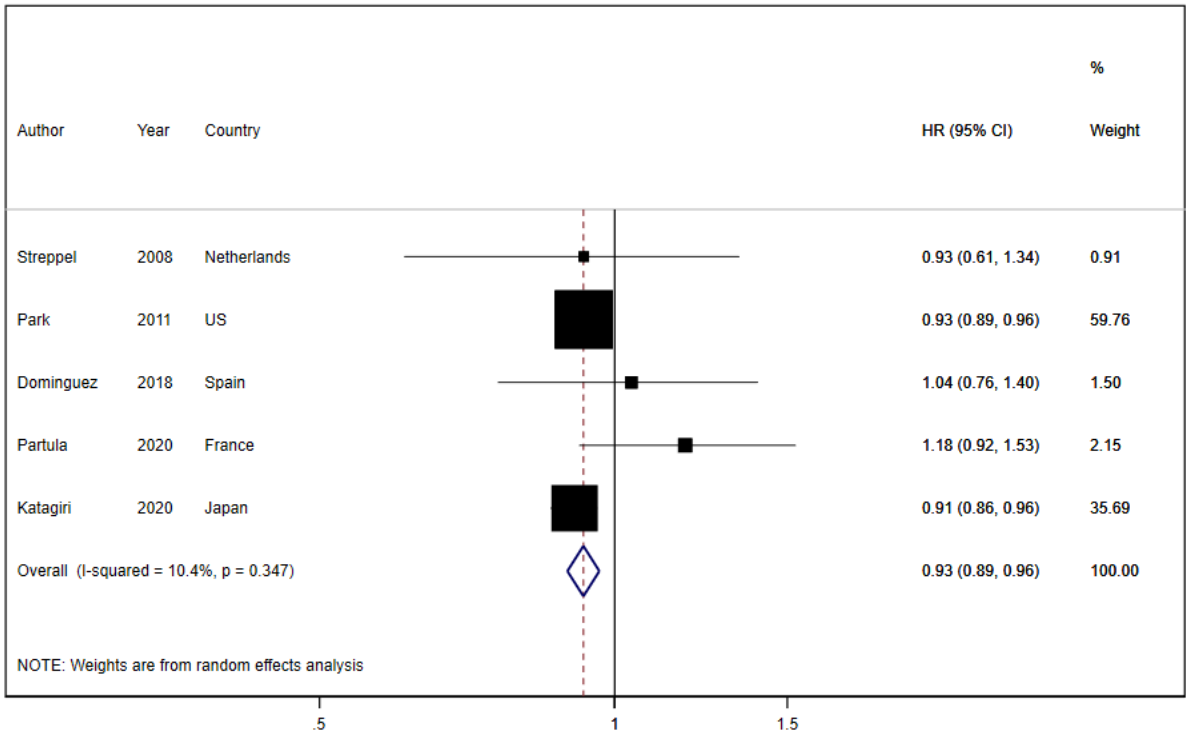
Supplemental Figure 11. Hazard ratio of all-cause mortality for the highest compared with the lowest category of vegetable fiber intake. HR, hazard ratio.



