

Lacto-Ovo-Vegetarian Diets for Myocardial Perfusion in Adults with Coronary Artery Disease: A Systematic Review

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ABSTRACT

Introduction: Lacto-ovo-vegetarian diets have gained increasing popularity in recent decades. These diets are characterized by a low intake of saturated fat and a high consumption of vegetables and legumes. Several publications have shown that the consumption of these foods is associated with a lower incidence of non-communicable chronic diseases (NCDs).

The aim of this systematic review was to evaluate the effects of lacto-ovo-vegetarian diets in adults with established coronary artery disease. We assessed their impact on myocardial perfusion, quality of life, mortality, type 2 diabetes, overweight, and obesity.

Materials and methods: Systematic review with meta-analysis (CRD 42023456770).

Results: We identified 3,601 records. After an independent screening process conducted by three authors, we included three studies in the systematic review, along with three additional secondary publications related to the included studies. The studies reported an improvement in myocardial perfusion measured by PET scan ($+4.9 \pm 3.3$ in the vegetarian diet group vs. -8.8 ± 2.3 in the control group), as well as improvements in certain quality-of-life domains with lacto-ovo-vegetarian diets compared with non-restricted diets (80.84 [95% CI: 76.21–85.47] vs. 80.45 [95% CI: 75.55–85.35] in the control group). However, the impact of these diets on type 2 diabetes, overweight, and obesity was minimal.

Conclusions: Lacto-ovo-vegetarian diets may improve myocardial perfusion and certain aspects of quality of life. Their effect on NCDs such as type 2 diabetes, overweight, and obesity appears to be minimal. Further studies with larger sample sizes are needed to assess the effect of lacto-ovo-vegetarian diets on the main outcomes considered in this review.

Keywords: Lacto-ovo-vegetarian diet, coronary artery disease, non-communicable diseases, myocardial perfusion imaging, quality of life, mortality.

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Dietas lacto-ovo-vegetarianas para la perfusión miocárdica en adultos con enfermedad coronaria: una revisión sistemática

RESUMEN

Introducción: las dietas lacto-ovo-vegetarianas ganaron una notable popularidad en las últimas décadas. Estas dietas se caracterizan por una baja ingesta de grasas saturadas y un alto consumo de vegetales y legumbres. Diversas publicaciones han demostrado que el consumo de estos alimentos está vinculado a una menor incidencia de enfermedades crónicas no transmisibles (ECNT).

El objetivo de esta revisión sistemática fue evaluar los efectos de las dietas lacto-ovo-vegetarianas en adultos con enfermedad coronaria establecida. Analizamos su impacto sobre la perfusión miocárdica, la calidad de vida, mortalidad, la diabetes tipo 2, el sobrepeso y la obesidad.

Materiales y métodos: revisión sistemática con metanálisis (CRD 42023456770).

Resultados: identificamos 3601 registros. Tras un proceso de selección independiente realizado por 3 autores, incluimos 3 estudios en la revisión sistemática, junto con 3 informes secundarios adicionales relacionados con los estudios incluidos. Los estudios informaron una mejora en la perfusión miocárdica medida por PET scan (+4,9 (-EE- ±3,3) en el grupo con dieta vegetariana vs. -8,8 (EE ±2,3) en el grupo control) y en ciertos aspectos de la calidad de vida con las dietas lacto-ovo-vegetarianas en comparación con dietas no restringidas (80,84 [IC 95%: 76,21-85,47] vs. 80,45 [IC 95%: 75,55-85,35] en el grupo control). Sin embargo, el impacto de estas dietas sobre la diabetes tipo 2, el sobrepeso y la obesidad fue mínimo.

Conclusiones: las dietas lacto-ovo-vegetarianas podrían mostrar beneficios en la perfusión miocárdica y en ciertos aspectos de la calidad de vida. Su efecto sobre enfermedades crónicas no transmisibles (ECNT) como la diabetes, el sobrepeso y la obesidad parece ser mínimo. Se necesitan más estudios con tamaños muestrales mayores, que analicen el efecto de dichas dietas en los principales desenlaces considerados en esta revisión.

Palabras clave: dieta lacto-ovo-vegetariana, enfermedad coronaria, enfermedades no transmisibles, imagen de perfusión miocárdica, calidad de vida, mortalidad.

