Fish and Dairy Consumption and reduced risk of breast Cancer

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Introduction

Diet is a modifiable risk factor for cancer. Previous studies examining the association between diet and breast cancer have shown variable results. The present study examines the relationship between dietary intake of fish and dairy products and breast cancer risk in a large nested case-control study.

Study Aim

To examine the association between diat and risk breast cancer.

Methods

Overview of the Study

▪**The Global Epidemiology Study**: The Global Epidemiology Study (GES) is a multinational study to assess disease risk factors. Subjects were recruited to the GES from countries including the United States, Tunisia and Poland. The GES is linked to the Global Repository that houses biomaterial. For breast cancer, newly diagnosed subjects provided informed consent and were asked about dietary preferences during in-person interviews using the same survey instrument.

▪**Participants**: We examined the association between exercise and breast cancer risk among 1,450 breast cancer cases and 3,774 cancer-free controls frequency matched in age, gender, race and body mass index.

Design of Current Project

▪**Participants:** 1,450 breast cancer cases and 3,774 controls (total=5,224)

Inclusion criteria:

- Diet data available
- Race of Caucasian-Americans, African-Americans, Hispanic-Americans, Tunisian-Arabs, and Polish-Caucasians (Asians were excluded due to unavailability of controls)

Covariate data: Data from the baseline questionnaire and medical assessment included data on age, race, diet, physical activity, cancer family history, cancer histology, cancer stage, tumor receptor status and lymph node involvement.

Statistical Analyses:

•Cross tabulations with Chi square tests and t-tests were conducted to determine the association between cancer status and potential confounders.

•Unconditional logistic regression was used to compute odds ratios (ORs) and 95% confidence intervals (CIs). The variables used in the multivariate analyses were age, pack-years of smoking and BMI as continuous variables and race as a categorical variable.

•Potential confounding of the association between diet and cancer risk was explored using Spearman rank correlation analyses and multivariate logistic regression models, including stepwise regression models. If the potential confounder caused a >20% change in the β coefficient, it was kept in the model for further analyses.

•All p-values shown are 2-sided.

•All statistical analyses were performed using the software package STATA (STATA Corporation, College Station, TX).

Results

Table 1. Crosstabs of Demographics and Health Behavior Indicators

Characteristic	All Controls (N=3774)	All Cases (N=1450)	P-Value	Caucasian American Controls (N=2217)	Caucasian American Cases (N=941)	P-Value	African American Controls (N=281)	African American Cases (N=92)	P-Value
Age (Years)*	56 [11.57]	59 [13.05]	<0.0001	57.54 [11.93]	61.29 [13.45]	<0.0001	50.54 [10.16]	56.43 [13.23]	<0.0001
Smoking Never Former Current	2386 (63.47%) 683 (18.17%) 690 (18.36%)	864 (60.38%) 410 (28.65%) 157 (10.97%)	<0.0001	1304 (58.98%) 533 (24.11%) 374 (16.92%)	497 (53.61%) 321 (34.63%) 109 (11.76%)	<0.0001	119 (42.65%) 33 (11.83%) 127 (45.52%)	50 (55.56%) 27 (30.00%) 13 (14.44%)	<0.0001
Cigarettes per day*	5.54 [9.94]	6.39 [10.62]	<0.007	6.63 [11.14]	8.00 [11.85]	<0.003	6.59 [8.74]	4.48 [6.67]	<0.04
Cigarettes smoking years*	7.57 [12.71]	8.80 [14.00]	<0.003	8.45 [13.43]	10.30 [14.87]	<0.0007	10.92 [12.99]	10.53 [15.30]	<0.81
Former smokers Years since quitting*	16.77 [12.30]	17.53 [13.38]	0.36	18.54 [12.47]	19.67 [13.63]	0.23	9.33 [9.45]	11.83 [10.13]	0.38
Smoking pack years*	6.45 [13.75]	7.84 [15.76]	<0.002	7.70 [15.61]	9.87 [17.93]	<0.0007	7.2 [11.69]	6.05 [11.22]	0.42
Alcohol No Yes	2570 (67.74%) 1224 (32.26%)	1096 (76.01%) 346 (23.99%)	<0.0001	1379 (62.43%) 830 (37.57%)	640 (68.67%) 292 (31.33%)	<0.001	187 (66.79%) 93 (33.21%)	72 (79.12%) 19 (20.88%)	<0.03
Alcohol drinks number*	1.11 [2.82]	0.86 [2.62]	<0.004	1.45 [3.12]	1.18 [2.98]	<0.03	1.41 [3.99]	0.78 [3.26]	0.17
Vegetables (servs/day)*	2.02 [1.19]	2.04 [1.16]	<0.5	2.25 [1.30]	2.30 [1.24]	<0.34	2.26 [1.29]	1.72 [0.97]	<0.0003
Fruits (servings/day)*	1.79 [1.12]	1.85 [1.13]	<0.1	1.87 [1.19]	1.96 [1.18]	<0.05	2.01 [1.53]	1.64 [1.24]	<0.04
Wholegrains (servs/day)*	1.53 [1.26]	1.52 [1.19]	<0.88	1.78 [1.38]	1.81 [1.21]	<0.56	1.77 [1.19]	1.46 [1.12]	<0.03
Dairy prod. (servs/day)*	1.72 [1.19]	1.62 [1.09]	<0.004	1.81 [1.28]	1.72 [1.13]	<0.08	1.98 [1.28]	1.23 [1.10]	<0.0001
Red meat (Times/week)*	2.68 [1.87]	2.60 [1.80]	<0.15	2.59 [1.87]	2.55 [1.82]	<0.59	3.20 [2.66]	2.38 [1.90]	<0.007
Fish (Times/week)*	1.37 [1.20]	1.25 [1.13]	<0.002	1.37 [1.24]	1.23 [1.18]	<0.003	1.98 [1.77]	1.62 [1.42]	0.09
BMI, Kg/m^2*	27.23 [5.61]	27.78 [6.08]	<0.002	27.30 [5.93]	27.66 [6.39]	<0.13	30.78 [6.78]	30.27 [6.87]	0.54

