Sex and Race Modify the Association Between Lifetime Cardiovascular Disease Risk and Cancer: The Bogalusa Heart Study

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Introduction

- Atherosclerotic cardiovascular disease (ASCVD) and cancer are the leading causes of mortality both nationally and globally
- ASCVD risk factor burden has increased among young adults, while cancer mortality has begun to surpass ASCVD-attributable deaths, especially in wealthy nations
- These epidemiological trends underline a need to study the natural course of ASCVD and cancer conjointly, beginning in childhood

Objectives

1) Assess the independent relationship(s) between traditional ASCVD risk factors over the life-course and adult onset-cancer

2) Identify potential sex and/or race differences in the association between ASCVD risk and cancer

Affiliations

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Methods

Sample Characteristics

N = 1,354

32.9% Black

57.8% Women

Median Follow-Up: 38.7 years

Follow Up ASCVD Risk Factors:
- BMI: 31.2 $\pm$ 7.8 kg/m^2
- Non-HDL-C: 126.9 $\pm$ 44.0 mg/dL
- SBP: 123.0 $\pm$ 16.6 mmHg

Independent Variables

Biological ASCVD Risk Factors:

Systolic blood pressure Diastolic blood pressure
Fasting blood glucose Fasting serum triglycerides
Body mass index Non-HDL-C HDL-C

Covariates and Lifestyle ASCVD Risk Factors:

Sex, race, cigarette smoking, alcohol drinking

Dependent Variables

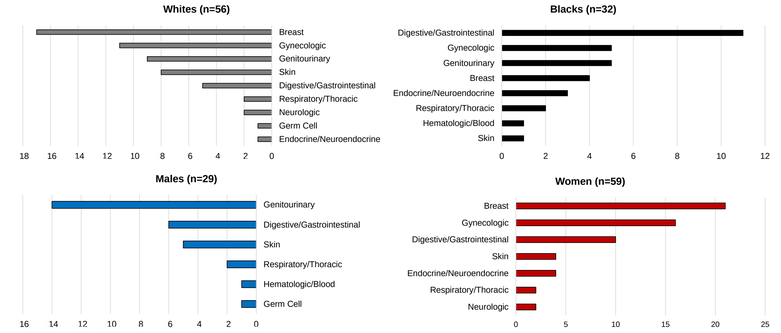
Cancer incidence data was obtained through the Louisiana Tumor Registry

Statistics

Multivariable-adjusted Cox proportional hazards regression

Results

Figure 1. Incident Cancer Cases (n=88) Stratified by Race and Sex.



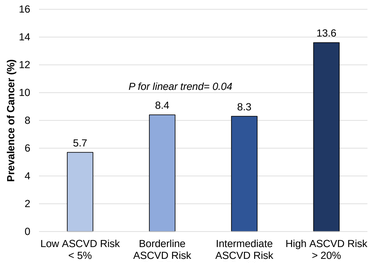


Figure 2. Prevalence of Cancer Across 10-Year ASCVD Risk Categories at Follow-Up

Table 2. Hazard of Incident Cancer Associated with Traditional Cardiovascular Disease Risk Factors

Annualized Change in Risk Factor	All (n = 1,354) HR (95% CI)	P-value	Whites (n = 908) HR (95% CI)	P-value	Blacks (n=446) HR (95% CI)	P-value	Interaction P-value	Men (n = 573) HR (95% CI)	P-value	Women (n = 781) HR (95% CI)	P-value	Interaction P-value
Systolic blood pressure (mmHg per year)	1.65 (1.06, 2.58)	0.03*	1.81 (0.92, 3.57)	0.09	1.36 (0.70, 2.65)	0.37	0.94	0.62 (0.23, 1.66)	0.34	2.11 (1.26, 3.54)	<0.01*	0.01*
Diastolic blood pressure (mmHg per year)	2.79 (1.50, 5.19)	<0.01*	2.40 (0.93, 6.20)	0.07	1.88 (0.78, 4.54)	0.16	0.86	1.32 (0.40, 4.38)	0.65	3.42 (1.69, 6.95)	<0.01*	0.03*
Non-HDL-cholesterol (mg/dL per year)	1.09 (0.90, 1.33)	0.38	1.04 (0.76, 1.41)	0.82	1.35 (0.98, 1.85)	0.07	0.65	1.01 (0.63, 1.63)	0.97	1.07 (0.86, 1.33)	0.56	0.26
HDL-cholesterol (mg/dL per year)	0.90 (0.65, 1.24)	0.50	1.06 (0.68, 1.65)	0.81	0.47 (0.25, 0.89)	0.02*	0.03*	1.03 (0.47, 2.25)	0.94	0.88 (0.62, 1.25)	0.48	0.97
Triglycerides (mg/dL per year)	0.99 (0.87, 1.12)	0.85	0.97 (0.82, 1.13)	0.65	1.06 (0.86, 1.31)	0.60	0.15	0.99 (0.80, 1.23)	0.83	1.00 (0.86, 1.17)	0.99	0.38
Glucose (mg/dL per year)	1.09 (0.70, 1.68)	0.71	1.18 (0.67, 2.06)	0.57	0.81 (0.40, 1.62)	0.55	0.32	1.08 (0.55, 2.09)	0.83	1.07 (0.61, 1.88)	0.80	0.91
Body mass index (kg/m^2 per year)	2.80 (0.92, 6.70)	0.07	2.14 (0.52, 8.86)	0.29	2.47 (0.43, 14.21)	0.31	0.68	6.20 (0.75, 51.46)	0.09	2.08 (0.65, 6.69)	0.22	0.93

Model = sex, race, blood pressure-lowering medication, lipid-lowering medication, glucose-lowering medication, smoking, drinking, annualized change in systolic blood pressure, diastolic blood pressure, total cholesterol, LDL-cholesterol, HDL-cholesterol, glucose, triglycerides, body mass index. *statistically significant p-value (<0.05)

Conclusions

- Preservation of normotension and a non-atherogenic lipid profile throughout the lifespan may improve cancer prevention in a race- and sex-specific fashion
- This is one of the first population-based studies to examine the role of ASCVD risk factors, beginning in childhood, and incident cancer in adulthood
- Future studies should assess the role of ASCVD risk factors with specific cancer to develop more precise primary prevention strategies