INTRODUCTION

Background

Lacto-ovo vegetarian diets have gained popularity in recent decades. The reasons are generally related to animal rights and environmental concerns. This dietary pattern includes eggs, milk, and dairy products, and excludes the consumption of meat from any animal, seafood, and products containing them, which may lead to a reduction in overall saturated fat intake. In addition, this type of diet may include vegetables, fruits, whole grains, legumes, soy products, nuts, and seeds. When well planned, this combination of foods is associated with a reduction in low-density lipoprotein (LDL) cholesterol levels and improved glycemic control. These factors contribute to a reduction in chronic noncommunicable diseases, such as cardiovascular diseases, cancer, and type 2 diabetes¹.

Chronic noncommunicable diseases (NCDs) are the leading cause of death and disability worldwide. Cardiovascular diseases rank first, accounting for the majority of NCD-related deaths (17.9 million each year), followed by cancer, respiratory diseases, and diabetes².

Considering the relationship between vegetarian diets and the leading cause of death worldwide, we conducted a systematic review to evaluate the impact of these diets

in adults older than 18 years with established coronary artery disease, as this effect remains unclear. We selected studies that included this dietary pattern for at least 4 weeks. In addition, we assessed the effects on quality of life, mortality, type 2 diabetes, overweight, and obesity. Developers of future clinical practice guidelines may use this type of systematic review when formulating recommendations.

Objective

The objective was to evaluate the effects of lacto-ovo vegetarian diets on myocardial perfusion in adults with coronary artery disease. We also investigated the effects of this dietary pattern on health-related quality of life and mortality. In addition, as secondary outcomes, we assessed the effects of lacto-ovo vegetarian diets on the incidence of type 2 diabetes, overweight, and obesity.

MATERIALS AND METHODS

Eligibility Criteria

We included only randomized controlled trials and crossover studies that evaluated the use of a lacto-ovo vegetarian diet in adults (≥18 years) with established coronary artery disease, such as angina pectoris or a history of acute myocardial infarction, who had followed

a lacto-ovo vegetarian diet for at least 4 weeks. This type of diet includes eggs, milk and dairy products, legumes, fruits, and vegetables, as well as all types of cereals and flours, without caloric restriction. It excludes the consumption of meat from any animal, seafood, and products containing them.

We selected studies that compared this type of diet with a diet without specific restrictions. We excluded studies that investigated vegan, low-carbohydrate, Mediterranean, DASH, or other dietary patterns. We also excluded studies whose populations consisted of healthy individuals.

Our primary outcomes were myocardial perfusion measured by PET scan, health-related quality of life measured using the SF-36 questionnaire or the EuroQol 5-dimension questionnaire, and mortality. Secondary outcomes included type 2 diabetes, assessed by glycemic control or glycated hemoglobin (HbA1c), and overweight and obesity, both measured by body mass index (BMI).

No restrictions were applied regarding language or publication status.

Information Sources

We conducted a search in MEDLINE (PubMed®), CENTRAL, and ClinicalTrials.gov from database inception to the date of the search (September 12, 2023). We identified additional potentially eligible studies or complementary publications by reviewing the reference lists of the included studies, as well as of systematic reviews, meta-analyses, and health technology assessment reports identified during our searches. The complete search strategy for each database is provided in Appendix A.

Study Selection and Data Collection Process

We removed duplicates and grouped multiple references to the same study using EndNote X7®. Two review authors (from among CF, VF, and EJ) independently assessed studies for potential inclusion, initially based on titles and abstracts. Full texts of relevant records were then evaluated to determine eligibility. Discrepancies between the two reviewers were resolved by consensus. Any unresolved disagreement was referred to an adjudicator (LG). Two review authors (from among CF, VF, and EJ) independently extracted data from the included trials using a standardized data extraction form that had been previously piloted. Extracted data included study population characteristics, intervention characteristics, and outcomes of interest.

Data Items

We collected data on the following population characteristics: age, sex, type of coronary artery disease, and type of diet. We also collected data on the following aspects related to the intervention or comparator: dietary characteristics, duration of dietary follow-up (in weeks), duration of the intervention, cointerventions, and treatment for coronary artery disease. Additionally, we collected data on the following outcome-related aspects:

type of measurement, time points assessed, and time points reported.

Risk of Bias Assessment

Two review authors independently assessed the risk of bias of the included studies using the Cochrane Risk of Bias Tool 1 for Randomized Controlled Trials³, which considers six key domains: random sequence generation (selection bias), allocation concealment (selection bias), blinding of participants and personnel (performance bias), blinding of outcome assessment (detection bias), incomplete outcome data (attrition bias), and selective reporting (reporting bias).

