

The Relation of **Type 2 Diabetes** and **Breast Cancer** **Incidence**

in Asian, Hispanic and African American Populations
—A Review

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Reference:

Canadian Journal of Diabetes

journal homepage:

www.canadianjournalofdiabetes.com





view

- **Introduction**
- **Methods**
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- **Conclusions**
- **References**

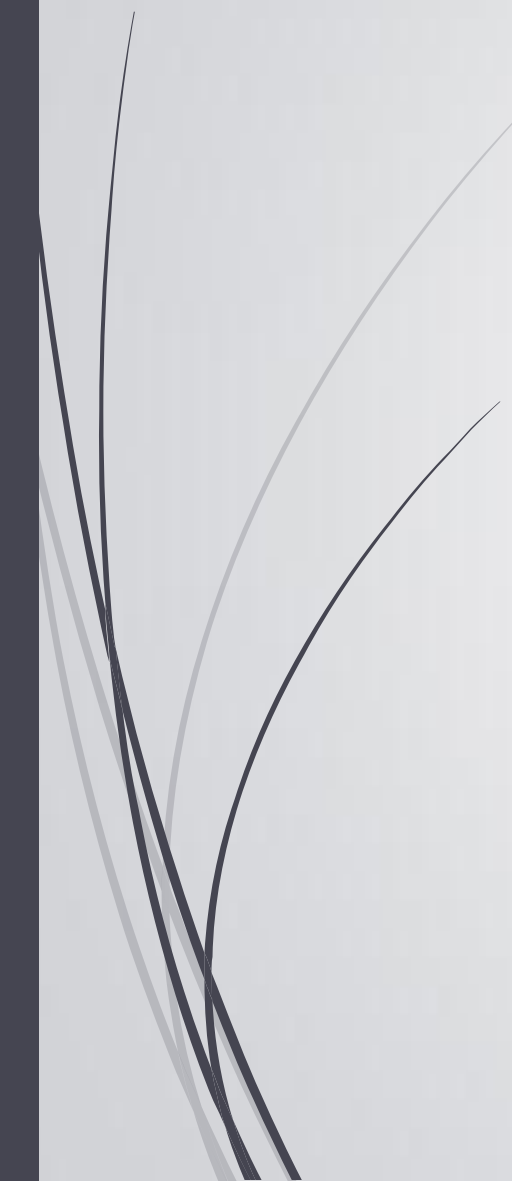


Introduction

- ▶ **History:**
total age-adjusted studies : 15
different countries in Asia: 11
Hispanics: 3
African-American: 1
- ▶ **studies of Asian-women significant associations in 8 reports, with high risk estimates**
- ▶ **Studies of Hispanic-women weak association limited to postmenopausal women**
- ▶ **Study of African-American no significant association**



Summary:

- ▶ **10% to 20% higher risk for breast cancer associated with diabetes reported for Caucasian women**
 - ▶ **little evidence for an association in Hispanics and African Americans**
 - ▶ **higher risk for Asian women**
- 

Methods


- ▶ prevalence of diabetes is 2 to 3 times higher in many non-Caucasian groups than in Caucasian groups
- ▶ Breast cancer is the most common cancer among women

highest rates occurring in North America, Australia and Europe

lowest rates occurring in large parts of Africa and Asia

- ▶ The prevalence of obesity is increasing at a rapid rate
- ▶ the major modifiable risk factor for diabetes
- ▶ the most important risk factor for postmenopausal breast cancer





▶ **in Caucasian** considerable evidence of an association between diabetes and a higher breast cancer risk **independent of obesity**

- Two meta analyses reported a nearly **20% higher risk** for breast cancer in women with diabetes

