

Citation:

Nikolic M, Nikic D, Petrovic B. Fruit and vegetable intake and the risk for developing coronary heart disease. *Cent Eur J Public Health*. 2008 Mar; 16(1): 17-20.

PubMed ID: [18459474](#)

Study Design:

Case Control Study

Class:

C - [Click here](#) for explanation of classification scheme.

Research Design and Implementation Rating:

NEUTRAL: See Research Design and Implementation Criteria Checklist below.

Research Purpose:

To study the relationship between fruit and vegetable intake and risk of coronary heart disease (CHD) among people in southeast Serbia.

Inclusion Criteria:

- Cases were patients diagnosed for the first time with acute coronary syndrome (non-fatal acute myocardial infarction (AMI) or unstable angina pectoris)
- Controls were admitted to the same hospitals for a wide spectrum of acute conditions unrelated to familiar risk factors for AMI.

Exclusion Criteria:

None reported.

Description of Study Protocol:**Recruitment**

Subjects were recruited from cardiology clinics in Nis, Serbia.

Design

Matched (sex, age and region) pair case-control.

Dietary Intake/Dietary Assessment Methodology (if applicable):

A questionnaire was used to obtain the frequency of fruit and vegetable intake (serving size = one cup).

Statistical Analysis

- Fruit and vegetable intake was considered both a continuous variable (servings per day) and a categorical variable (in tertiles)
- Odds ratios (OR) of CHD stratified by age were calculated using the Mantel-Haenszel procedure.

Data Collection Summary:

Timing of Measurements

Subjects were interviewed by trained physicians in a hospital (sociodemographic factors, lifestyle, personal and family history of cardiovascular disease, frequency of dietary intake of fruits and vegetables) and anthropometric measures were obtained.

Dependent Variables

First-time diagnosis of acute coronary syndrome (non-fatal AMI or unstable angina pectoris).

Independent Variables

- Frequency of fruit consumption
- Frequency of vegetable consumption
- Frequency of fruit juice consumption.

Control Variables

Cases and controls matched on age, sex and region of residence.

Description of Actual Data Sample:

- *Initial N*: 290 (194 males, 96 females)
- *Attrition (final N)*: 290
- *Age*: Median (SD) of 59.43±10.10 years
- *Other relevant demographics*: 39% of controls had more than 12 years of education, compared to 23.1% of cases
- *Anthropometrics*: Percent with a body mass index (BMI) of more than 25kg/m² was 66.9% for cases and 55.5% for controls (P<0.01)
- *Location*: Nis, Serbia.

Summary of Results:

Other Findings

- Patients in the lowest tertile of vegetable consumption had a 4.04 (95% CI: 1.51 to 11.41) times higher odds of CHD compared to patients in the upper tertile of consumption. The odds ratio for the middle tertile of vegetable consumption compared to the upper tertile was 1.06 (95% CI: 0.69 to 1.65)
- Patients who consumed between one serving of fruit a day and one serving a week had a 1.78 (95% CI: 1.12 to 2.87) times greater odds of CHD compared to those who consumed more than one serving per day
- Patients who consumed between one serving of fruit juices a day and one serving a week

had a 1.78 (95% CI: 1.27 to 2.54) times greater odds of CHD compared to those who consumed more than one serving per day.

Author Conclusion:

The data support a protective effect of higher fruit and vegetable consumption against risk of CHD.

Reviewer Comments:

- *Limitations:*
 - *Case definition (acute coronary syndrome) was not clear*
 - *Covariate-adjusted odds ratios were not presented*
 - *Questions used to assess dietary intake were not presented*
- *Strength: Cases matched to controls by age, sex and region of residence.*

Research Design and Implementation Criteria Checklist: Primary Research

Relevance Questions

- | | | |
|----|---|-----|
| 1. | Would implementing the studied intervention or procedure (if found successful) result in improved outcomes for the patients/clients/population group? (Not Applicable for some epidemiological studies) | Yes |
| 2. | Did the authors study an outcome (dependent variable) or topic that the patients/clients/population group would care about? | Yes |
| 3. | Is the focus of the intervention or procedure (independent variable) or topic of study a common issue of concern to nutrition or dietetics practice? | Yes |
| 4. | Is the intervention or procedure feasible? (NA for some epidemiological studies) | Yes |

Validity Questions

- | | | |
|------|---|-----|
| 1. | Was the research question clearly stated? | Yes |
| 1.1. | Was (were) the specific intervention(s) or procedure(s) [independent variable(s)] identified? | Yes |
| 1.2. | Was (were) the outcome(s) [dependent variable(s)] clearly indicated? | Yes |
| 1.3. | Were the target population and setting specified? | Yes |
| 2. | Was the selection of study subjects/patients free from bias? | Yes |
| 2.1. | Were inclusion/exclusion criteria specified (e.g., risk, point in disease progression, diagnostic or prognosis criteria), and with sufficient detail and without omitting criteria critical to the study? | Yes |