Measures of Effect

We summarized dichotomous outcomes in prospective studies using relative risks with 95% confidence intervals. Continuous data were summarized using mean differences or standardized mean differences, along with their corresponding 95% confidence intervals. When qualitative heterogeneity was not suspected, we pooled outcome measures across studies using a random-effects meta-analysis, following the Cochrane Handbook recommendations for handling statistical heterogeneity using the I^2 statistic. Missing data were not imputed. Analyses were conducted using RevMan® software. When meta-analysis was not feasible, we performed alternative forms of synthesis, including summarizing effect estimates, following the *Synthesis without Meta-analysis* (SWiM) guideline⁴.

Assessment of Reporting Bias

Had we been able to include more than 10 studies, we would have assessed reporting bias through visual inspection of funnel plots to detect small-study effects. There are several possible explanations for asymmetry in these plots, including true heterogeneity of effects according to study size, poor methodological design (and thus bias in small studies), and selective reporting of results.

RESULTS

Study Selection

A total of 3,601 records were identified from databases and clinical trial registries. Three duplicates were removed using Covidence, leaving 3,598 records for title and abstract screening. After independent assessment by three authors, 25 studies were selected for full-text evaluation. We were unable to retrieve the full text of 7 studies. Of the remaining 18 studies, 10 were excluded due to their methodological design⁵⁻¹⁴. One additional study was excluded because it did not report any outcomes of interest for this review¹⁵. One study was classified as ongoing¹⁶. Ultimately, 3 studies were included in the systematic review, along with 3 additional reports related to the included studies¹⁷⁻²².

The PRISMA flow diagram is shown in Figure 1. A complete description of the excluded studies is available in Appendix B.

Characteristics of the Studies

Population

Three studies were included, comprising a total of 100 participants. The smallest sample size was 28 participants, and the largest included 41 participants.

The minimum age of participants across studies was approximately 56 years, and the maximum age exceeded 70 years. Overall, 65% of participants were men and 35% were women.

Djekic et al. included participants with stable ischemic heart disease receiving optimal medical therapy, including aspirin and lipid-lowering medications¹⁷.

The other two studies included participants with stable ischemic heart disease who were not receiving lipid-lowering therapy at the time^{18,19}. In addition, Toobert et al. included exclusively postmenopausal women¹⁸.

Intervention

Djekic et al. implemented an intervention consisting of a vegetarian diet that included eggs and dairy

products during 4-week intervention periods, separated by a 4-week washout period. At the initial study visit, patients met with a nutritionist who provided guidance on how to follow individually energy-adjusted meal plans. The nutritional composition of the diets was calculated using the Dietist Net Pro® nutritional analysis software (Dietist Net Pro, Kost och Näringsdata AB, Bromma, Sweden)¹⁷.

Toobert et al. and Ornish et al.^{18,19} implemented an intervention consisting of a lacto-ovo vegetarian diet that included fruits, vegetables, cereals, legumes, and soy-based products. Animal-derived foods were not allowed, except for egg whites and one cup per day of skim milk or yogurt. The diet consisted of approximately 10% of calories from fat, 15-20% from protein, and 70-75% from complex carbohydrates. Cholesterol intake was limited to 5 mg/day or less. Vitamin B12 supplementation was provided. The intervention began with a one-week residential retreat at a hotel to teach the lifestyle program to the experimental group.