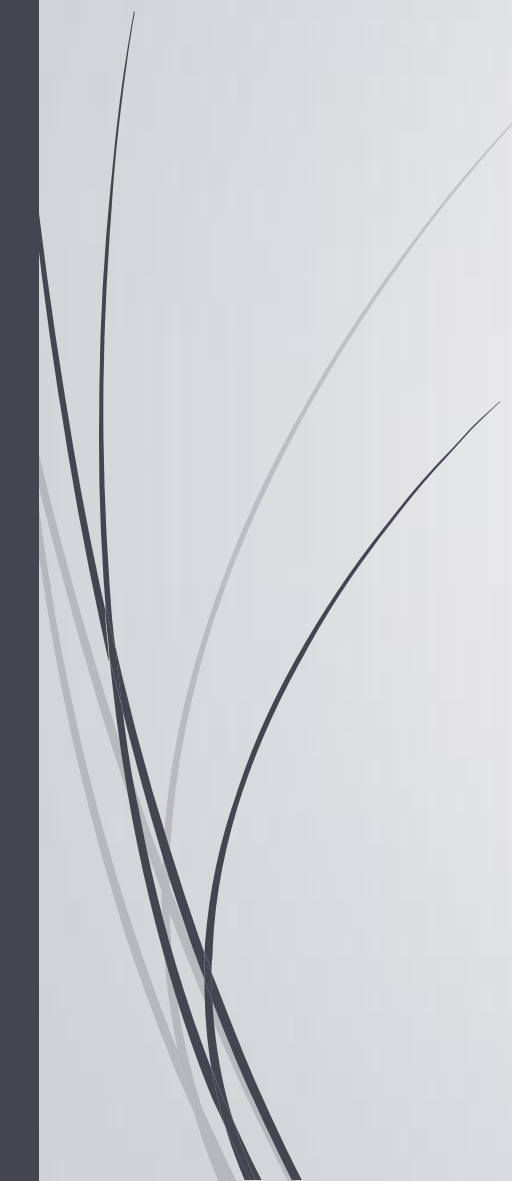
- a larger review of 40 studies found:
a relative risk of **1.16** for BMI-adjusted studies
a RR of **1.33** in studies that did not include BMI as a confounder

▶ **similar risk** for breast cancer in women with & without diabetes from **Asia** compares to **Europe & North America**

▶ a more recent meta-analysis showed a stronger association in studies from **Europe** as compared to Asia



Methodologic shortcomings

- ▶ **lack of adjustment for obesity**
 - ▶ **use of a general population as controls**
 - ▶ **case-control design**
 - ▶ **small sample sizes**
- 

Results:

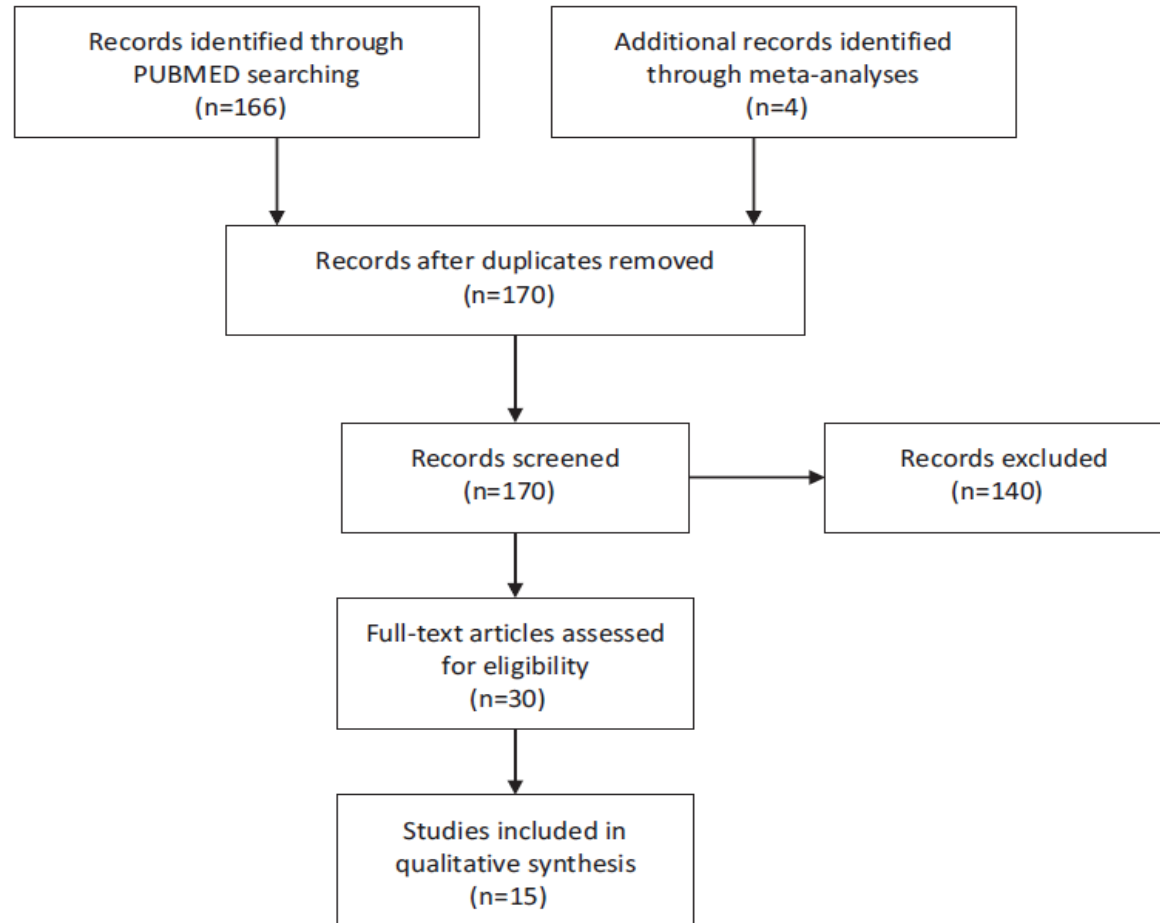


Figure 1. Flow diagram of study selection for systematic review.

Results:

- 15 reports refer to epidemiologic investigations that examined the association between diabetes and breast cancer incidence

9
cohort
study

6
case-
control
study

- 3 studies used general population as control
- 6 studies used women without breast cancer served as comparison
- population-based sources as control
- Clinical settings

- All risk estimates were adjusted for age
- 6 of the studies of Asians were not able to adjust the models for BMI
- number of breast cancer cases ranged from 36 to 1380
- cohort sizes varied from 4155 women with diabetes to more than 400,000 Korean health-plan members
- All studies except 1 of Hispanic women, were conducted uniquely within a single ethnic group



Discussion

- **Little** evidence for a higher risk of breast cancer with diabetes among **Asian, Hispanic** and **African American** women
- significant relative risk estimates, some of the higher risk estimates may have been affected by the lack of control for BMI and other covariates in **Asian**

may have been affected by **the lack of control for BMI and other covariates**
- largest investigation based on **prospective cohorts** detected **no significant association**

Confidence interval

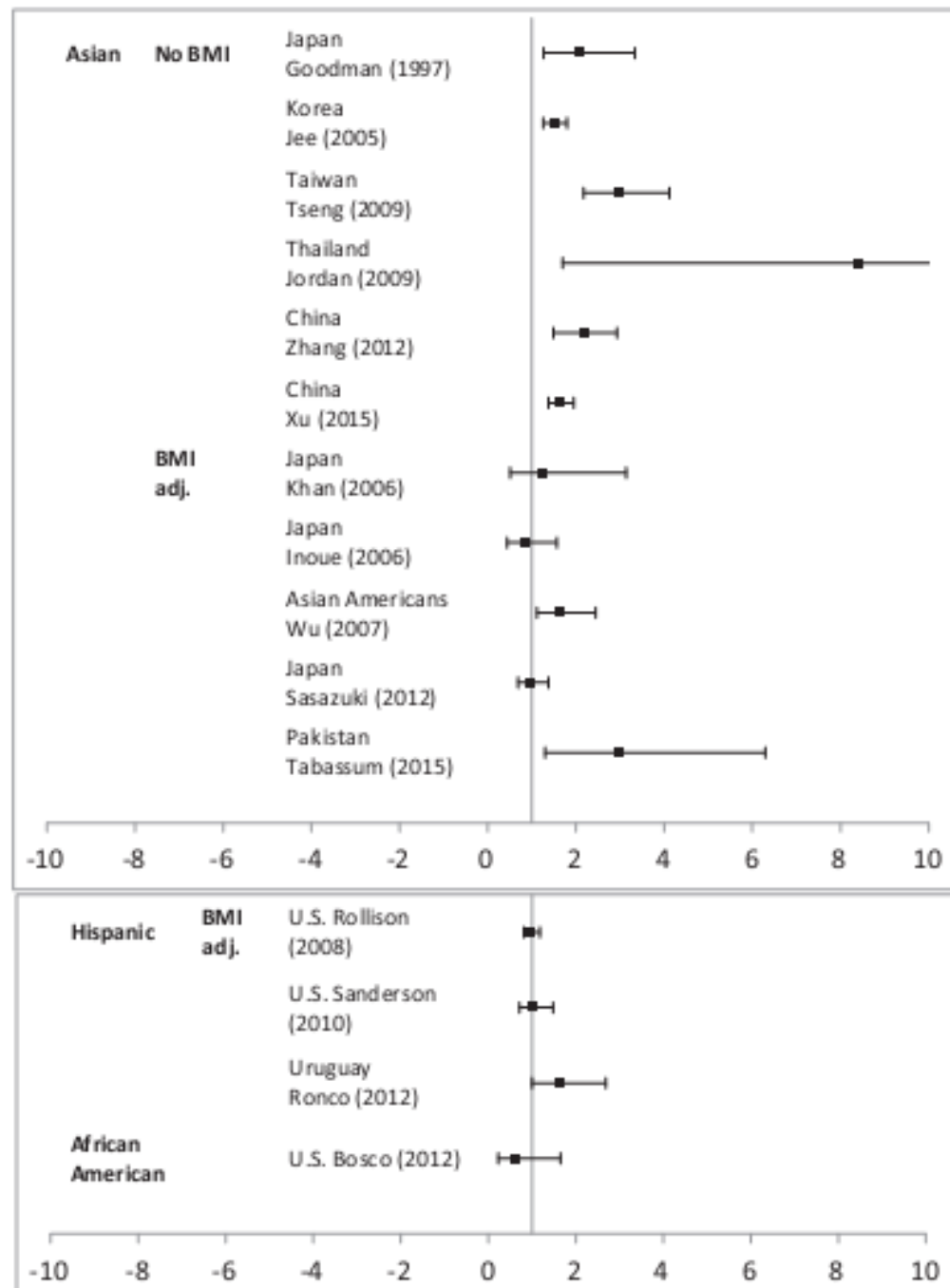
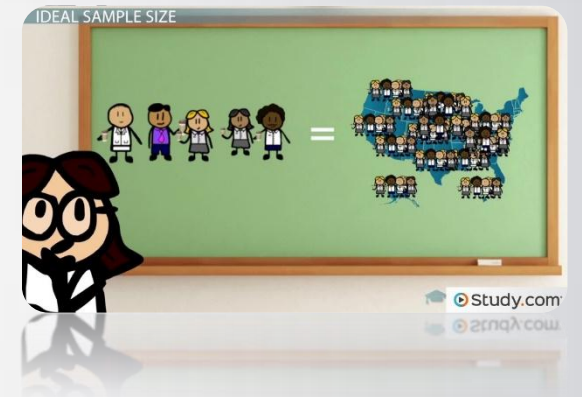


