

## EFFECT OF LIFESTYLE ON THE DEVELOPMENT OF COLORECTAL CANCER

**Shaimaa Y. Hammad<sup>(1)</sup>; Hala I. Awadallah<sup>(2)</sup>; Manal A. Badawi<sup>(1)</sup>;  
Nermeen M. Shaffie<sup>(1)</sup>; Hebaallah M. S. <sup>(3)</sup> and Dalia M. Abouelfadl<sup>(1)</sup>**

1) Department of Pathology, National Research Centre 2) Department of Environmental Medical Sciences, Faculty of Graduate Studies and Environmental Research, Ain Shams University 3) Department of Community, Environmental and Occupational Medicine, Faculty of Medicine, Ain Shams University

### ABSTRACT

**Background:** Cancer has a complicated etiology, and the risk factors for cancer are ingrained in genetics and environment. Globally, an estimated 19.3 million new cancer cases and approximately 10 million cancer deaths occurred in 2020. Female breast cancer has surpassed lung cancer as the most commonly diagnosed cancer (11.7%), followed by lung (11.4%) and colorectal cancer (10.0%) in the third place. Colorectal Cancer (CRC) is associated with the population dietary and lifestyle factors.

**Aim:** To determine dietary risk factors of CRC in patients and to study the relation between lifestyle factors and development of CRC.

**Methods:** A case control study was done included 60 CRC patients and 60 control subjects matched by age and sex. Data was collected through an electronic questionnaire, including questions about socio-demographic data, medical data concerning dietary and lifestyle factors.

**Results:** The most significant dietary and life style CRC risk factors were higher consumption of red meat, preserved food (daily consumption 36.8% of patients vs 1.67% of control), daily spicy food consumption (60% of patients vs 5% of control), About most (80%) of patients consumed soft drinks daily compared to 45% of controls. 40% of CRC patients were smokers in comparison to (18.33) % of healthy control. The most significant protective

factors were physical activity, higher consumption of fruits and vegetable as 60% of controls ate more than five servings of fruits and vegetables per day compared to 10% of patients, fresh fish and fruit juice (daily consumption of fruit juice was higher among controls (40%) than among CRC patients (5%) and all these differences were represented as statistically significant p value = ( $p < 0.001$ ).

**Conclusion:** This study provides supporting evidence that lifestyle and dietary modification are important factors in the prevention of colorectal cancer.

**Key words:** colorectal cancer, risk factors, life style, diet

## INTRODUCTION

Cancer has a complicated etiology, and the risk factors for cancer are ingrained in genetics and environment. Globally, an estimated 19.3 million new cancer cases and approximately 10 million cancer deaths occurred in 2020. Female breast cancer has surpassed lung cancer as the most commonly diagnosed cancer (11.7%), followed by lung (11.4%) and colorectal cancer (10.0%) in the third place. However, lung cancer is still the leading cause of cancer death (18%), followed by colorectal cancer (9.4%) (**Sung *et al*; 2021**) Overall, cancer is the sixth leading cause of death worldwide (**WHO; 2018**).

Colorectal cancer is the 7<sup>th</sup> commonest cancer in Egypt, representing 3.47% of male cancers and 3% of female cancers. The estimated number of colon cancer patients (excluding rectal cancer) in 2015 was slightly more than three thousand. Studies have shown that approximately a third of all

cancer deaths may be preventable by dietary modifications (**Metwally *et al*; 2018**).

The concept of “lifestyle” is based on the idea that people generally exhibit a recognizable pattern of behavior in their everyday lives, the (**WHO; 2008**) definition of lifestyle providing a broader understanding of the determinants of a healthy lifestyle stated that lifestyle is a way of living based on identifiable patterns of behavior which are determined by the interplay between the individual personal characteristics, social interactions, and socioeconomic and environmental living conditions (**Lyons and Langille; 2000**). Life style factors associated with risk of CRC include smoking, alcohol intake, high red meat and processed meat consumption, high fat and protein diet intake, physical inactivity, and overweight (**Harriss *et al*; 2009**). According to the **National Institute for Clinical Excellence;2009**, about three quarters of CRC cases are associated with the population lifestyle.

