VANCOUVER
INC XLI WORLD NUT AND DRIED FRUIT CONGRESS
May 8-10, 2024

NUTRITION RESEARCH SEMINAR

Panel

Chaired by **Prof. Jordi Salas-Salvadó**, Chairman of the INC World Forum for Nutrition Research and Dissemination

Guest speakers:

- **Dr. John L. Sievenpiper**, Professor, Departments of Nutritional Sciences and Medicine, University of Toronto, Canada
- **Dr. Kristina Petersen**, Associate Professor, Professor in Charge, Graduate Program in Nutritional Sciences, Department of Nutritional Sciences, Penn State University

Program

1. The NUTPOOL world epidemiologic study, and the TOP-5 new studies in relation to nut consumption and health. **Prof. Jordi Salas-Salvadó.**

2. Leveraging nut-containing plant-based dietary patterns for cardiometabolic health: Moving from evidence to guidelines to clinical practice. **Prof. John Sievenpiper.**

3. The Role of Nuts & Dried Fruits in Improving Diet Quality. **Dr. Kristina Petersen.**

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https://nutpool.eu

Nut Consumption and Risk of Non-communicable Diseases: A Global Individual Participant Data Meta-analysis

NUTPOOL
World Epidemiological Study

is an international project coordinated by:

Marta Guasch-Ferré, PhD,

Principal Investigator and Coordinator

UNIVERSITY OF COPENHAGEN

Associate Professor. Department of Public Health, Section of Epidemiology, and Novo Nordisk Foundation Center for Basic Metabolic Research, University of Copenhagen (Denmark)

Jordi Salas-Salvadó, MD, PhD

Co-Principal Investigator

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What is the rationale for the NUTPOOL project?

GAP: Some observational studies have explored the associations between nut consumption and the risk on disease, but controversial results and inconsistencies between studies have been shown.

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Reasons of inconsistencies between studies and study limitations until now:

- **Different analytical approaches** and confounding factors used across studies.
- Most of the previous studies have **focused on populations in Europe or United States of America**, potentially restricting the broader applicability of the findings to other global regions.
- Few studies have analyzed a potential **dose-response relationship**.
- Findings from previous prospective studies have been **conflicting for some health outcomes** such as type 2 diabetes (T2D).
- Prospective studies **underexplored the associations for other outcomes** such as neurodegenerative diseases.

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NUTPOOL
World Epidemiological Study

The goal of the NUTPOOL project is to conduct an IPD meta-analysis pooling results of worldwide representative large prospective cohort studies on the associations of total and specific types of nut consumption and the future risk of NCDs.

This project will use cutting-edge epidemiological approaches to leverage existing resources from worldwide prospective cohorts.

We anticipate that about 20 cohorts with >1 million participants will participate in the analysis representing populations across America, Europe, Asia, and Oceania.

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Aim 1.
Evaluate the associations between the consumption of total and specific types of nuts and the incidence of NCDs including **T2D**, **total CVD** (**coronary heart disease**, stroke) and **cardiovascular mortality**, **total cancer** and **cancer mortality**, neurodegenerative diseases **(dementia** and **Alzheimer's diseases**) and **all-cause mortality**.

We will determine whether these associations are consistent across specific types of nuts.

Aim 2.
Evaluate potential **dose-response relationships** and **subgroup analyses** based on demographics, geography, or other relevant factors including T2D, obesity, age, sex, race/ethnicity, physical activity, and overall dietary pattern adherence, among others.

The NUTPOOL project will contribute substantively to change public health recommendations and dietary guidelines, potentially influencing healthier dietary patterns worldwide.

