

Citation:

Mehlig K, Skoog I, Guo X, Schütze M, Gustafson D, Waern M, Ostling S, Björkelund C, Lissner L. Alcoholic beverages and incidence of dementia: 34-year follow-up of the prospective population study of women in Goteborg. *Am J Epidemiol*. 2008 Mar 15;167(6):684-91. Epub 2008 Jan 24.

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Study Design:

Prospective Cohort Study

Class:

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

Research Design and Implementation Rating:

NEUTRAL: See Research Design and Implementation Criteria Checklist below.

Research Purpose:

To assess the association between different types of alcoholic beverages and 34-year incidence of dementia.

Inclusion Criteria:

- Women aged 38 - 60 years living in Goteborg, Sweden in 1968 - 1969

Exclusion Criteria:

- 4 women did not respond to the questions about alcohol intake at the baseline examination and were excluded from analysis

Description of Study Protocol:**Recruitment**

- The Prospective Population Study of Women in Goteborg, Sweden, started in 1968-1969 with a cross-sectional survey of women aged 38, 46, 50, 54 and 60 years
- To ensure a representative sample of women in Goteborg in 1968, 1,622 women were chosen randomly from the Revenue Office Register, according to their date of birth

Design: Prospective cohort study

Blinding used (if applicable): not applicable

Intervention (if applicable): not applicable

Statistical Analysis

- At baseline as well as in 1974-1975, 1980-1981 and 1992-1993, the frequency of alcohol intake, as well as other lifestyle and health factors, was recorded and related to dementia with Cox proportional hazard regression, by use of both baseline and updated covariates
- To avoid the influence of recent changes in drinking or smoking habits caused by dementia, robustness of results was tested by accepting updated covariates only if they had been measured at least 10 years before diagnosis

Data Collection Summary:

Timing of Measurements

- At baseline as well as in 1974-1975, 1980-1981, and 1992-1993, the frequency of alcohol intake, as well as other lifestyle and health factors, was recorded.
- Alcohol exposure reported during the 2000-2001 examination occurred after most diagnoses of dementia

Dependent Variables

- 34-year incidence of dementia
- Neuropsychiatric examinations were performed by psychiatrists and experienced psychiatric nurses

Independent Variables

- Different types of alcoholic beverages
- At each examination, women were asked about the average intake frequency of 3 different types of alcoholic drinks, namely beer, wine and spirits

Control Variables

- Hypertension
- BMI
- Serum triglycerides and cholesterol
- Medical history of diabetes, stroke and infarction
- Smoking
- Leisure-time physical activity
- Education
- Socioeconomic status

Description of Actual Data Sample:

Initial N: 1,622 women chosen randomly from the Revenue Office Register

Attrition (final N): 1,462 women participated in the baseline health examination (90.1%). The women were later invited for reexamination in 1974-1975 (91%), 1980-1981 (83%), 1992-1993 (70%) and 2000-2001 (71%). 636 women died from 1968 - 2002.

Age: aged 38 - 60 years in 1968-1969

Ethnicity: not reported, assumed Caucasian

Other relevant demographics:

Anthropometrics

Location: Sweden

Summary of Results:

Key Findings:

- 164 cases of dementia were diagnosed by 2002
- Wine was protective for dementia (hazard ratio = 0.6, 95% confidence interval: 0.4, 0.8) in the updated model, and the association was strongest among women who consumed wine only (hazard ratio = 0.3, 95% confidence interval: 0.1, 0.8).
- After stratification by smoking, the protective association of wine was stronger among smokers.
- In contrast, consumption of spirits at baseline was associated with slightly increased risk of dementia (hazard ratio = 1.5, 95% confidence interval: 1.0, 2.2).

Results for Survival until Diagnosis of Dementia, Goteborg, Sweden, 1968 - 2002

| Time Dependence of Covariate Exposure | Age-Adjusted Model: Hazard Ratio (95% CI) | Multivariate Model: Hazard Ratio (95% CI) |
|---------------------------------------|---|---|
| Constant Covariates (baseline values) | | |
| Wine | 0.78 (0.54, 1.12) | 0.82 (0.56, 1.19) |
| Beer | 1.14 (0.79, 1.66) | 1.21 (0.82, 1.80) |
| Spirits | 1.59 (1.09, 2.30) | 1.45 (0.98, 2.15) |
| Updated Covariates (1968 - 1992) | | |
| Wine | 0.58 (0.40, 0.85) | 0.56 (0.38, 0.82) |
| Beer | 1.12 (0.79, 1.57) | 1.18 (0.83, 1.69) |
| Spirits | 1.32 (0.91, 1.90) | 1.16 (0.80, 1.69) |

Other Findings

- Smoking was found to be an independent risk factor for dementia
- Smoking was associated with mortality competing with dementia, in both the baseline (hazard ratio = 1.95, 95% confidence interval: 1.61, 2.35) and the updated models (hazard ratio = 1.68, 95% confidence interval: 1.39, 2.03)

Author Conclusion:

In summary, the fact that we do not observe a significant association between total intake of alcoholic beverages and dementia may be a consequence of the opposing trends of wine and spirits described in this article. The relative strength of the association between wine and dementia

in smokers compared with nonsmokers is an observation that requires further investigation. This includes subtypes of dementia with Alzheimer's disease and vascular dementia being the most common, which will become increasingly feasible as the cohort ages and the number of incident cases increases. Additionally, it will be important to study the association between alcoholic beverages and dementia in male cohorts, where consumption of beer and spirits is expected to have a higher prevalence than among women.

Reviewer Comments:

Large cohort. Several measurements made over time. Authors note the following limitations:

- *Lack of information about the amount of intake of the different alcoholic beverages*
- *Possible underreporting of alcohol intake*
- *Difficulty to avoid reverse causation*
- *Lack of knowledge about the type of wine and other dietary sources of antioxidants as well as other sources of free radicals*

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? | Yes |
| 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? | 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.) | 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? | 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? | Yes |

| | | |
|-----------|---|------------|
| 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? | 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? | ??? |
| 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? | No |
| 7.6. | Were other factors accounted for (measured) that could affect outcomes? | No |

| | | |
|------------|--|------------|
| 7.7. | Were the measurements conducted consistently across groups? | N/A |
| 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? | Yes |
| 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 |

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