The increase in morbidity is also influenced by lifestyle, body fatness and dietary patterns (**Arnold *et al*; 2017**). There is convincing evidence that physical activity has a protective effect. The risk of developing the disease is increased by more frequent red and processed meat and alcohol drinks (**Bray *et al*; 2018**). The progress of civilization and economic development, apart from improving socioeconomic conditions, also causes a change in dietary patterns. This means higher consumption of animal fats, processed meats, refined grains or sweets, a low supply of dietary fibers, fruits, vegetables and

low physical activity. The occurrence of overweight or obesity is often the result of such a lifestyle (**Murphy *et al*; 2019**). Overweight and obesity are associated with an increased risk of many civilization diseases. Visceral obesity has been reported to adversely affect the prognosis of CRC in men (**Silva *et al*; 2020**).

## **SUBJECTS AND METHODS**

### **Selection of patients:**

The present case control study included 60 CRC patients and 60 control subjects matched by age and sex. Cases were sought from private laboratories between 2018 and 2022. The tool used for collection data was questionnaire. Patients contact information were detected from their clinical files, 100 patients were recruited through convenience sampling technique which is a non-probability sample characterized by being ease of access some of them been met during their follow up, others were called and some patients couldn't be reached so they had been excluded from the study. Final number of patients were 60. Questionnaire was done through google form after taking written consent from patients. The name of the patients was replaced by numerical codes for privacy and confidentiality. This study was approved by the ethics committee of National Research Centre (Approval No. 19/027). Clinical data were reviewed to detect the inclusion and exclusion criteria:

1. **Inclusion criteria:** patients that underwent radical surgical resection of CRC.
2. **Exclusion criteria:** patients received neoadjuvant radiotherapy because of the possible interference between this therapy and the assessment of the local immune response.

**Selection of controls:**

1. **Inclusion criteria:** 60 patients with age and sex matched controls were selected randomly from community where the cases lived.
2. **Exclusion criteria:** relatives or cases and individuals with family history of colorectal cancer.

**Questionnaire included:**

- Socio-demographic characteristics age, gender, residence which were divided to urban and rural and occupation).
- Clinical data concerning disease (its duration and CRC site)
- Life style factors concerning dietary history – dietary pattern during 2 years prior to cancer diagnosis was assessed through the dietary questionnaire introduced by Melbourne University (**Giles GG, 2002**). This food frequency questionnaire included:
  1. Dairy products, as cheese, milk and yoghurt.
  2. Processed and red meat, canned and fresh fish, as well as fruits, vegetables and drinks which were divided to soft drink and fresh juices. The questions were also about fast food, food rich in calcium, spicy food and preserved

food. The analysis of each food item included the frequency of intake daily, weekly or monthly, the number of servings for each food item and conversions of household measures and serving sizes of various foods into grams.

- Life style factors concerning smoking history included type of smoking, duration of smoking, number of cigarettes per day and smoking index, i.e., total number of cigarettes per day (other types as shish converted into cigarette unit) multiplied by the duration of smoking.
- While asking about passive smoking, patients were asked about who smoke around them and which type of smoking as well as the frequency of exposure.
- Asking about history of physical activity done after explaining WHO definition of it which is as follow:
  1. Anybody movement produced by skeletal muscles that requires energy expenditure. Physical activity refers to all movement including during leisure time, for transport to get to and from places, or as a person's work.
  2. Physical activity can further be classified by the level of intensity: light, moderate and vigorous.
  3. Vigorous-intensity physical activity: jogging, fast swimming, fast dancing, jumping rope, tennis (singles), basketball, soccer, playing with children or dogs at a fast pace, heavy gardening (such as continuous digging or hoeing)

4. Moderate-intensity physical activity: brisk walking, water aerobics, tennis (doubles), biking on level ground, sports involving catch and throw (such as volleyball and baseball), stair-climbing, carrying small children, mopping floor, scrubbing the bathtub, car washing, general gardening
  5. Low-intensity physical activity: walking, stretching, lifting hand weights, push-ups against the walls.
- Anthropometric measurements including weight and height to calculate BMI.
1. Body Mass Index (BMI) is a person's weight in kilograms divided by the square of height in meters. A high BMI can indicate high body fatness. BMI screens for weight categories that may lead to health problems, but it does not diagnose the body fatness or health of an individual.
  2. BMI of 18.5 to 24.9 means normal weight, 25 to 29.9 means overweight and 30 to 39.9 means obese (data collected converted to underweight, normal, overweight and obese).