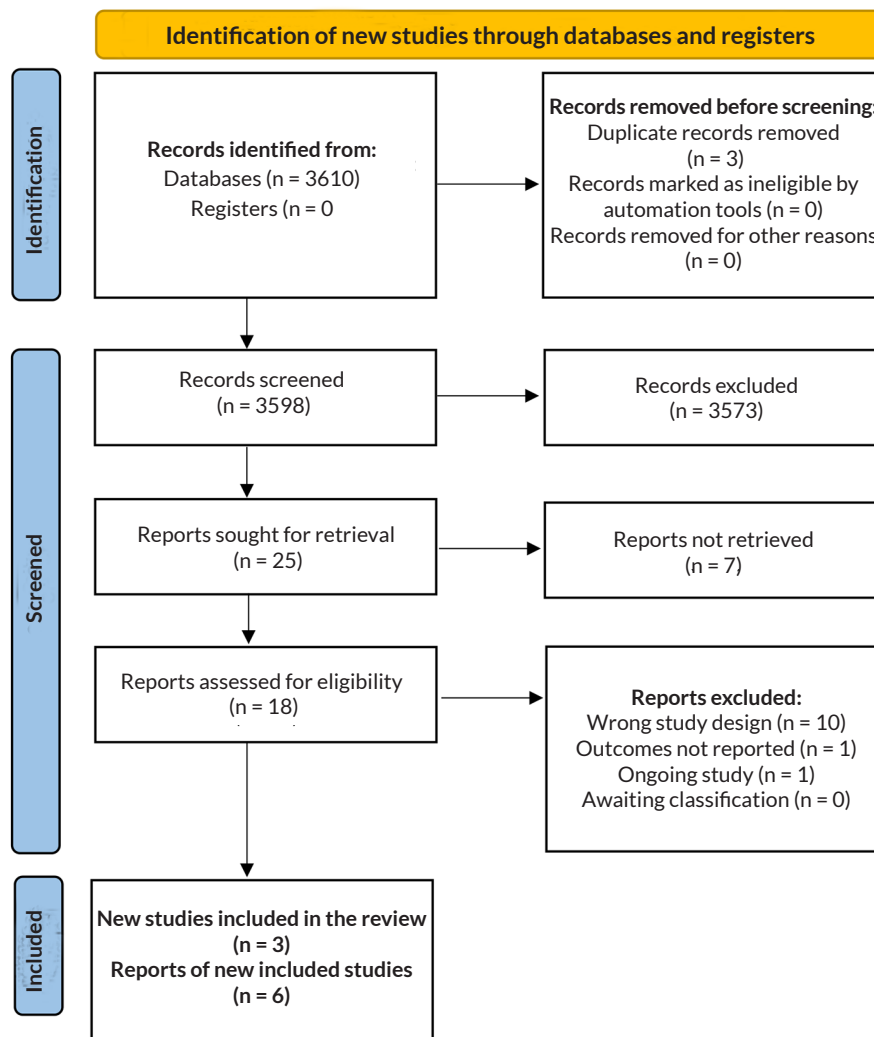


Figure 1. PRISMA 2020 flow diagram.

Toobert et al. also included daily group sessions of physical activity (warm-up, walking or aerobics, and cool-down sessions led by a physiotherapist certified by the American College of Sports Medicine). Exercise intensity was individually prescribed based on performance on a treadmill stress test. After the retreat, the exercise program required participants to engage in one-hour sessions at least three days per week. Similarly, Ornish et al. incorporated aerobic exercise for a minimum of 3 hours per week, with sessions lasting at least 30 minutes while maintaining the target heart rate.

In addition, both programs included stress management. Toobert et al. implemented stress management techniques twice daily during the retreat, led by a certified yoga instructor. These techniques included Hatha yoga stretching, progressive deep relaxation, deep breathing, meditation, and guided or receptive imagery. Participants were asked to practice these techniques for one hour per day and were provided with audio recordings to support adherence. Ornish et al. applied similar techniques but without Hatha yoga. Finally, both interventions also included smoking cessation and group psychological support. Toobert et al. conducted the program over two years, whereas Ornish et al. initially implemented it for one year, later extending it to five years²⁰.

Comparator

Djekic et al. used an unrestricted diet as the comparator, with an average meat consumption of 145 g/day, including red meat, white meat, and processed foods¹⁷. In the other two studies, control groups were not required to make dietary changes, although they were free to do so^{18, 19}.

Outcomes

Ornish et al. reported myocardial perfusion and mortality¹⁹⁻²¹. The other two studies reported quality of life, overweight, and obesity^{17,18}. Only Djekic et al.¹⁷ reported outcomes related to diabetes.

Funding Sources

One study was funded by the Örebro County Council through medical training grants, the Swedish Research Council, the Swedish Research Council Formas, the Chalmers Foundation, and the Swedish National Infrastructure for Computing through the Uppsala Multidisciplinary Center for Advanced Computational Science¹⁷.