TOP 5 news

Nut consumption and health

Selected for their impact and originality

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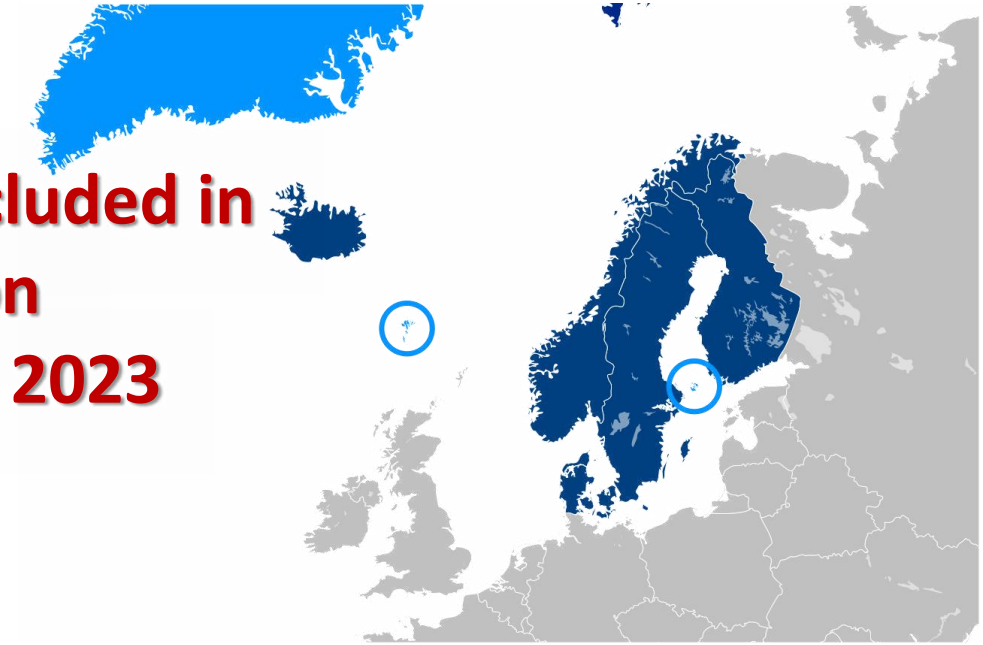
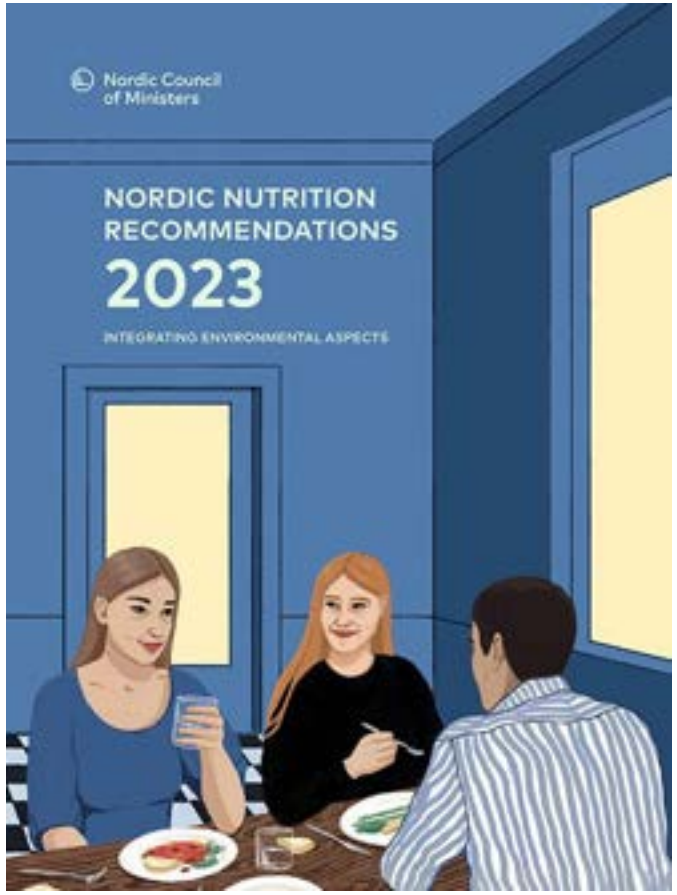
5

Nuts have been included in the Nordic Nutrition Recommendations 2023



food & nutrition research



Overall, the current evidence supports dietary recommendations to increase nut consumption to a serving of nuts and seeds per day for people without allergies to these foods.