#### **Pathological data**

Gross description of the tumor; tumor size, site, number of metastatic lymph nodes, and with or without distant metastases.

### **Statistical analysis**

Statistical analysis was performed using SPSS 13 and quantitative data (mean and standard deviation), qualitative data (frequency distribution) were measured. Chi square test and Fisher's exact test was used to compare proportions.

- Chi-square ( $\chi^2$ ) test of significance was used in order to compare proportions between qualitative parameters.
- The confidence interval was set to 95% and the margin of error accepted was set to 5%. So, the p-value was considered significant as the following:
- Probability (P-value)
  - P-value  $\leq 0.05$  was considered significant.
  - P-value  $\leq 0.001$  was considered as highly significant.
  - P-value  $> 0.05$  was considered insignificant.

## **RESULTS**

### **Sociodemographic Data**

The study population included 60 patients with CRC; there were 28 (46.67%) males and 32 (53.33%) females. It was found that more than half (55%) of CRC patients were aged 40–60 years, 53.3% of CRC patients were living in rural areas showing no significant value p (1), 51.67% were illiterate, and 46.66% were unemployed with high significant value p ( $< 0.001$ ) (Table 1).

**Table (1):** Sociodemographic characteristics of cases and controls groups

Sociodemographic Characters		CRC cases 60		Controls 60		P value*
		No	%	No	%	
<b>Gender</b>	Female	32	53.33%	32	53.33%	1
	Male	28	46.67%	28	46.67%	
<b>Age group</b>	<60 years	33	55%	33	55%	1
	≥60 years	27	45%	27	45%	
<b>Residence</b>	rural	32	53.3%	32	53.3%	1
	urban	28	46.7%	28	46.7%	
<b>Educational level</b>	illiterate	31	51.67%	30	50%	<0.001
	Read & write	7	11.67%	10	16.6%	
	Sec	12	20%	18	30%	
	High & univ	10	16.66%	2	3.4%	
<b>Occupation</b>	Clerical	13	21.67%	12	20%	< 0.001
	manual	19	31.67%	6	10%	
	unemployed	28	46.66%	40	66.6%	
	professional	0	0.00%	2	3.4%	

p-value >0.05 NS; \*p-value <0.05 S; \*\*p-value <0.001 HS

### **Lifestyle factors and Colorectal cancer**

All cases with CRC were physically inactive while nearly two third (66.67%) of healthy controls were physically inactive with high significant value ( $p < 0.001$ ). All patients with CRC never intake alcohol in comparison to 96.6% of healthy control with non-significant difference ( $P > 0.05$ ). Nearly one third (31.67%) of CRC patients were nonsmoker, while healthy controls were nearly two third (66.67%) non-smoker and 40% of CRC patients were smokers in comparison to (18.33) % of healthy control, with high significant difference ( $P < 0.001$ ) (Table 2).

**Table 2:** Association between lifestyle factors and Colorectal cancer among cases and controls groups

Variables		CRC cases No.60		Controls No.60		P value*
		No	%	No	%	
Physical activity	inactive	60	100%	40	66.67%	<0.001
	moderate	0	0.00%	12	20%	
	active	0	0.00%	8	13.33%	
Alcohol intake	Never	60	100%	58	96.6%	0.15
	Rarely	0	0%	2	3.4%	
Smoking history	Non smoker	19	31.67%	40	66.67%	<0.001
	Passive smoker	17	28.33%	9	15%	
	smoker	24	40%	11	18.33%	

