Excess Dietary Intake May Increase the Risk of Early Colon Cancer Pathogenesis

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BACKGROUND

- Although non-modifiable factors such as age, sex, and race have been associated with increased risk of developing colon cancer, there are limited studies investigating modifiable factors
- Some studies have shown fiber and calcium to be protective, while processed meats and alcohol to be risk factors
- The link between nutrition and colon cancer however remains controversial

AIMS

- To re-evaluate the epidemiology of colon cancer in the United States
- To explore the nutritional status of those with early colon cancer diagnosis

METHODS

- The National Health and Nutrition Examination Survey (NHANES) is a survey designed to assess the health and nutritional status of adults and children across the United States
- Nutritional data was collected via a 24-hour diet recall, and those with reliable recall were included
- We combined demographic and nutritional datasets from NHANES during 2007-2016 and identified patients who reported a diagnosis of colon cancer
- The sample size was weighted and stratified into 2 cohorts: age < 45 years vs age ≥ 45 years
- SPSS was used for analysis

RESULTS

FIGURE 1 – Demographic Data

		Colon Cancer Diagnosis ≥ 45 years	Colon Cancer Diagnosis < 45 years	p-value
Sample Size		4,651,155 (80.6%)	1,116,438 (19.4%)	-
Sex	Male (%)	83.8%	16.2%	p<0.001
	Female (%)	78.2%	21.8%	
Race	Non-Hispanic White (%)	78.3%	21.7%	p<0.001
	Non-Hispanic Black (%)	89.5%	10.5%	
	Hispanic (%)	95.9%	4.1%	
	Other (%)	100%	0%	
Education Level	Less than 9th Grade (%)	80.6%	19.4%	p<0.001
	9-12th Grade (%)	87.0%	13.0%	
	High School Graduate (%)	89.8%	10.2%	
	AA Degree or Some College (%)	79.1%	20.9%	
	College Graduate (%)	72.4%	27.6%	
Ratio of Family Income to Poverty Level (FIP)	FIP ≥ 1 (%)	78.3%	21.7%	p<0.001
	FIP < 1 (%)	88.2%	11.8%	
BMI (kg/m²)		29.9	31.4	p<0.001
BMI	BMI ≥ 25	79.7%	20.3%	p<0.001
	BMI < 25	83.6%	16.4%	

FIGURE 2 – Nutritional Intake

		Colon Cancer Diagnosis ≥ 45 years	Colon Cancer Diagnosis < 45 years	Average	p-value
Total Caloric Intake (kcal)		1679.1 ± 654.1	2177.6 ± 1092.3	1775.6 ± 784.0	p<0.001
Total Caloric Intake	Kcal ≥ 2000	68.4%	31.6%	-	p<0.001
	Kcal < 2000	86.3%	13.7%		
Total Sugar (gm)		94.2 ± 69.7	122.9 ± 150.8	99.8 ± 91.9	p<0.001
Total Fat (gm)		62.5 ± 28.8	90.7 ± 64.9	68.0 ± 40.1	p<0.001
Dietary Fiber (gm)		14.3 ± 8.0	16.7 ± 10.5	14.7 ± 8.6	p<0.001
Calcium (mg)		825.1 ± 537.5	980.1 ± 560.8	855.1 ± 545.6	p<0.001
Caffeine (mg)		193.0 ± 177.4	284.0 ± 262.3	210.6 ± 200.0	p<0.001
Alcohol (gm)		4.7 ± 14.3	9.0 ± 35.9	5.5 ± 20.4	p<0.001

RESULTS

FIGURE 3 – Logistic Regression

Variable		Odds Ratio	95% Confidence Interval	p-value
BMI		1.05	1.05-1.05	p<0.001
Sex *(ref: female)*		0.37	0.37-0.37	p<0.001
Race	Non-Hispanic White	-	-	-
	Hispanic	0.23	0.22-0.23	p<0.001
	Non-Hispanic Black	0.47	0.47-0.48	p<0.001
	Other	0	0-0	p=0.84
Education	Less than 9th Grade	-	-	-
	9-12th Grade	0.46	0.45-0.46	p<0.001
	High School Graduate	0.28	0.28-0.29	p<0.001
	AA Degree or Some College	0.66	0.65-0.66	p<0.001
	College Graduate	0.75	0.74-0.75	p<0.001
Ratio of Family Income to Poverty Level (FIP) *(ref: FIP < 1%)*		2.14	2.12-2.15	p<0.001
Total Caloric Intake *(ref: ≥ 2000 kcal)*		**3.81**	**3.79-3.82**	**p<0.001**

CONCLUSIONS

- Females, non-Hispanic whites, and those with higher education/income were associated with early colon cancer diagnosis possibly due to earlier screening
- Contrary to other studies, higher fiber and calcium intake did not appear to be protective factors
- Those with early diagnosis of colon cancer did have higher alcohol intake
- Those with high caloric intake, a modifiable risk factor, increased the odds of developing early cancer by over threefold, perhaps due to chronic underlying inflammation
- Additional studies are needed to assess the effects of nutrition on colon cancer pathogenesis