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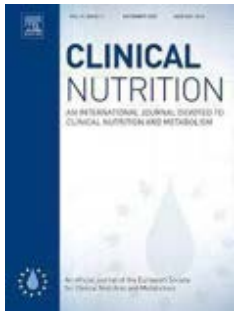
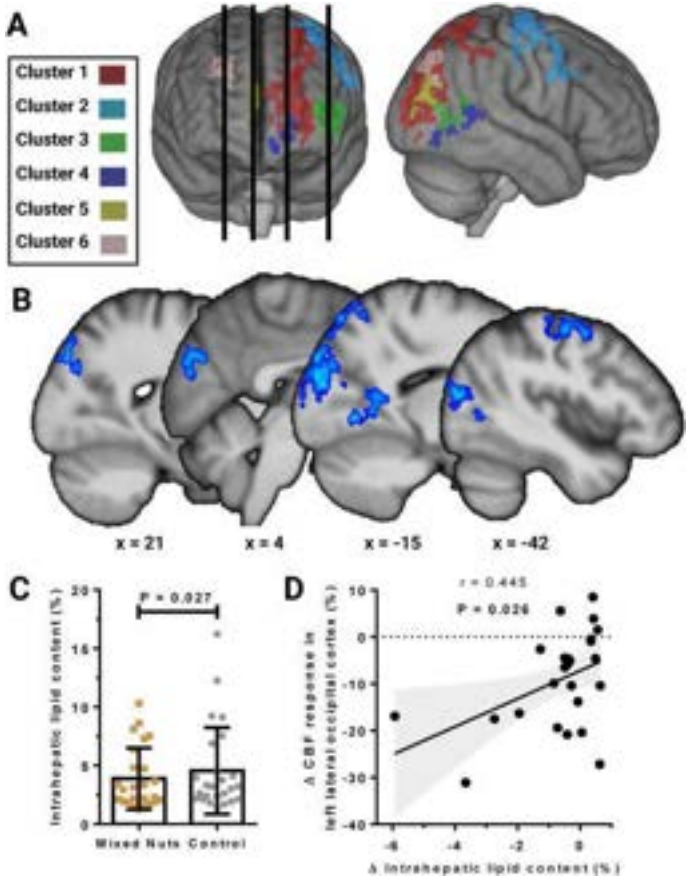
Mixed nut consumption improves brain insulin sensitivity: a randomized, single-blinded, controlled, crossover trial in older adults with overweight or obesity



Nijssen KM, Mensink RP, Plat J, Ivanov D, Preissl H, Joris PJ. (Mastrich and Germany)

- Randomized crossover trial (n=28 adults)
- 16 weeks, separated by an 8-week washout period
- 60 g mixed nuts (walnuts, pistachio, cashew, and hazelnuts) or not

✓ Brain insulin action was assessed by quantifying acute effects of intranasal insulin on regional CBF using arterial spin labeling magnetic resonance imaging.
✓ Cerebral blood flow (CBF), a marker of brain vascular function, was quantified using arterial spin labeling magnetic resonance imaging.
✓ Effects on endothelial function, arterial stiffness, and the retinal microvasculature was assessed.



Nut consumption affected insulin action in brain regions involved in the modulation of metabolic and cognitive processes and beneficially affected brain vascular function, and had beneficial effects on memory