p-value >0.05 NS; \*p-value <0.05 S; \*\*p-value <0.001 HS

#### Association between Dietary Pattern and Colorectal Cancer:

Red meat consumption as more than 500 grams per week was found to be higher among patients than among controls 36 (60%) vs 32(53.4%) and this difference was statistically significant (p<0.001). The same was noted for processed meat consumption by CRC patients than by controls 36(60%) vs 20(33.4%) respectively and this difference was statistically significant (p<0.001). Half (50%) of controls ate fresh fish once or more times a week compared to 30% of patients (p<0.001). 60% of control ate canned fish more than once per week compared to 31.66% of patients (p<0.001). Intake of calcium rich diet was higher among controls (63.3%) than among patients (25%) (p<0.001).60% of controls ate more than five servings of fruits and

vegetables per day compared to 10% of patients only and this difference was statistically significant ( $p < 0.001$ ). Daily consumption of spicy foods was higher among patients (60%) compared to (5 %) of controls, this difference was statistically significant ( $p < 0.001$ ). 36.8% of patients consumed preserved food daily compared to 1.67% of controls ( $p < 0.001$ ). 5% of patients consume fast foods daily compared to only 3.333% of controls ( $p = 0.39$ ). About most (80%) of patients consumed soft drinks daily compared to 45% of controls, this difference was statistically significant ( $p < 0.001$ ). Daily consumption of fruit juice was higher among controls (40%) than among CRC patients (5%) and this difference was statistically significant ( $p < 0.001$ ) (Table 3).

**Table3:** Association between dietary pattern and colorectal cancer among cases and controls groups.

Variables		CRC cases		controls		P value*
		No	%	No	%	
<b>Red meat/wk.</b>	< 500g	24	40%	28	46.6%	<0.001
	> 500g	36	60%	32	53.4%	
<b>Processed meat /wk.</b>	< 25g	24	40%	40	66.6%	<0.001
	> 25g	36	60%	20	33.40%	
<b>Fresh fish</b>	< once / WK	42	70%	30	50%	<0.001
	> once / WK	18	30%	30	50%	
<b>Canned fish</b>	< once/WK	41	68.34%	24	40%	<0.001
	> once/WK	19	31.66%	36	60%	
<b>Calcium rich diet</b>	High	15	25%	38	63.3%	<0.001
	Moderate	9	15%	10	16.70%	
	low	36	60%	12	20%	

**Con. Table3:**

Variables		CRC cases		controls		P value*
		No	%	No	%	
<b>Fruits and veg</b>	less than 5/WK	54	90%	24	40%	
	more than 5/WK	6	10%	36	60%	
<b>Spicy food</b>	No	18	30%	42	70%	<0.001
	Rarely	0	0.00%	3	5%	
	1-2/WK	3	5%	9	15%	
	3-6/WK	3	5%	3	5%	
	Daily	36	60%	3	5%	
<b>preserved food</b>	No	10	16.6%	45	75%	<0.001
	Rarely	2	3.3%	12	20%	
	1-2/WK	9	15%	0	0.00%	
	3-6/WK	17	28.3%	2	3.33%	
	Daily	22	36.80%	1	1.67%	
<b>fast foods*</b>	No	48	80%	48	80%	0.39
	Rarely	0	0	0	0.00%	
	1-2/WK	6	10%	4	6.67%	
	3-6/WK	3	5%	6	10	
	Daily	3	5%	2	3.33%	
<b>Soft drink</b>	No	12	20%	33	55%	<0.001
	yes	48	80%	27	45%	
<b>Fruit juice</b>	No	57	95%	36	60%	<0.001
	yes	3	5%	24	40%	

Fast food\*easily prepared processed food served in snack bars and restaurants as a quick meal or be taken away.

p-value >0.05 NS; \*p-value <0.05 S; \*\*p-value <0.001 HS

### Body mass index and colorectal cancer

The frequency of obesity was higher among patients (48.33%) than controls (6.67%) ( $p < 0.001$ ) (Table 4).