Another study¹⁸ was funded by the National Heart, Lung, and Blood Institute, whereas the remaining study¹⁹ received funding from the National Heart, Lung, and Blood Institute of the National Institutes of Health, the California Department of Health Services, Gerald D. Hines Interests, Houston Endowment Inc., the Henry J. Kaiser Family Foundation, the John E. Fetzer Institute, Continental Airlines, the Enron Foundation, the Nathan Cummings Foundation, the Pritzker Foundation, First Boston Corporation, Quaker Oats Co., Texas Commerce Bank, Corrine and David Gould, the Pacific Presbyterian

Medical Center Foundation, General Growth Companies, Arthur Andersen & Co., and others.

Conflicts of interest: None of the studies reported conflicts of interest.

Risk of Bias in Included Studies

In our systematic review, we assessed the risk of bias of the included studies using the Cochrane RoB 1[®] tool (Figs. 2 and 3). The analysis revealed a high risk of bias in allocation concealment and in blinding of participants and personnel. Random sequence generation and incomplete outcome data showed an unclear risk, whereas selective reporting presented a low risk of bias.

The three included studies showed variability in methodological quality (see Figure 3)¹⁷⁻²². The studies by Toobert et al. and Ornish et al. exhibited several domains with high risk of bias (in red), particularly in allocation concealment and blinding of participants^{18,19}. The study by Djekic et al. demonstrated better methodological quality, with a predominantly low risk of bias (in green), although some aspects remained unclear (in yellow), such as selection and detection bias¹⁷.

Synthesis of Results

Myocardial Perfusion

One study involving 48 participants assessed myocardial perfusion using positron emission tomography (PET) scans²⁰. The outcome was measured by evaluating the activity of the lowest-performing quadrant, expressed as a percentage of the heart's maximum activity. The quadrant with the lowest activity represented the most severe perfusion abnormality observed on PET imaging after dipyridamole-induced stress. The study reported an average improvement in the activity of the lowest-performing quadrant, with a mean increase of +4.9 (standard error [SE] ± 3.3) in the vegetarian diet group, compared with a decrease of -8.8 (SE ± 2.3) in the control group²⁰.

In the first study, results were presented using a visual analog scale (VAS), where 100 represented the best imaginable health state and 0 the worst. The intervention group achieved a mean score of 80.84 (95% CI: 76.21-85.47), compared with 80.45 (95% CI: 75.55-85.35) in the control group¹⁷. In the other study, the intervention group showed improvement in specific domains of quality of life. The general health domain improved by an average of 4 points in the intervention group, whereas the control group experienced a decrease of 23 points. Similarly, the social functioning domain improved by an average of 22 points in the intervention group, compared with a decrease of 4 points in the control group. No significant differences were observed in the other SF-36 domains¹⁸.

Mortality

One study including 48 participants reported this outcome. The study reported 2 deaths in the vegetarian group and 1 death in the control group (RR: 0.685; 95% CI: 0.012-13.2; P = 0.81)²¹.

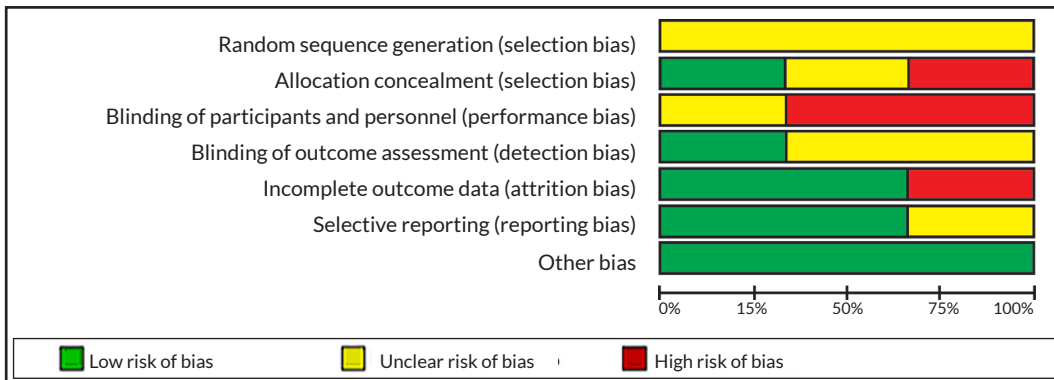


Figure 2. Risk of bias across studies.