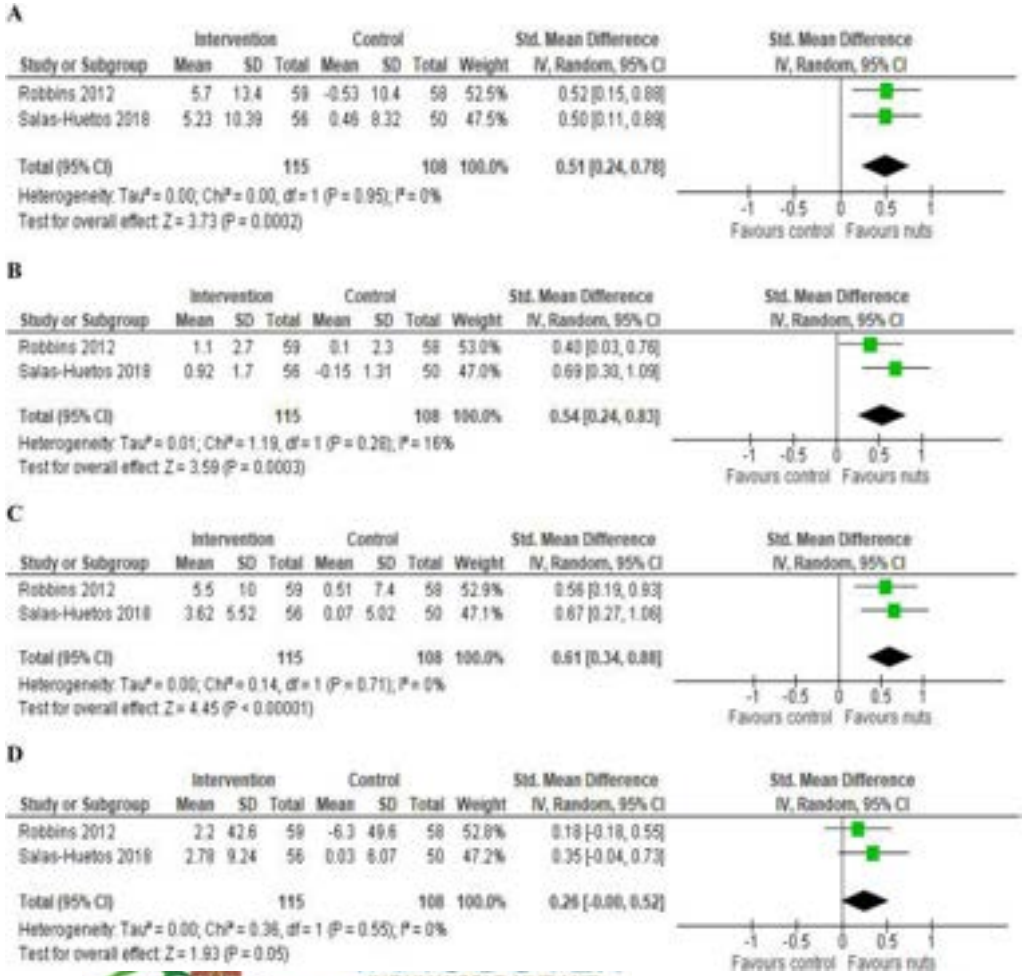
PMID: 38128733


3

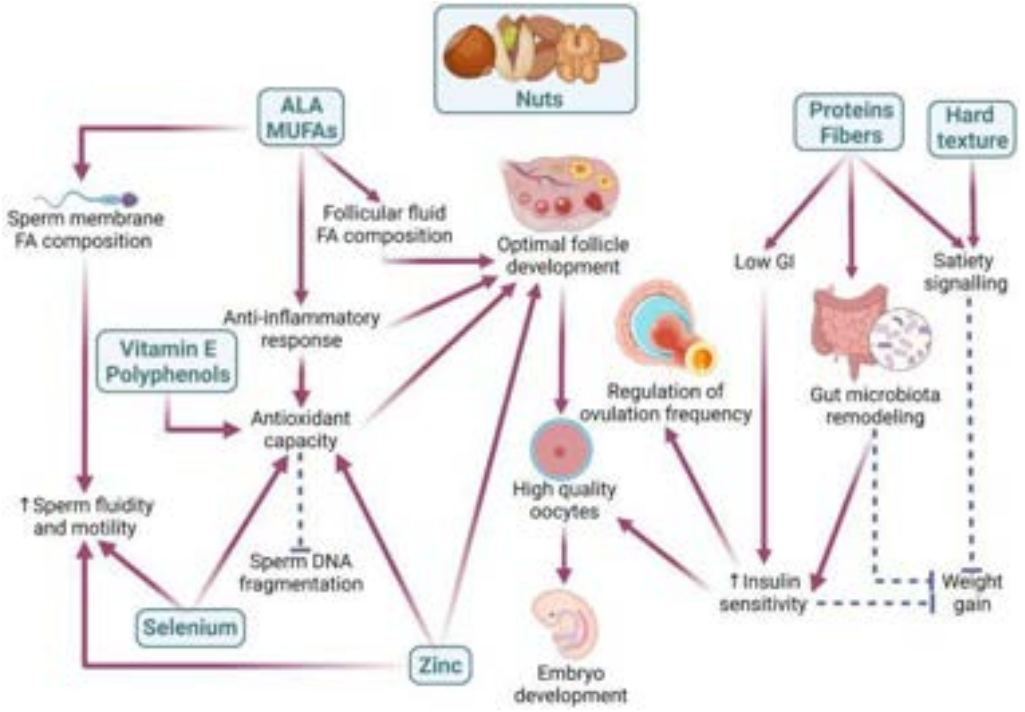
Nut Consumption and Fertility: a Systematic Review and Meta-Analysis

Cardoso BR, Fratezzi I, Kellow NJ.

Increased sperm motility, vitality, and morphology in comparison to controls but had no effect on sperm concentration.



Including at least 2 servings of nuts daily as part of a Western-style diet in healthy males improves sperm parameters, which are predictors of male fertility. Due to their nutritional profile, nuts were found to have potential to promote successful reproductive outcomes.