**Table 4:** Association between body mass index and colorectal cancer among cases and controls groups

Variables		CRC cases No 60		Controls No 60		P value*
		No	%	No	%	
<b>Body Mass Index BMI</b>	Under wight	4	6.67%	2	3.33%	<0.001
	Normal	12	20%	30	50%	
	Over wight	15	25%	24	40%	
	Obese	29	48.33%	4	6.67%	

p-value >0.05 NS; \*p-value <0.05 S; \*\*p-value <0.001 HS

## DISCUSSION

Lifestyle factors that include obesity, physical activity, and diet are emerging as potential critical elements in improving colorectal cancer survival and morbidity outcomes. The association between colorectal cancer mortality and modifiable lifestyle factors is growing in evidence. Changes in individual health behaviors both before and after a diagnosis of colorectal cancer may improve outcomes of survivors (**Lee *et al*; 2015**). The evidence shows that overweight and obesity, physical inactivity, cigarette smoking, alcohol consumption and inappropriate dietary patterns (a diet low in fiber, fruits, vegetables, calcium and dietary products and high in red and processed meat) increase CRC risk factors. (**Sawicki *et al*; 2021**).

In the present study, analysis was conducted to determine possible associations between patient's hazardous habits and colorectal characteristics in a sample of Egyptian population since the importance of individual life style both before and after a diagnosis of colorectal cancer and how they may improve outcomes of survivors, so as mentioned before, in the present case and control study a questionnaire was used to analyze the possible associations between patient's hazardous habits and colorectal characteristics **(Giles and English; 2002)**.

In the present study the age and sex were matched between cases and controls, there were 28 (46.67%) males and 32(53.33%) females. It was found that more than half (55%) of CRC patients were aged <60 years. This result is in agreement with **(Mahfouz *et al*; 2014)** where the study was carried out upon age group ranged between 16-80 years, the majority of them were aged between 40-60 years. In addition, **Almurshed; 2009** who studied sociodemographic, lifestyle and anthropometric parameters in CRC in a case control study found 54% of cases were 40-60 years old and 46% of controls were falling in the same age group.

Regarding other socio-demographic data, 53.3% of CRC patients were living in rural areas, 51.67% were illiterate, and 46.66% were unemployed which was similar to results reported by **Mahfouz *et al*; 2014** 61.3% of cases came from rural areas, 58% were illiterate, and 73.3% were unemployed as

well as results reported by **Almurshed; 2009**, who found that 44% were illiterate and 54% were unemployed.

All cases (100%) examined in this study were physically inactive, while 66.67%, 20% and 13.33% of controls were inactive, moderately and active, respectively, and these differences were statistically significant. These findings are in agreement with **Mahfouz *et al*; 2014** as 100% of examined cases were physically inactive, while 78.3%, 4% and 17.7% of controls were inactive, moderately and severely active, respectively, and these differences were statistically significant. Also, these results are similar with **Arafa *et al*; 2011** who found that 75.7%, 7.7% and 16.8% of controls were inactive, moderately and severely active, respectively, and approximately the same what reported by **Almurshed; 2009**, who found that all (100%) cases were physically inactive and 54%, 33% and 13% of controls were inactive, moderately and severely active, respectively.

This study showed that All patients with CRC never intake alcohol in comparison to 96.6% of healthy control with non-significant difference ( $P > 0.05$ ). similarly, to findings by **Mahfouz *et al*; 2014**, as well as **Sriamporn *et al*; 2007**, who studied risk factors for CRC in Northeast Thailand and found that the risk associated with alcohol consumption did not achieve statistical significance. **Squires *et al*; 2010** did not find any significant differences between cases and controls for males and females regarding mean alcohol consumption per day.

According to this study 31.67% of CRC patients were nonsmoker, while healthy controls were 66.67% non-smoker and 40% of CRC patients were smokers in comparison to 18.33% of healthy control, with high significant difference ( $< 0.001$  P value). these results were in agreement with

**Mahfouz *et al*; 2014** study as they observed that there was a significant difference between CRC cases and controls regarding history of smoking, as 34% of cases versus 18.7% of controls were smokers and 24.7% of cases were passive smokers compared to only 5.3% of controls. Similarly, **Limsui *et al*; 2010** conducted a prospective study on the relation between cigarette smoking and CRC risk and found that 34% of those who develop CRC were smokers, as well as **Bener *et al*; 2010**. who carried out a case control study on lifestyle habits and CRC risk in Qatar and found that 26.7% of cases and 17% of controls were smokers.