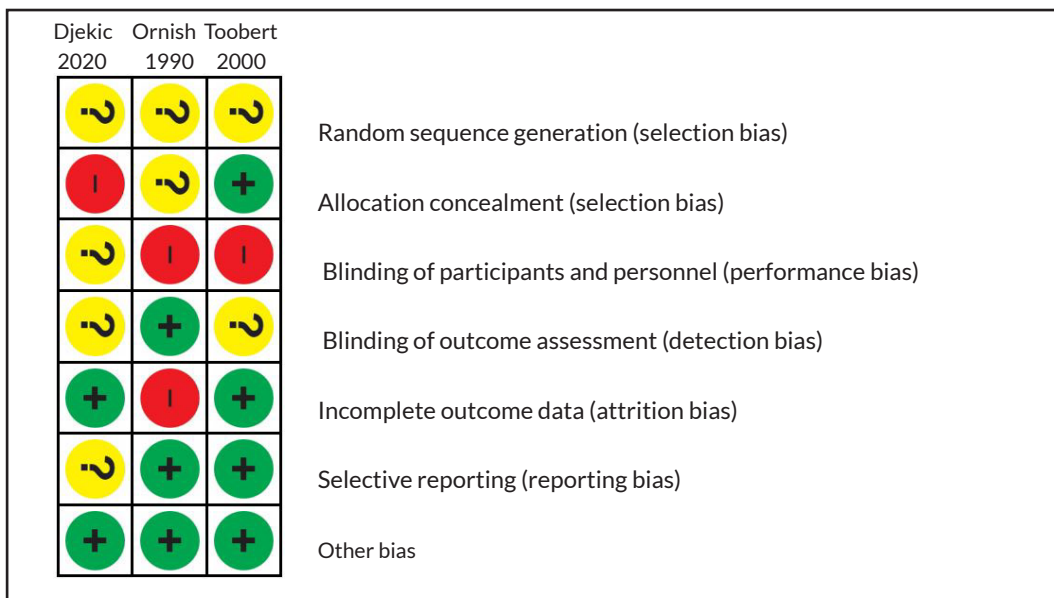


Figure 3. Risk of bias across studies

Type 2 Diabetes

One study including a total of 31 participants assessed type 2 diabetes mellitus using HbA1c (mmol/mol). The intervention group had a mean of 38.7 (95% CI: 37.2-40.3), whereas the control group had a mean of 38.8 (95% CI: 37.2-40.6)¹⁷.

Overweight and Obesity

Two studies including 56 participants reported this outcome using BMI. The vegetarian diet may have little or no effect on BMI compared with an unrestricted diet (MD -0.29; 95% CI: -1.63 to 1.06)^{17,18}. These results are shown in Figure 4.

DISCUSSION

The results of this systematic review suggest that lacto-ovo vegetarian diets may improve myocardial perfusion and certain aspects of quality of life. However,

no significant effects were observed on type 2 diabetes, overweight, or obesity. Regarding mortality, one trial reported a higher number of deaths in the vegetarian diet group compared with the unrestricted diet group; however, these results were not statistically significant (P = 0.81).

We identified several limitations in the studies included in this review. First, there was a substantial risk of bias due to the lack of blinding among participants, which may have amplified the placebo effect. Second, all studies had small sample sizes, limiting the ability to draw generalizable conclusions about the effects of the diet. Third, study populations were heterogeneous. One trial included exclusively postmenopausal women, making comparisons across studies less consistent. In addition, one trial included participants receiving lipid-lowering therapy, whereas the other two did not, further complicating comparisons. Two of the studies

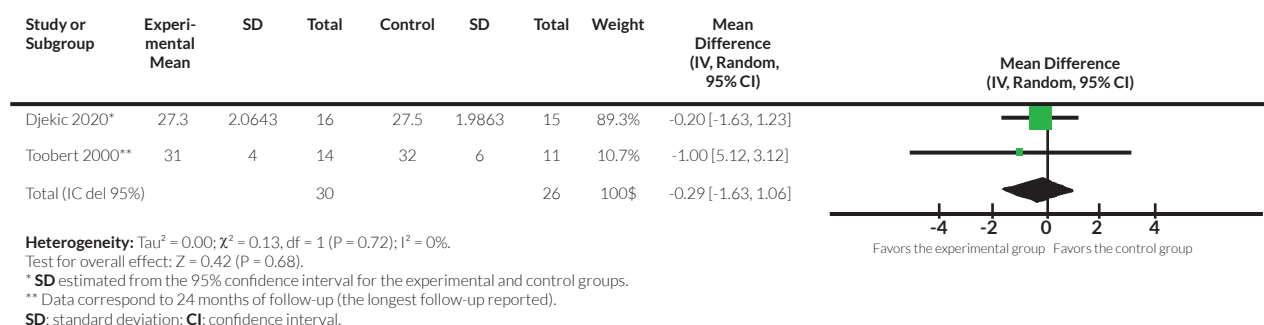


Figure 4. Forest plot of overweight and obesity outcomes comparing a vegetarian diet with an unrestricted diet.