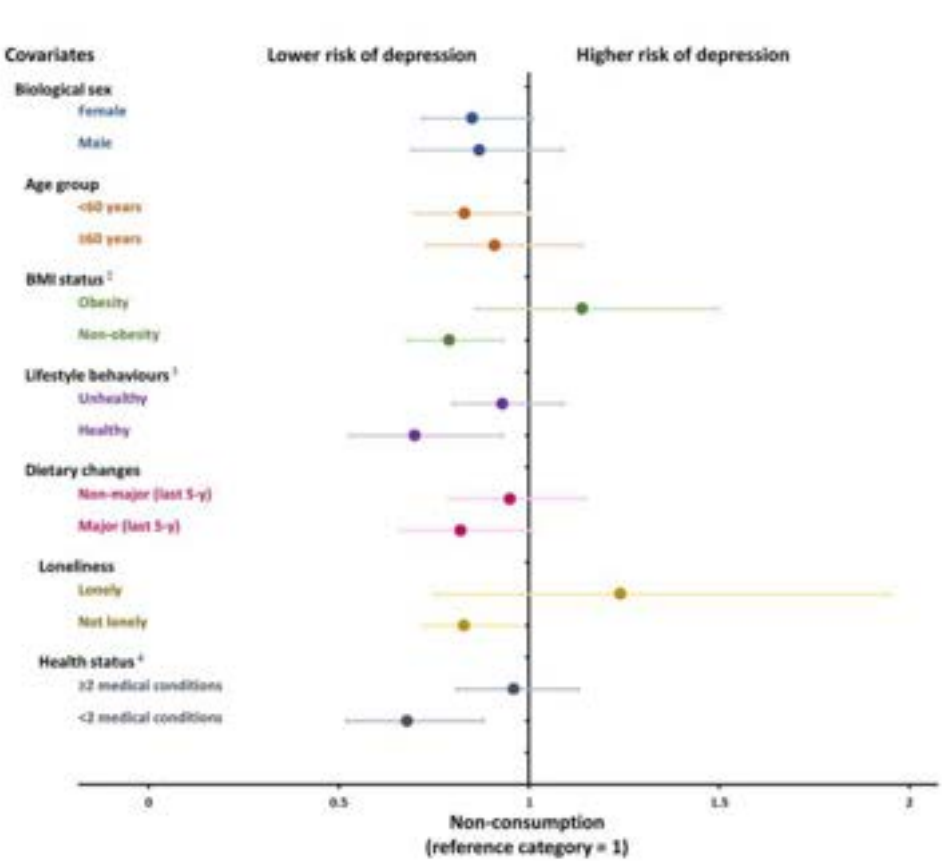
PMID: 37977328


2

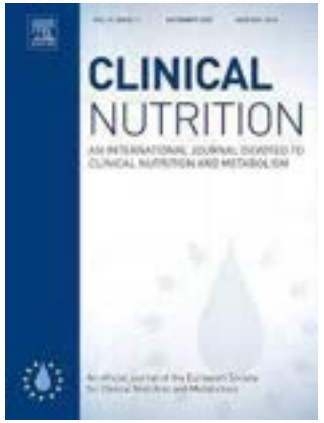
Nut consumption is associated with a lower risk of depression in adults: A prospective analysis with data from the UK Biobank cohort

Bizzozero-Peroni B, et al.

N= 13,504



Covariates	Nut consumption vs. non-consumption HR	LL	UL	*p-for-interaction*	Total, *n* (incident depression [1])
Biological sex					
Female	0.85	0.72	1.01	0.882	6,850 (709)
Male	0.87	0.69	1.09		6,654 (413)
Age group					
<60 years	0.83	0.66	1.00	0.504	7,208 (729)
≥60 years	0.91	0.73	1.16		6,296 (393)
BMI status [2]					
Obesity	1.14	0.86	1.50	**0.022**	2,819 (278)
Non-obesity	0.79	0.68	0.93		10,865 (844)
Lifestyle behaviours [3]					
Unhealthy	0.93	0.80	1.09	**0.048**	9,703 (844)
Healthy	0.70	0.53	0.93		3,801 (278)
Dietary changes					
Non-major (last 5-y)	0.95	0.79	1.15	0.201	8,125 (603)
Major (last 5-y)	0.82	0.66	1.01		5,379 (519)
Loneliness					
Lonely	1.24	0.79	1.95	0.177	634 (102)
Not lonely	0.83	0.72	0.97		12,870 (1,020)
Health status [4]					
≥2 medical conditions	0.96	0.81	1.13	**0.047**	8,784 (762)
<2 medical conditions	0.68	0.52	0.88		4,735 (364)