On studying the Relation between dietary factors and CRC among cases and controls results in the present study showed that, red meat consumption as more than 500grame per week was found to be higher among patients than among controls 36 (60%) vs 32(53.4%) and this difference was statistically significant ( $p < 0.001$ ). The same was noted for processed meat consumption by CRC patients than by controls 36(60%) vs 20(33.40%) respectively and this difference was statistically significant ( $p < 0.001$ ). **Almurshed; 2009** found that higher red meat consumption is associated with increased CRC risk. Similar to the present study **Mahfouz *et al*; 2014** reported that red meat

consumption was significantly higher among cases than among controls, more than one third of patients (40.7%) ate more than 500 g of red meat per week compared to 1% of controls. This was also in agreement with **Alexander and Cushing; 2011**, who conducted critical summary of prospective epidemiologic studies of red meat consumption and found positive association between red meat consumption and CRC. The World Cancer Research Fund (WCRF) recommends that red meat consumption should be less than 500 grams per week. Also, **Mahfouz *et al*; 2014** observed that there was a significant relation between processed meat consumption and CRC as its consumption was higher among cases than among controls, consumption of more than 250 grams per day of processed meat was higher (66.7%) among cases than among controls (17%). This was also in accordance with **Santarelli *et al*; 2008** who conducted systematic review on multiple observational and experimental studies which assessed the relation between processed meat consumption and CRC and reported that processed meat intake increases CRC risk.

half (50%) of controls ate fresh fish once or more times a week compared to only 30% of patients ( $p < 0.001$ ). 60% of control ate canned fish more than once per week compared to 31.66% of patients ( $p < 0.001$ ). **Mahfouz *et al*; 2014** reported that sea food consumption was significantly higher among controls than among cases, eating fish once or more per week was higher among controls (51.7%) compared to 29.3% of cases and more than half

(57.3%) of controls ate canned fish once or more per week compared to 22.7% of cases. This was in agreement with **Hall *et al*; 2008** who studied fish intake and CRC in men in 22 years prospective study and found that fish intake was inversely associated with the risk of CRC, similarly to what was determined by **Sanjoaquin *et al*; 2004** who carried out a prospective study on lifestyle and CRC incidence and found that only 33.6% of CRC cases ate fish once or more a week.

Intake of calcium rich diet was higher among controls (63.3%) than among patients (25%) ( $p < 0.001$ ). This was in agreement with **Mizoue *et al*; 2008** who found that mean calcium rich foods intake was higher among controls (200 grams per day) compared to cases (167 grams per day) and that only 34.8% of CRC cases consumed calcium rich food compared to 40.9% of controls. As well as **Mahfouz *et al*; 2014** showed that consumption of calcium rich diet was higher among controls (64.3%) compared to 36.7% of cases, and consumption of lower amount of calcium was higher among cases (58.6%) than in controls (19.7%).

Nearly two thirds (60%) of controls ate more than five servings of fruits and vegetables per day compared to 10% of patients only and this difference was statistically significant ( $p < 0.001$ ). This was in agreement with **Arafa *et al*; 2011** who found that eating more than five servings per day was higher among controls (45.9%) than cases (33.6%). Similarly, to **Mahfouz *et al***;

**2014** study which reported that eating more than five servings per day was higher among controls (40.7%) than among cases (2.7%).

Daily consumption of spicy foods was higher among patients (60%) compared to (5 %) of controls, this difference was statistically significant ( $p < 0.001$ ). which was in agreement with **Nayak *et al.*; 2009** who conducted a case control study on the role of diet in CRC in India and found strong positive association between spices and CRC. Similar to these results **Mahfouz *et al.*; 2014** results showed that consumption of spicy foods was significantly higher among cases than among controls, daily consumption of spicy foods was higher among cases (67.3%) compared to 5.7% among controls.