Figure 2. Risk estimates for the association of type 2 diabetes and breast cancer for 3 ethnic groups. *adj.*, adjusted body mass index; *BMI*, body mass index.

Discussion

Reasons responsible for the inconclusive results

- ▶ small samples sizes
- ▶ low power



it remains **unclear** whether the magnitude of this association differs by ethnic background

Cont.

Hypothesized reasons of effects on the association in different ethnics:



- visceral fat
- Adipokines
- chronic inflammation

Challenges

- ▶ assess the influence of treatment and glucose control across populations
 - possible protective effect of metformin
 - adverse influence of certain insulin preparations





Discussion cont.

- ▶ Just as **obesity** constitutes a risk factor primarily for **hormone receptor-positive** and not triple-negative breast cancer, diabetes may increase the risk factor for some molecular breast cancer **subtypes** and not others

thereby, contribute to the racial/ethnic-specific incidence of breast cancer subtypes

- ▶ observations for association between diabetes and breast cancer in **European women** may be more closely related to **shared lifestyle factors** and **residual confounding** than to a **direct association**



Cont.

- ▶ **Strengths** of the current review include:
 - the geographic diversity,
 - the high percentage of prospective designs,
 - the generally sound procedures for the ascertainment of diabetes and breast cancer diagnoses,
 - the adjustment for many relevant confounders in a large proportion of the studies

Cont.

▶ **Methodologic concerns** include

diverse study designs and control populations,

small numbers of cases,

differences in the definition of diabetes,

uncontrolled confounding factors, e.g.,

- physical activity,

- diet,

- family history of breast cancer

- reproductive characteristics in some reports

Cont.

- ▶ no definite conclusions are possible for Hispanic & African-American
- ▶ Significantly elevated risk estimates **only for Asian women**, but caution is necessary
- ▶ that risk maybe confined to **postmenopausal women**, but the mortality investigation in **Taiwan** indicated a stronger association in **younger women**
- ▶ influence of diabetes diagnoses on **survival** in women with breast cancer:

long-term all-cause mortality in 2 systematic reviews involving primarily **Caucasian** women with breast cancer and with **preexisting diabetes**



Conclusions

- more comprehensive data collection and analysis will be necessary
- Probable **causes** of observed ethnic differences
- The potential importance and implications of finding ethnic-based differences include **more intensive breast cancer screening** in women with diabetes from **certain ethnic populations that are at high risk.**



THANK
YOU