incorporated additional lifestyle interventions, such as stress management and physical activity, alongside the vegetarian diet. This made it difficult to isolate the specific effect of the diet from the combined impact of lifestyle modifications. On the other hand, it is worth noting that the observed potential benefits may be attributable to a higher intake of fresh foods versus ultra-processed foods (UPFs), rather than to the absence of meat per se. In this regard, a systematic review of prospective cohort studies showed that vegetarian diets low in UPFs may reduce cardiovascular events, whereas vegetarian diets high in UPFs may increase them²⁸.

Finally, a four-week duration of a lacto-ovo vegetarian diet may be insufficient to observe an impact on certain chronic conditions, such as diabetes or cardiovascular disease. Conversely, participants with shorter follow-up periods may underestimate the effects of this dietary pattern on these chronic conditions.

According to the American Dietetic Association, Dietitians of Canada, and the Academy of Nutrition and Dietetics, vegetarian diets are associated with lower body mass index, reduced mortality from ischemic heart disease, and lower rates of type 2 diabetes. These benefits are attributed to lower intake of animal fats, higher fiber consumption, and increased intake of plant-based foods, as reported in numerous prospective studies involving vegetarian and vegan populations^{4,5}. However, our findings do not support these conclusions. The lack of consistent results in our analysis may be due to our exclusive focus on clinical trials involving strict lacto-ovo vegetarian diets, which limits comparability with other types of evidence.

CONCLUSIONS

Lacto-ovo vegetarian diets may be associated with improvements in myocardial perfusion and in certain aspects of quality of life. However, their effect on chronic noncommunicable diseases (NCDs), such as diabetes, overweight, and obesity, appears to be minimal. Further studies with larger sample sizes are needed to assess the

effects of lacto-ovo vegetarian diets on the main outcomes considered in this review.

Author Contributions: Conceptualization (CPF, LG). Data curation, methodology, supervision, writing—review and editing (LG). Formal analysis (CPF, MVF, EAJ, LG). Investigation (CPF, MVF, EAJ). Validation (CPF, MVF, EAJ). Visualization (CPF). Writing—original draft (CPF, MVF, EAJ).

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APPENDIX A

Medline (Pubmed):

15 #7 AND #14
 14 #8 OR #9 OR #10 OR #11 OR #12 OR #13
 13 “vegetarian diet”[tiab]
 12 “ovo-lacto”[tiab]
 11 “vegetarianism”[tiab]
 10 “Vegetarians”[Mesh]
 9 “Diet, Vegetarian”[Mesh]
 8 “Diet Therapy”[Mesh]
 7 #1 OR #2 OR #3 OR #4 OR #5 OR #6
 6 “myocardial”[tiab]
 5 “ischemic heart disease”[tiab]
 4 “ischaemic heart disease”[tiab]
 3 “coronary”[tiab]
 2 “Ischemia”[Mesh]
 1 “Heart Diseases”[Mesh]

CENTRAL

#1 MeSH descriptor: [Heart Diseases] explode all trees 72 170
 #2 MeSH descriptor: [Ischemia] explode all trees 18 732
 #3 (coronary):ti,ab,kw 65 508
 #4 (“ischaemic heart disease”):ti,ab,kw 7093
 #5 (ischemic heart disease):ti,ab,kw 11 380
 #6 (“myocardial”):ti,ab,kw 28
 #7 #1 OR #2 OR #3 OR #4 OR #5 OR #6 113 180
 #8 MeSH descriptor: [Diet Therapy] explode all trees 7749
 #9 MeSH descriptor: [Diet, Vegetarian] explode all trees 281
 #10 (diet therapies):ti,ab,kw 1102
 #11 MeSH descriptor: [Vegetarians] explode all trees 28
 #12 (“vegetarianism”):ti,ab,kw 44
 #13 (“ovo-lacto vegetarian”):ti,ab,kw 9
 #14 (vegetarian diet):ti,ab,kw 663
 #15 #8 OR #9 OR #10 OR #11 OR #12 OR #13 OR #14 9185
 #16 #7 AND #15 575

