

Citation:

Silvera SA, Rohan TE, Jain M, Terry PD, Howe GR, Miller AB. Glycemic index, glycemic load, and pancreatic cancer risk (Canada). *Cancer Causes Control*. 2005 May; 16(4): 431-436.

PubMed ID: [15953985](#)

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 pancreatic cancer risk in association with glycemic index (GI), glycemic load (GL) and intake of dietary carbohydrate and sugar.

Inclusion Criteria:

89,835 women aged 40 to 59 years were recruited into the Canadian National Breast Screening Study (NBSS) between 1980 and 1985 from the general Canadian population.

Exclusion Criteria:

- 88 women were excluded with extreme energy intake values [at least three standard deviations (SD) above or below the mean value for caloric intake]
- One woman was excluded with prevalent pancreatic cancer at baseline.

Description of Study Protocol:**Recruitment**

89,835 women aged 40 to 59 years were recruited into the Canadian National Breast Screening Study (NBSS) between 1980 and 1985 from the general Canadian population.

Design

Prospective cohort study.

Dietary Intake/Dietary Assessment Methodology

- At recruitment into the cohort, participants completed a self-administered questionnaire that sought information on demographic characteristics, lifestyle factors (including cigarette

smoking), menstrual and reproductive history and use of oral contraceptives and replacement estrogens

- Starting in 1982, a self-administered food-frequency questionnaire (FFQ) was distributed to all new attendees at all screening centers, and to women returning to the screening centers for re-screening. The FFQ sought information on usual portion size and frequency of consumption of 86 food items, and included photographs of various portion sizes to assist respondents with quantifying intake
- A total of 49,613 dietary questionnaires were returned and available for analysis.

Statistical Analysis

- Cox proportional hazards models (using age as the time scale) were used to estimate hazard ratios (HR) and 95% CI for the association between energy-adjusted quartile levels of glycemic load, overall glycemic index, total carbohydrates, sucrose, fructose and total sugar, and pancreatic cancer risk; energy adjustment was performed using the residual method. For these analyses, cases contributed person-time to the study from their date of enrollment until the date of diagnosis of their pancreatic cancer, and non-cases contributed person-time from their date of enrollment until the termination of follow-up (the date to which cancer incidence data were available for women in the corresponding province) or death, whichever occurred earlier
- Multivariate models included body mass index (BMI) [defined as weight (kg)/height (m²); weight and height were measured at baseline, self-reported alcohol consumption (frequency of consumption of beer, wine and liquor) and smoking history (in pack years, defined as the number of cigarettes per day multiplied by how many years they reported smoking), energy intake (kcal per day), study center and randomization group
- To test for trend the median value of each quartile was fitted as an ordinal variable in the risk models, and evaluated the statistical significance of the coefficient using the Wald test
- All analyses were performed using SAS version 8 (SAS Institute Cary, NC).

Data Collection Summary:

Timing of Measurements

- The average duration of follow-up for cohort members was 16.5 (809,492 person-years), during which 112 cases of pancreatic cancer were diagnosed
- The mean (SD) age at diagnosis for the cases was 61.7±7.3 years
- For the cohort as a whole, the means (±SD) of the energy-adjusted overall glycemic index and glycemic load were 79.4±24.5 and 147.2±35.1 g per day, respectively.

Dependent Variables

Pancreatic cancer risk.

Independent Variables

- Glycemic index
- Glycemic load
- Total carbohydrate intake
- Total sugar intake.

Description of Actual Data Sample:

- *Initial N*: 49,613
- *Attrition (final N)*: 49,111
- *Age*: 40 to 59 years
- *Location*: Canada.

Summary of Results:

Key Findings

- There was no association between overall glycemic index, glycemic load, total carbohydrate and total sugar intake and pancreatic cancer risk
- In multivariate adjusted models, the hazard ratio (HR) for the highest vs. lowest quartile levels of overall GI and GL were 1.43 (95% CI: 0.56 to 3.65, P=0.58) and 0.80 (95% CI: 0.45 to 1.41, P=0.41), respectively.

Author Conclusion:

Overall glycemic index and glycemic load, as well as total sugar and total carbohydrate intake, are not associated with pancreatic cancer risk.

Reviewer Comments:

None.

Research Design and Implementation Criteria Checklist: Primary Research

Relevance Questions

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| 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

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| 1. | Was the research question clearly stated? | Yes |
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| 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? | Yes |
| 3.1. | Was the method of assigning subjects/patients to groups described and unbiased? (Method of randomization identified if RCT) | Yes |
| 3.2. | Were distribution of disease status, prognostic factors, and other factors (e.g., demographics) similar across study groups at baseline? | Yes |
| 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 |

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| 4.3. | Were all enrolled subjects/patients (in the original sample) accounted for? | ??? |
| 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? | Yes |
| 5.1. | In intervention study, were subjects, clinicians/practitioners, and investigators blinded to treatment group, as appropriate? | Yes |
| 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? | 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? | 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? | 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 |

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| 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? | N/A |
| 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? | N/A |
| 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? | Yes |
| 10. | Is bias due to study's funding or sponsorship unlikely? | Yes |
| 10.1. | Were sources of funding and investigators' affiliations described? | No |
| 10.2. | Was the study free from apparent conflict of interest? | ??? |