2.2.	Were criteria applied equally to all study groups?	Yes
2.3.	Were health, demographics, and other characteristics of subjects described?	Yes
2.4.	Were the subjects/patients a representative sample of the relevant population?	Yes
3.	Were study groups comparable?	No
3.1.	Was the method of assigning subjects/patients to groups described and unbiased? (Method of randomization identified if RCT)	N/A
3.2.	Were distribution of disease status, prognostic factors, and other factors (e.g., demographics) similar across study groups at baseline?	N/A
3.3.	Were concurrent controls used? (Concurrent preferred over historical controls.)	Yes
3.4.	If cohort study or cross-sectional study, were groups comparable on important confounding factors and/or were preexisting differences accounted for by using appropriate adjustments in statistical analysis?	N/A
3.5.	If case control or cross-sectional study, were potential confounding factors comparable for cases and controls? (If case series or trial with subjects serving as own control, this criterion is not applicable. Criterion may not be applicable in some cross-sectional studies.)	No
3.6.	If diagnostic test, was there an independent blind comparison with an appropriate reference standard (e.g., "gold standard")?	N/A
4.	Was method of handling withdrawals described?	N/A
4.1.	Were follow-up methods described and the same for all groups?	N/A
4.2.	Was the number, characteristics of withdrawals (i.e., dropouts, lost to follow up, attrition rate) and/or response rate (cross-sectional studies) described for each group? (Follow up goal for a strong study is 80%.)	N/A
4.3.	Were all enrolled subjects/patients (in the original sample) accounted for?	N/A
4.4.	Were reasons for withdrawals similar across groups?	N/A
4.5.	If diagnostic test, was decision to perform reference test not dependent on results of test under study?	N/A
5.	Was blinding used to prevent introduction of bias?	No
5.1.	In intervention study, were subjects, clinicians/practitioners, and investigators blinded to treatment group, as appropriate?	N/A

5.2.	Were data collectors blinded for outcomes assessment? (If outcome is measured using an objective test, such as a lab value, this criterion is assumed to be met.)	Yes
5.3.	In cohort study or cross-sectional study, were measurements of outcomes and risk factors blinded?	Yes
5.4.	In case control study, was case definition explicit and case ascertainment not influenced by exposure status?	No
5.5.	In diagnostic study, were test results blinded to patient history and other test results?	N/A
6.	Were intervention/therapeutic regimens/exposure factor or procedure and any comparison(s) described in detail? Were intervening factors described?	Yes
6.1.	In RCT or other intervention trial, were protocols described for all regimens studied?	N/A
6.2.	In observational study, were interventions, study settings, and clinicians/provider described?	Yes
6.3.	Was the intensity and duration of the intervention or exposure factor sufficient to produce a meaningful effect?	Yes
6.4.	Was the amount of exposure and, if relevant, subject/patient compliance measured?	Yes
6.5.	Were co-interventions (e.g., ancillary treatments, other therapies) described?	N/A
6.6.	Were extra or unplanned treatments described?	N/A
6.7.	Was the information for 6.4, 6.5, and 6.6 assessed the same way for all groups?	Yes
6.8.	In diagnostic study, were details of test administration and replication sufficient?	N/A
7.	Were outcomes clearly defined and the measurements valid and reliable?	???
7.1.	Were primary and secondary endpoints described and relevant to the question?	N/A
7.2.	Were nutrition measures appropriate to question and outcomes of concern?	Yes
7.3.	Was the period of follow-up long enough for important outcome(s) to occur?	N/A
7.4.	Were the observations and measurements based on standard, valid, and reliable data collection instruments/tests/procedures?	???
7.5.	Was the measurement of effect at an appropriate level of precision?	Yes
7.6.	Were other factors accounted for (measured) that could affect outcomes?	Yes
7.7.	Were the measurements conducted consistently across groups?	Yes

8.	Was the statistical analysis appropriate for the study design and type of outcome indicators?	Yes
8.1.	Were statistical analyses adequately described and the results reported appropriately?	Yes
8.2.	Were correct statistical tests used and assumptions of test not violated?	Yes
8.3.	Were statistics reported with levels of significance and/or confidence intervals?	Yes
8.4.	Was "intent to treat" analysis of outcomes done (and as appropriate, was there an analysis of outcomes for those maximally exposed or a dose-response analysis)?	N/A
8.5.	Were adequate adjustments made for effects of confounding factors that might have affected the outcomes (e.g., multivariate analyses)?	No
8.6.	Was clinical significance as well as statistical significance reported?	Yes
8.7.	If negative findings, was a power calculation reported to address type 2 error?	No
9.	Are conclusions supported by results with biases and limitations taken into consideration?	No
9.1.	Is there a discussion of findings?	Yes
9.2.	Are biases and study limitations identified and discussed?	No
10.	Is bias due to study's funding or sponsorship unlikely?	Yes
10.1.	Were sources of funding and investigators' affiliations described?	Yes
10.2.	Was the study free from apparent conflict of interest?	Yes