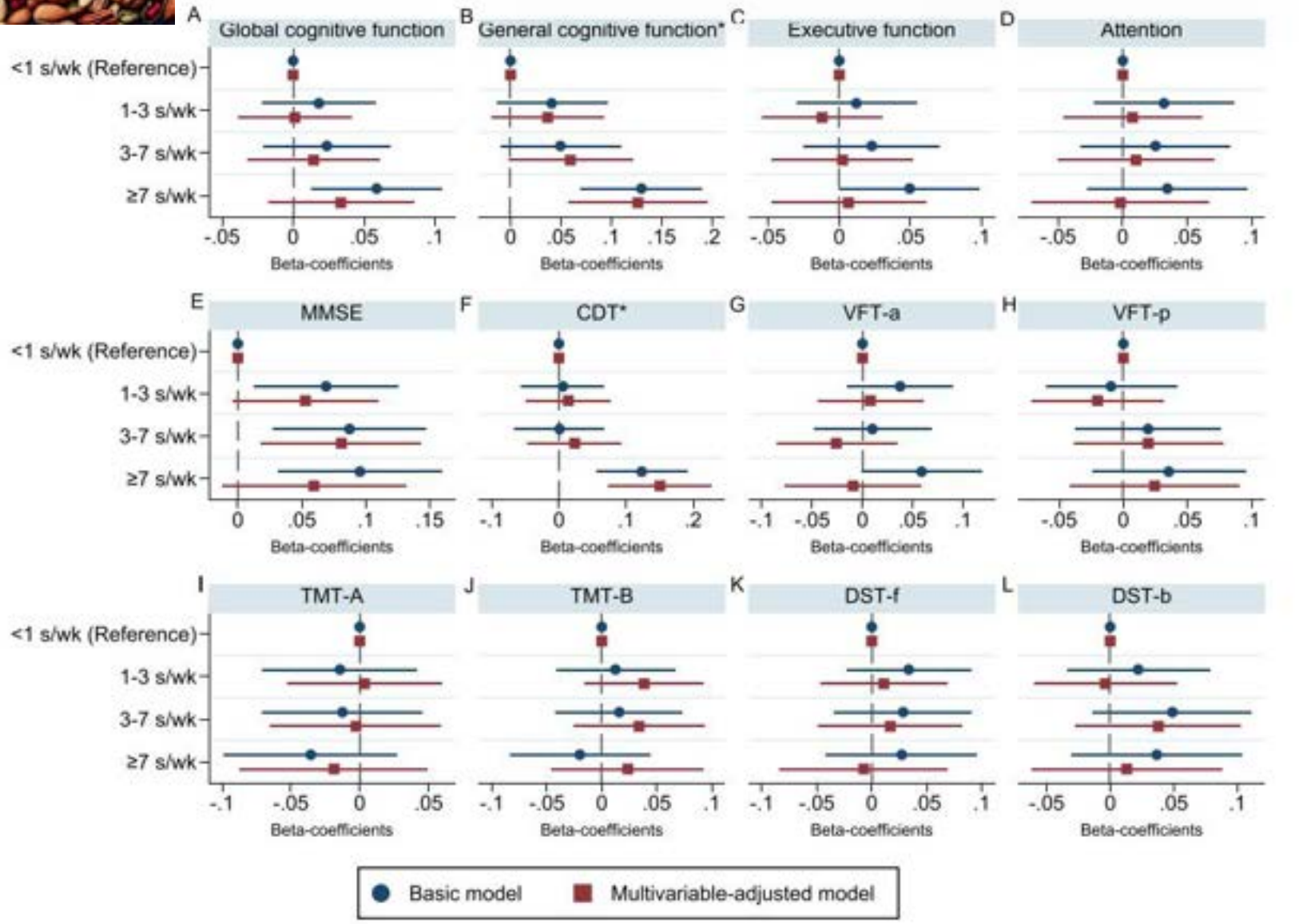
Low-to-moderate nut consumption (>0 to 1 serving of 30 g/day) was associated with a 17% lower risk of depression during a 5.3-year follow-up compared with no nut consumption in a large sample of middle-aged and older UK adults.