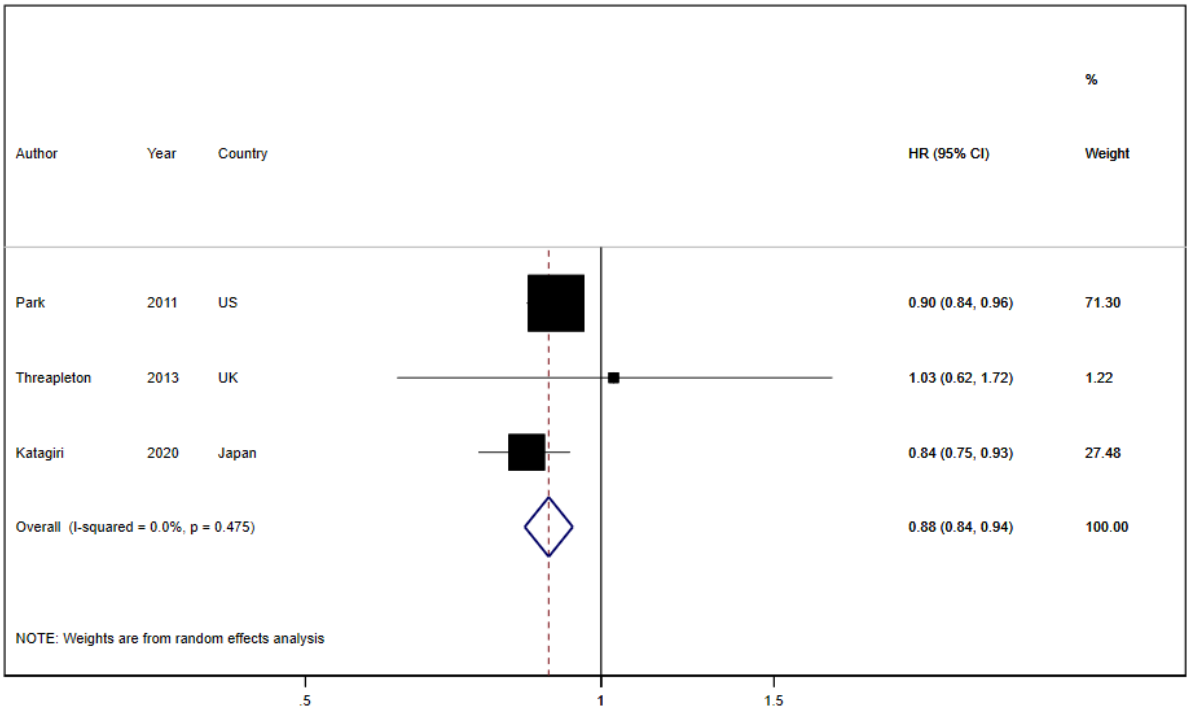
Supplemental Figure 12. Hazard ratio of cardiovascular mortality for the highest compared with the lowest category of vegetable fiber intake. HR, hazard ratio.



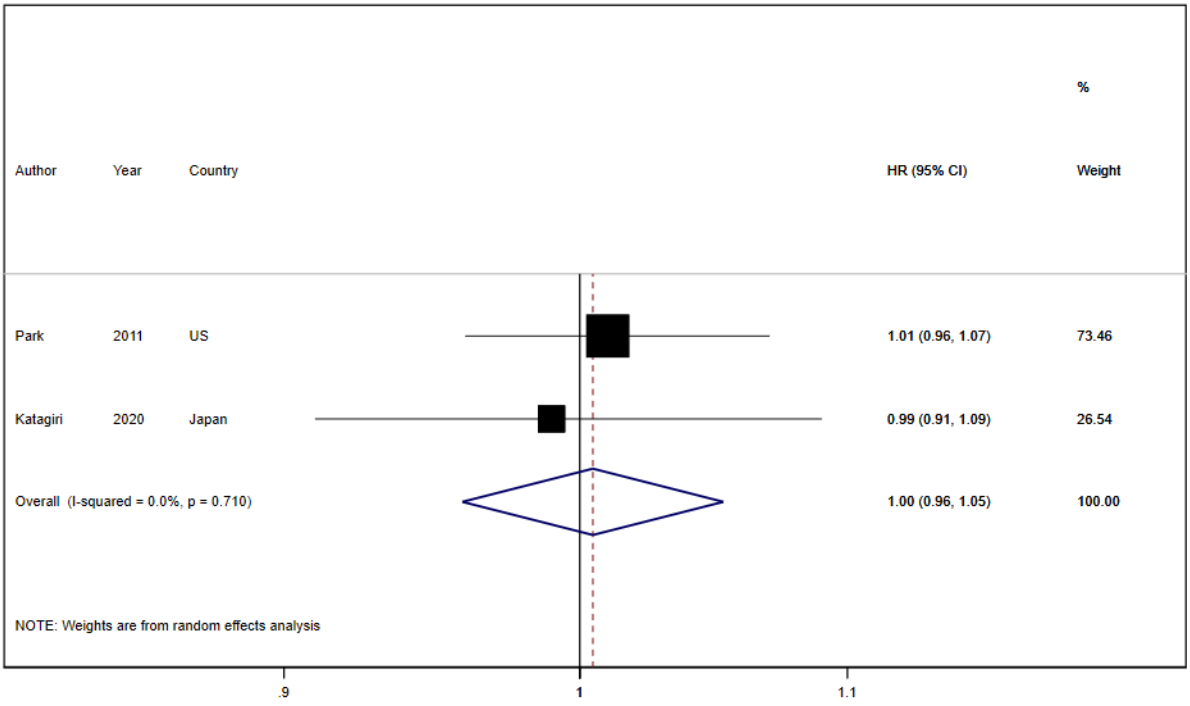
Supplemental Figure 13. Hazard ratio of cancer mortality for the highest compared with the lowest category of vegetable fiber intake. HR, hazard ratio.