Regarding preserved foods, 36.8% of patients consumed preserved food daily compared to 1.67% of controls with significant p value ( $< 0.001$ ), this result was in agreement with **Mahfouz *et al.*; 2014** as their study reported that daily consumption was higher among cases (27%) than among controls (10%). These findings were also in agreement with **Chiu *et al.*; 2003** who studied dietary factors and CRC in China and found that the risk of colon cancer increased significantly with increasing consumption of preserved foods.

Daily consumption of fast foods among patients was 5% compared to only 3.33% of controls ( $p = 0.39$ ). About most (80%) of patients consumed soft drinks daily compared to 45% of controls, this difference was statistically

significant ( $p < 0.001$ ). Daily consumption of fruit juice was higher among controls (40%) than among CRC patients (5%) and this difference was statistically significant ( $p < 0.001$ ). Similarly, to results reported by **Bener *et al*; 2010** who found that daily soft drink intake was significantly higher among cases (28.7%) in comparison to controls (18.8%). Fruit juice consumption was significantly higher among controls (29.7%) compared to 7.3% of cases, as well as **Mahfouz *et al*; 2014** study which revealed that daily consumption of soft drinks was significantly higher among cases (48.7%) than in controls (15%).

In the present study we also observed that the frequency of obesity was higher among patients (48.33%) than controls (6.67%) ( $p < 0.001$ ). This approximates to what was reported by **Slattery *et al*; 2003** who studied physical activity and CRC and found that obesity was higher in cases (21.3%) than in controls (18%), as well as by **Hu *et al*; 2010**, who found that 21.2% of cases were obese compared to 14.4% of controls. **Sun *et al*; 2012** studied the association of total energy intake and macronutrient 221 consumption with CRC risk and found that obesity was higher among cases (22.4%) in comparison to controls (18.5%). **Williams *et al*; 2010** studied dietary patterns and rectal cancer risk in white Americans and African-Americans and found that obesity was higher in cases (39%) than in controls (29%).

**Aleksandrova *et al*; 2014** reported that combined lifestyle factors - healthy weight, high physical activity, non-smoking, limited alcohol consumption and a healthy diet - are associated with a lower CRC incidence in European populations characterized by western lifestyles. These data support the notion that the complex nature and multiple dimensions of health behaviors may be better captured in analyses of lifestyle factors in combination compared to modeling individual factors alone.

These results are similar to the current study finding as physical activity, smoking habits, and all other studied parameters showed that control healthy individuals had good lifestyle in comparison to patients' lifestyle except for residence and alcohol consumption there were non-significant difference between cases and control findings. Also, **Lee *et al*; 2015** proved the same finding that Lifestyle factors as obesity, physical activity, and diet are emerging as potential critical elements in improving colorectal cancer survival outcomes. The association between colorectal cancer mortality and modifiable lifestyle factors is growing in evidence. Changes in individual health behaviors both before and after a diagnosis of colorectal cancer may improve outcomes of survivors. Several studies have indicated that maintaining a normal weight, participating in regular physical activity, and eating a healthy diet may be important preventative steps leading to improve survival outcomes.

## **CONCLUSION**

This study provides supporting evidence that lifestyle and dietary modification are important factors in the prevention of colorectal cancer. The most significant dietary and lifestyle CRC risk factors were higher consumption of red meat, preserved food, spicy foods, processed meat, soft drink and smoking. The most significant protective factors were physical activity, higher consumption of fruits and vegetable.

## **RECOMMENDATIONS**

Increase awareness among Egyptian population specially children and young adult about healthy life style to improve their general health and decrease levels of cancer and other immune disease which are affected by modifiable risk factors as lifestyle.