This protective association is enhanced in the absence of other known risk factors for depression.

•PMID: 37542950

two have been tied

PREDIMED-PLUS TRIAL



Nut consumption was positively associated with 2-y changes in general cognitive function (P-trend <0.001). Compared with participants consuming <1 serving/wk of nuts, those categorized as consuming >3 servings/wk showed more favorable changes in general cognitive Performance.

Conclusion:

Frequent nut consumption was associated with a smaller decline in general cognitive performance over 2 y in older adults at risk of cognitive decline.

Ni et al., Am J Clin Nutr 2023

Beta coefficients and 95% CI of 2-y changes in cognitive performance (i.e. global cognitive function (A), general cognitive function (B), executive function (C), attention (D), MMSE score (E), CDT score (F), VFT-a score (G), VFT-p score (H), TMT-A score (I), TMT-B score (J), DST-f score (K), DST-b score (L)) according to categories of baseline nut consumption.


1
1

Comparing the Effects of Consuming Almonds or Biscuits on Body Weight in Habitual Snackers: A 1-Year Randomized Controlled Trial

Brown R etal., University of Otago, Dunedin, New Zealand.

1 year RCT (n= 131 men and women nonobese snakers)
Almonds as a snack (42.5g), or biscuits (isocaloric, 10% energy)

Hypothesis: almonds will displace some of the less-healthful snacks

- No statistically significant differences in changes for body composition or cardiovascular risk factors.
- No differences in hunger, desire to eat or fullness.
- Diet quality has been improved in those participants consuming almonds

Conclusions: Almonds can be incorporated into the diets of habitual snackers to improve diet quality, without evidence for changes in body weight.

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Funded by the Almond Board of California

•PMID: 37156442

Summary & Conclusion

- The NUTPOOL project is a good opportunity to create synergies with different investigators around the world and promote future research in relation to nuts.

- The NUTPOOL project will contribute substantively to change public health recommendations and dietary guidelines, potentially influencing healthier dietary patterns worldwide.

- Nuts and dried fruits continue to be the object of great interest for science. It is important that nut-related industry continue to invest in knowledge. Not investing in research and development is investing in poverty for the future.

- We hope that interest of scientists on the importance of plant-based diets, and in particular nuts, and health, will be reflected in an increase in consumption.

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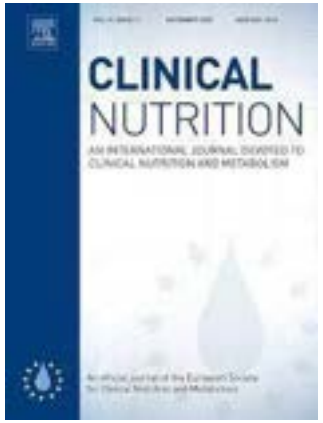
Longer-term mixed nut consumption improves brain vascular function and memory: A randomized, controlled crossover trial in older adults



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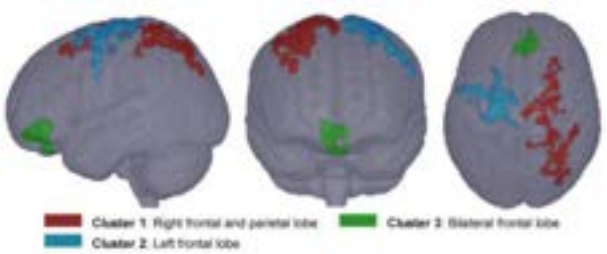

✓ **Cerebral blood flow** (CBF), a marker of brain vascular function, was quantified using arterial spin labeling magnetic resonance imaging.

✓ **Effects on endothelial function**, arterial stiffness, and the retinal microvasculature was assessed.

✓ **Cognitive performance was measured** using the Cambridge Neuropsychological Test Automated Battery.

- Intervention resulted in a higher regional CBF in the right frontal and parietal lobes, left frontal lobe, and bilateral prefrontal cortex.
- Carotid artery reactivity, brachial flow-mediated vasodilation, and retinal arteriolar calibers were higher.
- Visuospatial memory and verbal memory improved.

Longer-term mixed nut consumption as part of a healthy diet beneficially affected brain vascular function, which may relate to the observed beneficial effects on memory in older adults.

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•PMID: 37296019