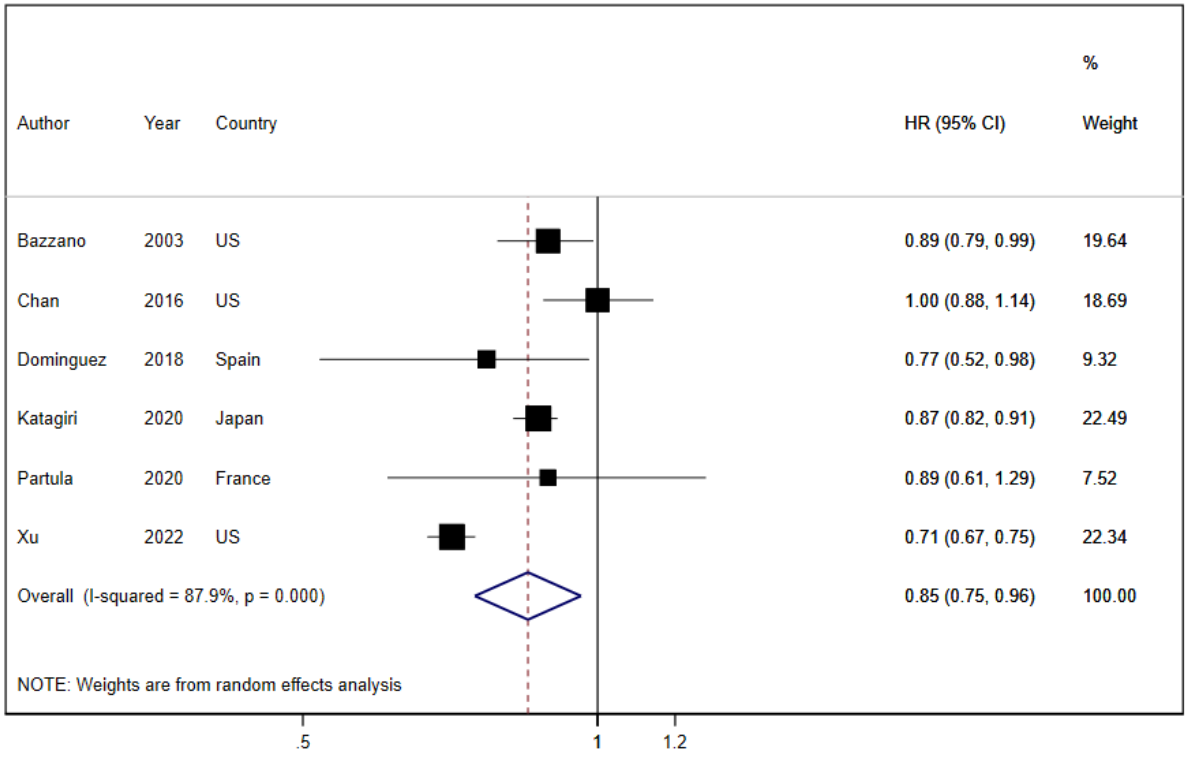
Supplemental Figure 14. Hazard ratio of all-cause mortality for the highest compared with the lowest category of legumes fiber intake. HR, hazard ratio



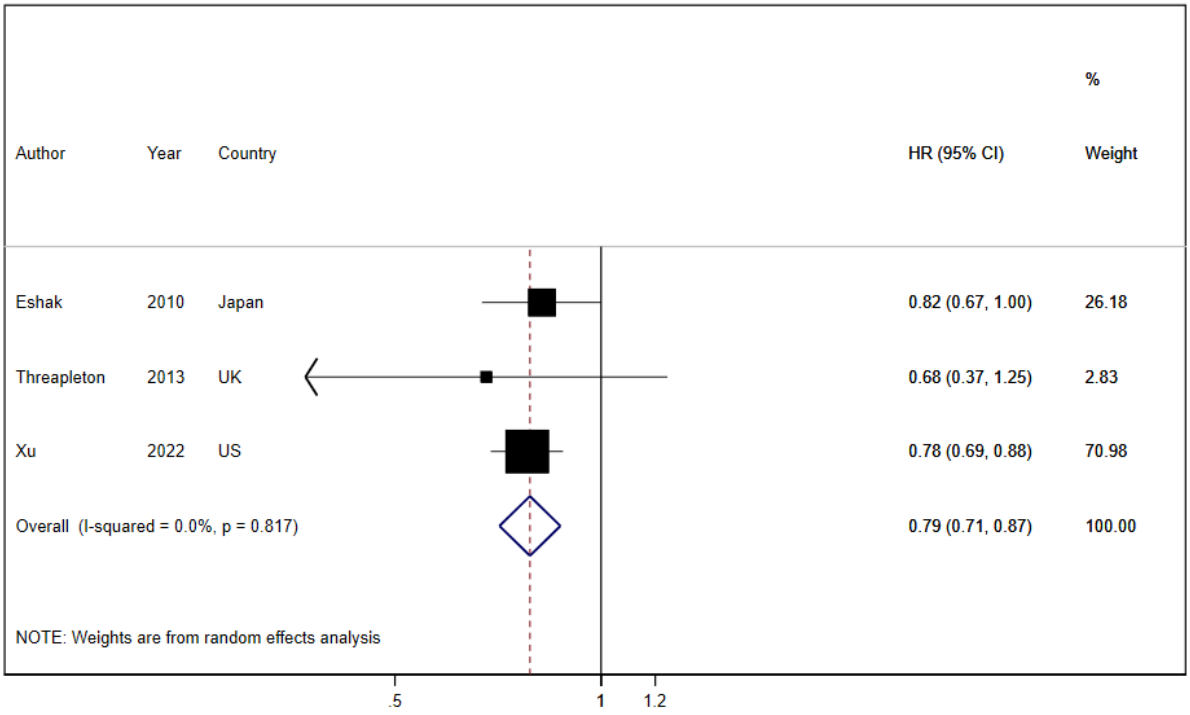
Supplemental Figure 15. Hazard ratio of cardiovascular