ClinicalTrials.gov

Heart Disease AND vegetarian diet

APPENDIX B

Excluded Studies

- American Dietetic Association; Dietitians of Canada. Position of the American Dietetic Association and Dietitians of Canada: Vegetarian diets. *J Am Diet Assoc.* 2003;103(6):748-765. <https://doi.org/10.1053/jada.2003.50142>. **Reason:** Wrong study design.
- Shrapnel WS, Calvert GD, Nestel PJ, et al. Diet and coronary heart disease. *The National Heart Foundation of Australia. Med J Aust.* 1992;156(S2):S9-16. **Reason:** Wrong study design.
- Djekic D, Shi L, Calais F, et al. Effects of a lacto-ovo-vegetarian diet on the plasma lipidome and its association with atherosclerotic burden in patients with coronary artery disease—a randomized, open-label, cross-over study. *Nutrients.* 2020;12(11):3586. <https://doi.org/10.3390/nu12113586>. **Reason:** Wrong outcomes.
- Rugulies R, Jäger A, Benesch L, et al. [Comprehensive lifestyle changes among patients CHD integration inpatient outpatient cardiac rehabilitation: first results secondary prevention intervention trial rugulies]. *Z Gesundh Wiss.* 1996;4(3):234-247. **Reason:** Wrong study design.
- Kahleova H, Levin S, Barnard N. Cardio-metabolic benefits of plant-based diets. *nutrients.* 2017;9(8):848. <https://doi.org/10.3390/nu9080848>. **Reason:** Wrong study design.
- Salehin S, Rasmussen P, Mai S, et al. Plant based diet and its effect on cardiovascular disease. *Int J Environ Res Public Health.* 2023;20(4):3337. <https://doi.org/10.3390/ijerph20043337>. **Reason:** Wrong study design.
- Vijayan A, Chithra V, Sandhya C. The relationship of lipid peroxidation and antioxidant status to selected modifiable risk factors in coronary artery disease patients. *Int J Cardiol Hypertens.* 2021;8:100077. <https://doi.org/10.1016/j.ijch.2021.100077>. **Reason:** Wrong study design.
- American Association of Neurological Surgeons (AANS), American Society of Neuroradiology (ASNR), Cardiovascular and Interventional Radiology Society of Europe (CIRSE), Canadian Interventional Radiology Association (CIRA), Congress of Neurological Surgeons (CNS), European Society of Minimally Invasive Neurological Therapy (ESMINT), European Society of Neuroradiology (ESNR), European Stroke Organization (ESO), Society for Cardiovascular Angiography and Interventions (SCAI), Society of Interventional Radiology (SIR), Society of NeuroInterventional Surgery (SNIS), and World Stroke Organization (WSO); Sacks D, Baxter B, et al. Multisociety consensus quality improvement revised consensus statement for endovascular therapy of acute ischemic strokes

- quality improvement revised consensus statement for endovascular therapy of acute ischemic stroke. *Int J Stroke*. 2018;13(6):612-632. <https://doi.org/10.1177/1747493018778713>. **Reason:** Wrong study design.
9. Ellsworth DL, Costantino NS, Blackburn HL, et al. Lifestyle modification interventions differing in intensity and dietary stringency improve insulin resistance through changes in lipoprotein profiles. *Obes Sci Pract*. 2016;2(3):282-292. <https://doi.org/10.1002/osp4.54>. **Reason:** Wrong study design.
 10. Agnoli C, Baroni L, Bertini I, et al. A comprehensive review of healthy effects of vegetarian diets. *Nutr Metab Cardiovasc Dis*. 2023;33(7):1308-1315. <https://doi.org/10.1016/j.numecd.2023.04.005>. **Reason:** Wrong study design.
 11. Fraser GE. Vegetarian diets: what do we know of their effects on common chronic diseases? *Am J Clin Nutr*. 2009;89(5):1607S-1612S. <https://doi.org/10.3945/ajcn.2009.26736K>. Errata en: *Am J Clin Nutr*. 2009;90(1):248. **Reason:** Wrong study design.

Ongoing Studies

1. Mandole RS, Dutta S. A clinical trial on reverse diet kit in reduction of total atheroma volume [Internet]. Geneva: International Clinical Trials Registry Platform; 2022 oct 17 [citado 2025 ene 16]. Disponible en: <https://trialsearch.who.int/Trial2.aspx?TrialID=CTRI/2021/12/038386>.