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## تأثير نمط الحياة على تطور سرطان القولون والمستقيم

شيماء يحيى حماد<sup>(١)</sup> - هالة ابراهيم عوض الله<sup>(٢)</sup> - منال عبد المجيد بدوى<sup>(١)</sup>  
نرمين محمد بهي الدين الشافعي<sup>(١)</sup> - هبة الله محمد صلاح<sup>(٣)</sup> - داليا محمد ابراهيم ابو الفضل<sup>(١)</sup>  
(١) قسم الباثولوجي، المركز القومي للبحوث، القاهرة، مصر (٢) قسم العلوم الطبية البيئية، كلية الدراسات العليا والبحوث البيئية، جامعه عين شمس، القاهرة، مصر (٣) قسم طب المجتمع، كلية الطب، جامعة عين شمس، القاهرة، مصر

### المستخلص

**الخلفية العلمية:** السرطان له مسببات معقدة، وعوامل خطر الإصابة بالسرطان متأصلة في علم الوراثة والبيئة. على الصعيد العالمي، حدثت ما يقدر بـ ١٩,٣ مليون حالة سرطان جديدة وحوالي ١٠ ملايين حالة وفاة بالسرطان في عام ٢٠٢٠. تجاوز سرطان الثدي لدى النساء سرطان الرئة باعتباره أكثر أنواع السرطان شيوعاً (١١,٧٪)، يليه سرطان الرئة (١١,٤٪) وسرطان القولون والمستقيم (١٠,٠٪). في المركز الثالث. يرتبط سرطان القولون والمستقيم بعوامل النظام الغذائي ونمط الحياة للسكان. تشمل عوامل نمط الحياة المرتبطة بمخاطر سرطان القولون والمستقيم التدخين، وتناول الكحول، واللحوم الحمراء العالية، واستهلاك اللحوم المصنعة، وتناول النظام الغذائي عالي الدهون والبروتين، وقلّة النشاط البدني، وزيادة الوزن

**الهدف:** تحديد عوامل الخطر الغذائية لسرطان القولون والمستقيم في المرض ودراسة العلاقة بين عوامل نمط الحياة وتطور المرض.

**الطريقة:** شملت الدراسة دراسة مقارنة بين المرضى وعينة مماثلة من الاصحاء وشملت الدراسة ٦٠ مريضاً من سرطان القولون والمستقيم و ٦٠ شخصاً سليماً متطابقين في العمر والجنس. تم جمع البيانات من خلال استبيان إلكتروني، بما في ذلك أسئلة حول البيانات الاجتماعية والديموغرافية، والبيانات الطبية المتعلقة بالعوامل الغذائية ونمط الحياة. تمت الدراسة في الفترة بين ٢٠١٨-٢٠٢٢ وتم الاستعانة بالمرضى من معامل خاصة مع مراعاة السرية التامة للمعلومات و تم اختيار العينة المماثلة من الاصحاء من نفس ظروف البيئة المحيطة بالمرضى.

**النتائج:** كانت أهم العوامل السلبية المتعلقة بالنظام الغذائي ونمط الحياة هي زيادة استهلاك اللحوم الحمراء والأطعمة المحفوظة (الاستهلاك اليومي للمرضى يساوي ٣٦,٨% مقارنة بـ ١,٦٧% للاصحاء) وكذلك الاستهلاك اليومي للأطعمة الغنية بالتوابل (٦٠% من المرضى مقابل ٥% من الاصحاء) واللحوم المصنعة ٨٠% من المرضى يستهلكون مشروبات غازية يوميا مقارنة بـ

٤٥% من الأوصاء، كما تبين لنا ان ٤٠% من المرضي مدخنون مقارنة ب١٨,٣٣% من الاوصاء. اوضحت النتائج ان أهم العوامل الوقائية هي النشاط البدني، استهلاك الفاكهة والخضروات حيث اظهرت النتائج ان ٦٠% من الاوصاء يأكلون الخضار والفاكهه يوميا مقارنة ب ١٠% من المرضي، من العوامل الوقائية كذلك هي الاسماك و العصائر الطازجة.  
الخلاصة: تقدم هذه الدراسة أدلة داعمة على أن نمط الحياة وتعديل النظام الغذائي من العوامل المهمة في الوقاية من سرطان القولون والمستقيم.  
الكلمات المفتاحية: سرطان القولون والمستقيم، عوامل الخطر، نمط الحياة، النظام الغذائي