mortality for the highest compared with the lowest category of legumes fiber intake. HR, hazard ratio.



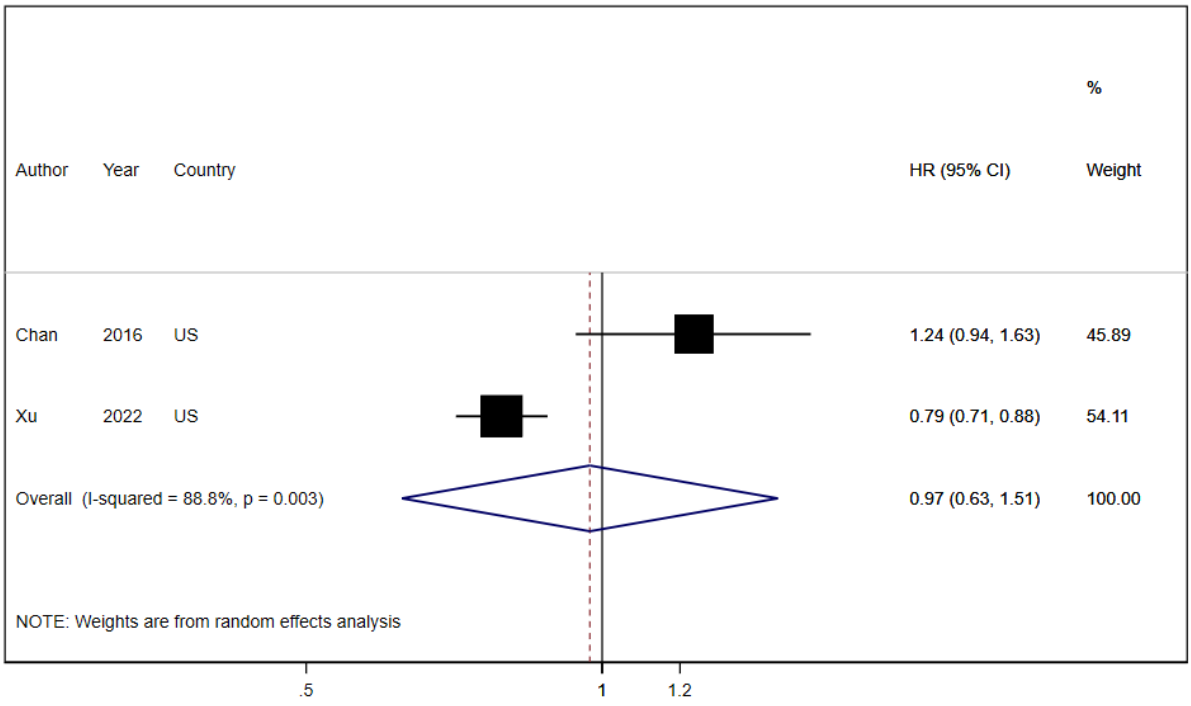
Supplemental Figure 16. Hazard ratio of cancer mortality for the highest compared with the lowest category of legumes fiber intake. HR, hazard ratio.