Characteristic	Hispanic Controls (N=236)	Hispanic Cases (N=59)	P-Value	Polish Controls (N=697)	Polish Cases (N=231)	P-Value	Arab Controls (N=249)	Arab Cases (N=91)	P-Value
Age (Years)*	60.16 [15.36]	60.20 [15.53]	0.99	56.36 [6.47]	57.89 [9.42]	<0.006	44.71 [7.89]	50.31 [10.22]	<0.0001
Smoking Never Former Current	186 (79.83%) 28 (12.02%) 19 (8.15%)	45 (78.95%) 11 (19.30%) 1 (1.75%)	0.1	478 (68.78%) 68 (9.78%) 149 (21.44%)	157 (67.97%) 45 (19.48%) 29 (12.55%)	<0.0001	243 (98.38%) 2 (0.81%) 2 (0.81%)	89 (98.89%) 0 (0%) 1 (1.11%)	0.07
Cigarettes per day*	1.89 [5.94]	3.50 [8.21]	0.09	4.63 [7.78]	4.41 [7.81]	0.72	0.20 [1.67]	0.11 [1.05]	0.63
Cigarettes smoking years*	3.11 [8.95]	5.25 [12.15]	0.14	7.66 [12.44]	6.87 [11.74]	0.4	0.23 [1.77]	0.14 [1.37]	0.69
Former smokers Years since quitting*	16.12 [12.23]	11.83 [9.60]	0.20	7.13 [6.51]	8.03 [7.50]	0.52	- []	- []	
Smoking pack years*	1.98 [7.37]	4.26 [12.38]	0.07	5.90 [10.77]	4.83 [9.69]	0.18	0.14 [1.21]	0.07 [0.69]	0.60
Alcohol No Yes	192 (82.05%) 42 (17.95%)	50 (86.21%) 8 (13.79%)	0.45	483 (69.30%) 214 (30.70%)	211 (92.54%) 17 (7.46%)	<0.0001	244 (100%) 0 (0%)	90 (100%) 0 (0%)	-
Alcohol drinks number*	0.41 [1.43]	0.25 [1.04]	0.44	0.54 [1.13]	0.12 [0.51]	<0.0001	0 [-]	0 [-]	-
Vegetables (servs/day)*	1.60 [0.89]	1.68 [1.03]	0.57	1.41 [0.72]	1.42 [0.77]	0.86	1.91 [0.30]	1.69 [0.46]	<0.0001
Fruits (servings/day)*	1.70 [0.98]	1.95 [1.46]	0.13	1.47 [0.85]	1.40 [0.85]	0.30	1.90 [0.31]	1.97 [0.18]	<0.04
Wholegrains (servs/day)*	1.46 [0.96]	1.95 [1.09]	<0.001	0.80 [0.79]	0.60 [0.74]	<0.001	1.02 [0.34]	0.80 [0.43]	<0.0001
Dairy prod. (servs/day)*	1.67 [1.14]	1.22 [0.83]	<0.006	1.65 [1.01]	1.68 [1.06]	0.67	1.11 [0.38]	1.15 [0.36]	0.29
Red meat (Times/week)*	2.25 [1.71]	2.98 [2.12]	<0.006	3.25 [1.56]	3.10 [1.84]	0.21	1.80 [0.62]	2.04 [0.65]	<0.002
Fish (Times/week)*	1.21 [1.08]	1.14 [1.15]	0.69	1.24 [0.88]	1.37 [0.98]	<0.05	1.15 [0.43]	0.98 [0.15]	<0.0002
BMI, Kg/m^2*	28.87 [5.34]	29.44 [5.94]	0.47	26.27 [3.97]	27.70 [4.96]	<0.0001	24.19 [2.12]	26.89 [3.10]	<0.0001

