

Citation:

Qureshi AI, Suri FK, Ahmed S, Nasar A, Divani AA, Kirmani JF. Regular egg consumption does not increase the risk of stroke and cardiovascular diseases. *Med Sci Monit.* 2007 Jan; 13 (1): CR1-8. Epub 2006 Dec 18.

PubMed ID: [17179903](#)

Study Design:

Prospective cohort study

Class:

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

Research Design and Implementation Rating:

POSITIVE: See Research Design and Implementation Criteria Checklist below.

Research Purpose:

To examine the association between egg consumption and risk of cardiovascular diseases and mortality in a nationally representative cohort of 9,734 adults aged 25 to 74 years.

Inclusion Criteria:

- Age 25-74 years
- Participants from the NHANES-I
- Have data of eggs consumption at baseline.

Exclusion Criteria:

Not available.

Description of Study Protocol:**Recruitment**

Subjects were recruited as part of the first National Health and Nutrition Examination Survey (NHANES-I).

Design

Prospective cohort design study.

Dietary Intake/Dietary Assessment Methodology

Baseline questionnaire (name and description not provided).

Blinding Used

Not applicable.

Intervention

Not applicable.

Statistical Analysis

- Cox proportional hazard analysis was used to estimate the relative risk (RR) for stroke, ischemic stroke, coronary artery disease (CAD) and mortality
- RR for stroke, ischemic stroke, CAD and mortality for various categories of egg consumption was estimated after adjustment for the established cerebrovascular risk factors
- A separate analysis was performed for sub-sets of interest comparing the effect of egg consumption on risk of stroke, ischemic stroke, CAD and mortality. The sub-sets included patients with hypertension (HTN) defined by blood pressure (BP) greater than 140/90mmHg or use of anti-hypertensive medication, diabetes mellitus, hyperlipidemia defined by serum cholesterol greater than 200mg/dL and current cigarette smokers.

Data Collection Summary:

Timing of Measurements

- Subjects were evaluated and completed baseline questionnaires between 1971-1975
- Follow-up occurred between 1982 and 1992.

Independent Variables

Egg consumption was measured at baseline, 1971-1975.

Dependent Variables

Risk of cardiovascular disease was determined by assessing incident stroke and CHD at follow-up using in-person interview with subject or proxy, measurement of pulse, weight, and blood pressure of surviving participants, collection of hospital and nursing home records and collection of death certifications.

Control Variables

- Age
- Gender
- Race/ethnicity
- Systolic blood pressure (SBP)
- Diabetes mellitus
- Serum cholesterol
- Cigarette smoking
- Body mass index (BMI)
- Educational status.

Description of Actual Data Sample:

- *Initial N*: N=13,586
- *Attrition (final N)*: N=9,734

- *Age*: 50±15 years
- *Ethnicity*: White (81.6%); Black and others (18.4%)
- *Other relevant demographics*: Education, gender
- *Anthropometrics*: BMI (25.7±5.1kg/m²)
- *Location*: USA.

Summary of Results:

Weekly egg consumption and risk for stroke, CAD, and mortality among persons with diabetes mellitus in NHANES-I

- After adjusting for differences in age, gender, race, serum cholesterol, BMI, diabetes, blood pressure, educational status and cigarette smoking, no significant (NS) difference was observed between persons who consumed more than six eggs per week compared to those who consumed none or less than one egg per week in regards to stroke, ischemic stroke or CAD
- Sub-group analysis revealed that among diabetics, consumption of more than six eggs per week was associated with an increased risk of CAD (RR 2.0 95% CI 1.0-3.8)
- Egg intake was divided into three groups: None or less than one egg per week, one to six eggs per week, and greater than six eggs per week
- During 15.9±5.6 years of follow-up, 655 strokes and 1,584 MI were observed
- A univariate analysis demonstrated a trend for increased rates of CAD with intake of greater than six eggs per week
- However, in multivariate analysis, there was no relationship with consumption of greater than six eggs per week and risk of stroke or ischemic stroke
- Similarly, compared with persons without any egg intake or less than one egg per week, there was NS difference in RR for persons with intake of greater than six eggs per week for risk of MI.

Author Conclusion:

- The study demonstrated that consumption of greater than six eggs per week or one egg or greater per day did not increase the risk of CAD, ischemic stroke, or all strokes in a cohort representative of US population
- Consumption of more than six eggs per week among diabetics was associated with increased risk of CAD.

Reviewer Comments:

This is a well conducted large prospective study. However, several important confounders such as family history, other dietary factors were not adjusted in the model.

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)	N/A
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?	N/A
4.	Is the intervention or procedure feasible? (NA for some epidemiological studies)	N/A

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?	N/A
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.)	N/A
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?	Yes

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.)	N/A
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?	Yes
4.1.	Were follow-up methods described and the same for all groups?	Yes
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%.)	Yes
4.3.	Were all enrolled subjects/patients (in the original sample) accounted for?	Yes
4.4.	Were reasons for withdrawals similar across groups?	Yes
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?	N/A
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.)	N/A
5.3.	In cohort study or cross-sectional study, were measurements of outcomes and risk factors blinded?	No
5.4.	In case control study, was case definition explicit and case ascertainment not influenced by exposure status?	N/A
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?	N/A

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?	N/A
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?	Yes
7.1.	Were primary and secondary endpoints described and relevant to the question?	Yes
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?	Yes
7.4.	Were the observations and measurements based on standard, valid, and reliable data collection instruments/tests/procedures?	Yes
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)?	Yes
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?	N/A
9.	Are conclusions supported by results with biases and limitations taken into consideration?	Yes
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?	???
10.1.	Were sources of funding and investigators' affiliations described?	???
10.2.	Was the study free from apparent conflict of interest?	???