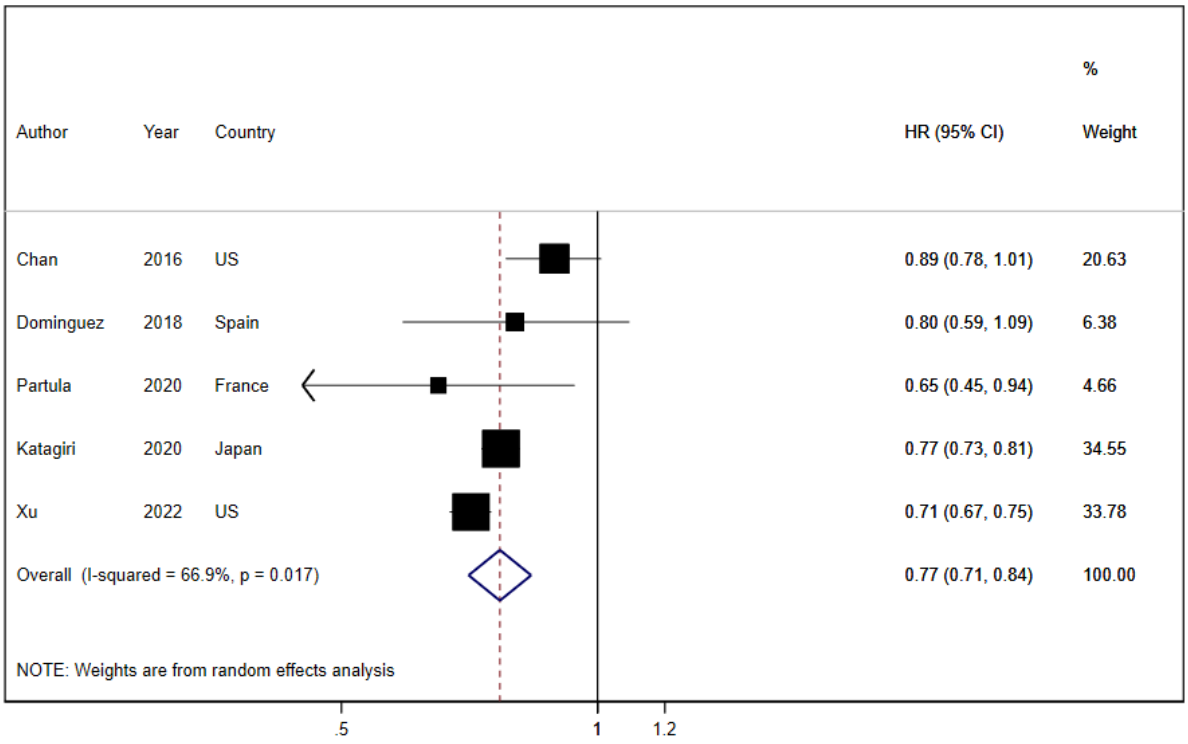
Supplemental Figure 17. Hazard ratio of all-cause mortality for the highest versus lowest category of soluble fiber intake. HR, hazard ratio.