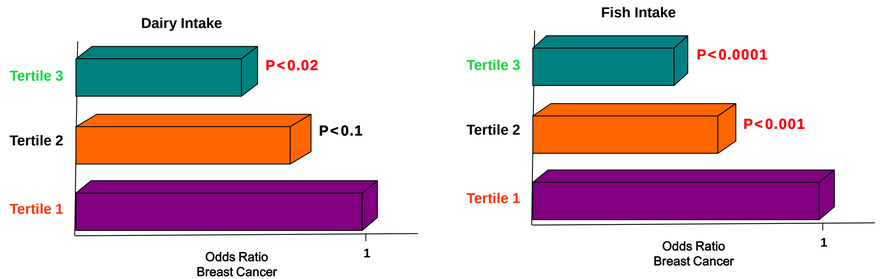
* Mean [Standard Deviation]

Table 2. Body Mass Index and Breast Cancer Risk

	Overall OR (95% CI) [$^{Cases}/_{Controls}$]	Caucasian-American OR (95% CI) [$^{Cases}/_{Controls}$]	African-American OR (95% CI) [$^{Cases}/_{Controls}$]
Dairy prod. (Servs/day)*			
Tertile 1: <1	1.0 (ref) [158/344]	1.0 (ref) [91/199]	1.0 (ref) [24/17]
Tertile 2: 1-2	0.84 (0.68-1.04) [551/1499]	0.86 (0.65-1.15) [315/819]	0.28 (0.13-0.59) [35/100]
Tertile 3: >2	0.78 (0.63-0.96) [663/1919]	0.90 (0.68-1.18) [466/1190]	0.17 (0.08-0.36) [29/163]
	P_{trend}<0.02	P_{trend}<0.87	P_{trend}<0.0001
Fish (Times/week)*			
Tertile 1: <1	1.0 (ref) [310/642]	1.0 (ref) [242/457]	1.0 (ref) [13/19]
Tertile 2: 1-2	0.75 (0.64-0.89) [663/1878]	0.69 (0.56-0.84) [361/984]	0.60 (0.25-1.42) [44/116]
Tertile 3: >2	0.64 (0.53-0.77) [399/1240]	0.60 (0.48-0.74) [265/765]	0.33 (0.14-0.80) [33/144]
	P_{trend}<0.0001	P_{trend}<0.0001	P_{trend} <0.005
	Hispanic-American OR (95% CI) [$^{Cases}/_{Controls}$]	**Tunisian-Arab OR (95% CI) [$^{Cases}/_{Controls}$]**	**Polish-Caucasian OR (95% CI) [$^{Cases}/_{Controls}$]**
Dairy prod. (Servs/day)*			
Tertile 1: <1	1.0 (ref) [11/21]	1.0 (ref) [26/88]	1.0 (ref) [0/6]
Tertile 2: 1-2	0.46 (0.20-1.09) [24/101]	1.29 (0.76-2.17) [86/223]	- () [77/210]
Tertile 3: >2	0.32 (0.13-0.78) [20/114]	0.99 (0.60-1.65) [119/385]	- () [14/32]
	P_{trend}<0.02	P_{trend}<0.48	P_{trend}<0.22
Fish (Times/week)*			
Tertile 1: <1	1.0 (ref) [17/54]	1.0 (ref) [24/92]	1.0 (ref) [2/5]
Tertile 2: 1-2	0.65 (0.32-1.34) [23/115]	1.25 (0.76-2.07) [134/421]	0.61 (0.11-3.51) [89/204]
Tertile 3: >2	0.75 (0.34-1.66) [16/67]	1.77 (1.03-3.05) [73/183]	- (-) [0/40]
	P_{trend}<0.5	P_{trend}<0.02	P_{trend}<0.007

p-value for trend estimated from logistic regression models.
Odds Ratios adjusted for age, smoking pack-years and exercise minutes per week. The overall model was also adjusted for race.

Figure 1. Dairy and Fish intake and Breast Cancer Risk



Conclusions

Among Caucasian-Americans, African-Americans and Hispanic-Americans fish consumption was associated with reduced risk of breast cancer. For dairy consumption, among African-Americans and Hispanic-Americans, we observed reduced risk of breast cancer. We observed no association between dairy consumption and risk of breast cancer among Caucasian-Americans. Results from our study suggest that diets rich in fish and dairy products may reduce breast cancer risk among most women.