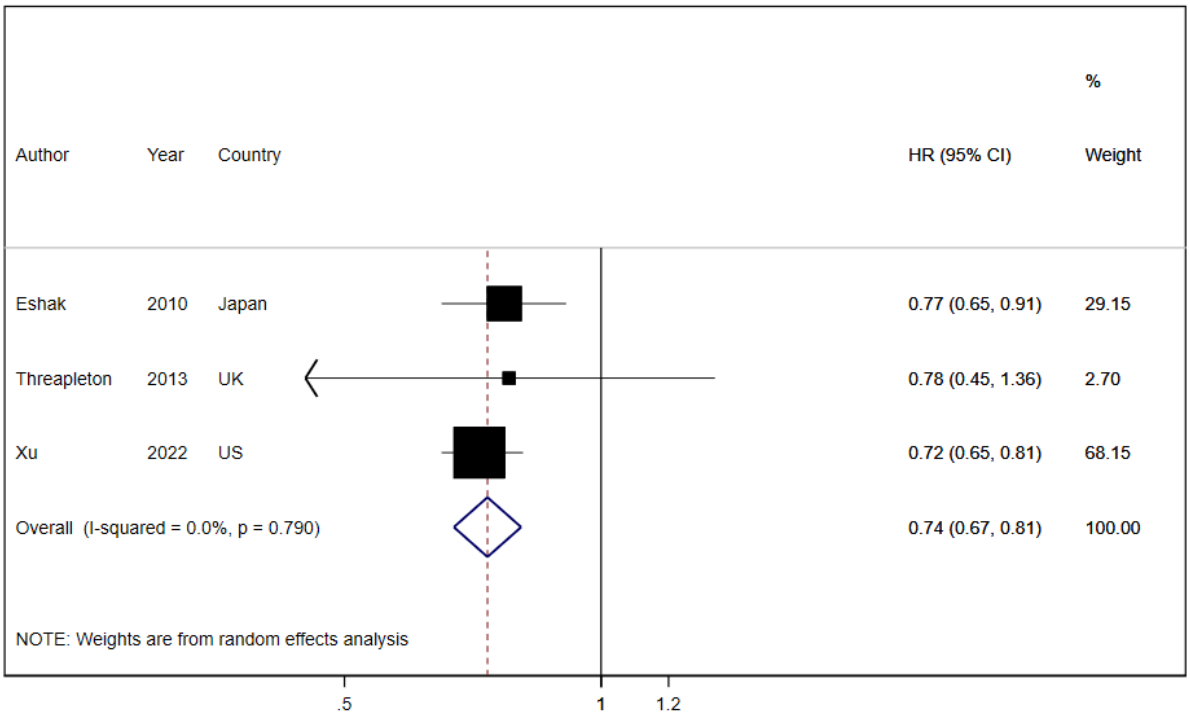
Supplemental Figure 18. Hazard ratio of cardiovascular mortality for the highest versus lowest category of soluble fiber intake. HR, hazard ratio.



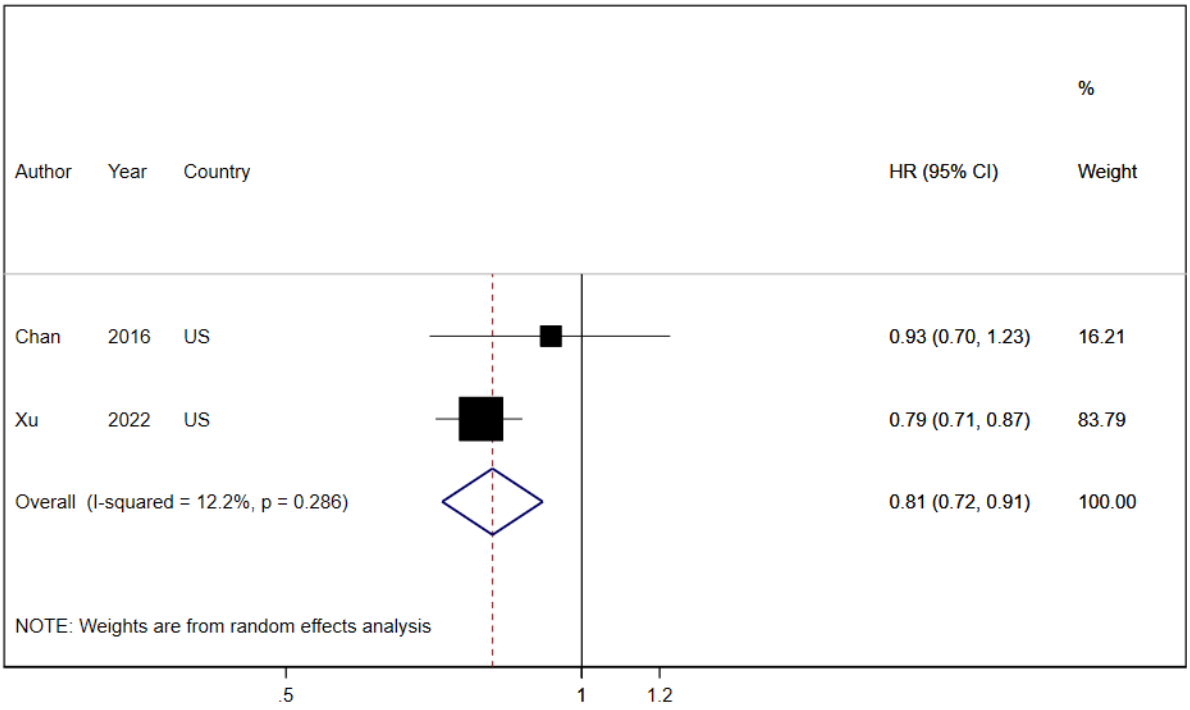
Supplemental Figure 19. Hazard ratio of cancer mortality for the highest versus lowest category of soluble fiber intake. HR, hazard ratio.



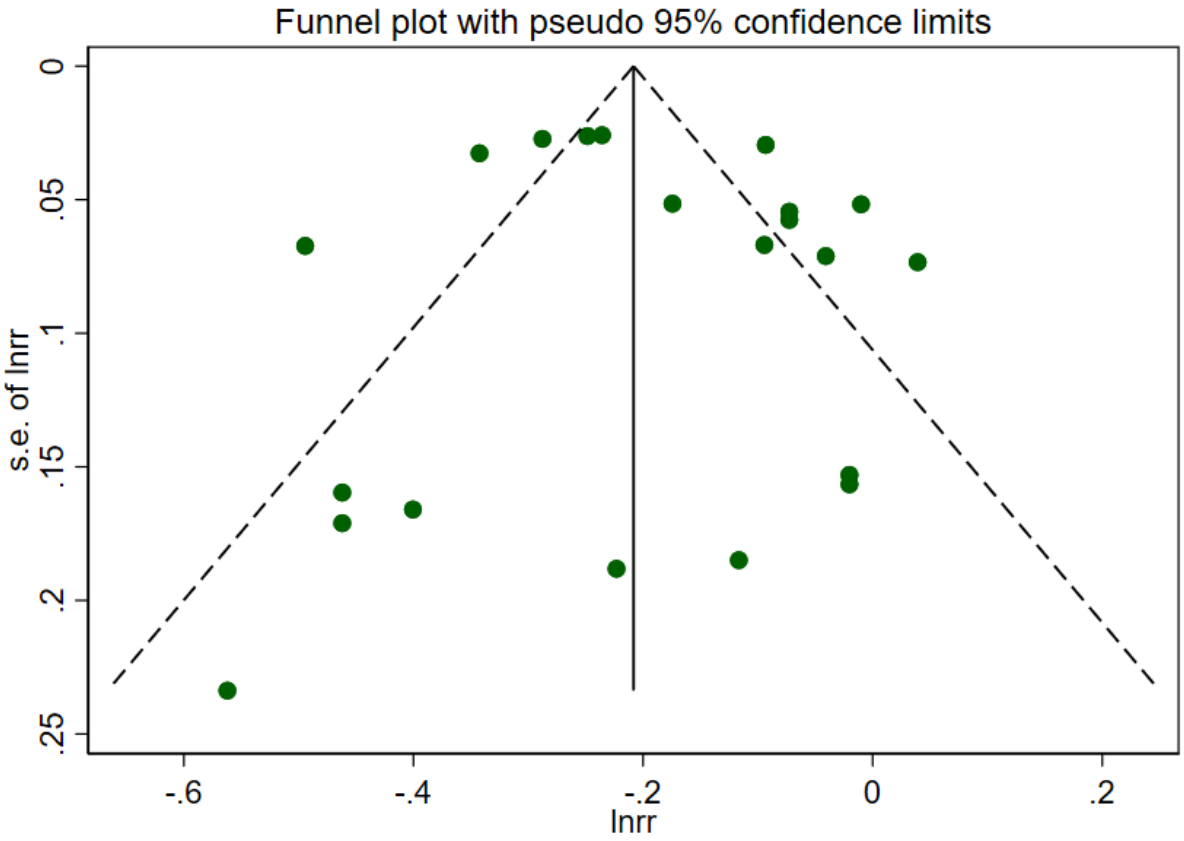
Supplemental Figure 20. Hazard ratio of all-cause mortality the highest versus lowest category of insoluble fiber intake. HR, hazard ratio.



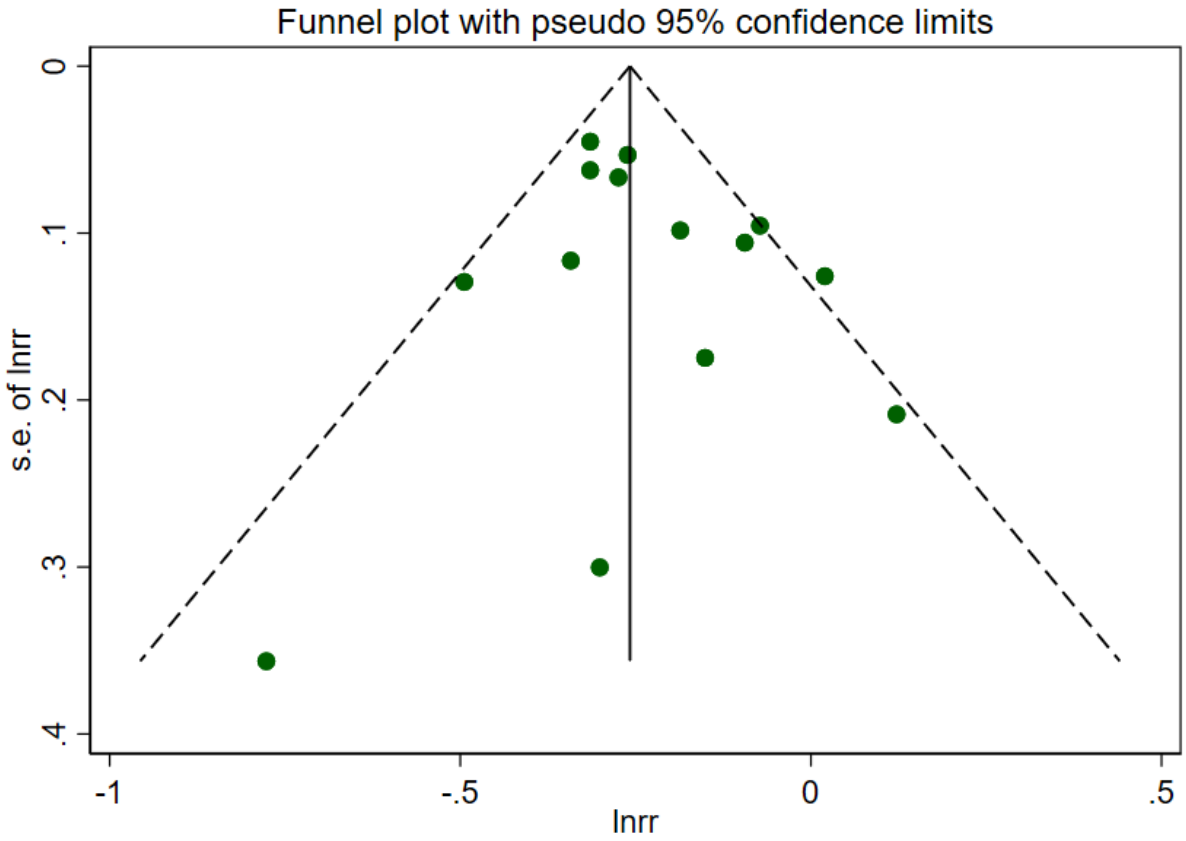
Supplemental Figure 21. Hazard ratio of cardiovascular mortality the highest versus lowest category of insoluble fiber intake. HR, hazard ratio.



Supplemental Figure 22. Hazard ratio of cancer mortality the highest versus lowest category of insoluble fiber intake. HR, hazard ratio.



Supplemental Figure 23. Funnel plot of the relative risks of all-cause mortality for total fiber intake. Egger's test *P*=0.55.



Supplemental Figure 24. Funnel plot of the relative risks of cardiovascular mortality for total fiber intake. Egger's test *P*=0.38.

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