RISK FACTORS OF COLORECTAL CANCER IN SULAIMANI CITY

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ABSTRACT

Background

The risk of developing colorectal cancer is influenced by both environmental and genetic factors. Globally, colorectal cancer is the third most commonly diagnosed cancer in males and the second in females.

Objectives

This study was conducted to determine the risk factors of colorectal cancer in a sample of colorectal cancer patients in Sulaimani city.

Methods

A case-control study was carried out between December, 2014 and March, 2016. The cases were interviewed in Hewa hospital in Sulaimani city, which is the only health institution dealing with cancer patients in the city. A sample of 200 cases whom diagnosed and registered at the hospital was selected. Those cases were compared with 400 controls free from cancer matched in age (± 2 years) and gender. Controls were collected from patients attending Karezawshk and Xabat public clinics.

Results

Patients with colorectal cancer have a mean ± SD age of 53.85 ± 15.9 years (ranged from 18 to 90 years) and the controls have a mean ± SD age of 53.69 ± 13.7 years (ranged from 19 to 87 years). Male: female ratio was 1.1:1. Logistic regression analysis revealed that there are positive statistical significant associations of colorectal cancer with family history of CRC (OR=8.489, 95% CI=3.285-21.941), smoking (OR=3.392, 95% CI=1.774-6.485), overweight and obesity (OR=6.034, 95% CI=3.386-10.755), drinking of carbonated beverages (OR=5.822, 95% CI=3.286-10.314) and canned juice (OR=3.448, 95% CI=1.972-6.028). However, negative statistical significant association between colorectal cancer and practicing exercise (OR=0.535, 95% CI= 0.290-0.987) and drinking of fresh juice (OR=0.283, 95% CI=0.163-0.491) was detected.

Conclusion

The most common risk factors for colorectal cancer are family history of colorectal cancer, smoking, overweight, obesity, drinking of carbonated beverages, and canned juice, while practicing exercise and drinking of fresh juice are decreasing the risk for colorectal cancer.

Keywords: *Colorectal cancer, Risk factor, Sulaimania, Iraq.*

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INTRODUCTION

The risk of developing colorectal cancer (CRC) is influenced by both environmental and genetic factors. Globally, CRC is the third most commonly diagnosed cancer in males and the second in females, with over 1.2 million new cases and 608,700 deaths estimated to have occurred in 2008. Incidence rates in most western countries have been stable or increased slightly [1]. Age is a major risk factor for sporadic CRC. Low socioeconomic status (SES) is also associated with an increased risk for the development of colorectal cancer; one study estimated the CRC risk to be about 30% higher in the lowest as compared to the highest SES quintile. Unhealthy but potentially modifiable behaviors such as physical inactivity, unhealthy diet, smoking, and obesity are thought to account for a substantial proportion (estimates of one-third to one-half) of the socioeconomic disparity in risk of new onset CRC. Lower rates of CRC screening, may contribute also substantively to SES differences in CRC risk [2,3].

Globally, the United States has one of the highest survival rates from CRC. Death rates from CRC have declined progressively since the mid-1980s in the United States and in many other Western countries. This improvement in outcome can be attributed, at least in part, to detection and removal of colonic polyps, detection of CRCs at an earlier stage, and more effective treatments, particularly adjuvant therapy. In contrast to these data, mortality rates continue to increase in countries with more limited resources and health infrastructure, particularly in Central and South America and Eastern Europe [4]. According to available data from records of HEWA hospital, CRC is the third most common cancer in Sulaimani HEWA hospital. Up to researchers' knowledge no previous study was done to find out common risk factors and general life style issues of CRC patients in Sulaimani city. Thus, this study was conducted to determine the risk factors of colorectal cancer in a sample of CRC patients in Sulaimani city.

PATIENTS AND METHODS

A case-control study was carried out between December, 2014 and March, 2016. The cases were interviewed in Hewa hospital in Sulaimani city which is the only health institution dealing with cancer patients in the city. A sample of 200 cases (diagnosed and registered at the hospital) was selected. Those cases were compared with 400 controls free from cancer matched in age (±2years) and gender. Controls were collected from patients attending Karezawshk and Xabat public clinics. Collection of data was performed by direct interviews and reviewing of hospital registries in a specially designed questionnaire.

The study was approved by research ethics committee of Kurdistan Board of Medical Specialties. A verbal informed consent was obtained from both cases and controls before being interviewed. An official permission was obtained from the directorate of health of Sulaimani and from the administration of Hewa hospital to carry out the study.

The questionnaire included data on the age, gender, and family history of CRC, personal and family history of intestinal polyp, weight, height, smoking status, alcohol consumption, physical activity, and lastly information on nutritional habits including eating meat and vegetables, drinking of coffee, juice, and beverages. The BMI (kg/m2) was calculated and categorized into three groups according to Hanlon et al [5]: normal weight (18.5-24.9), overweight (25-29.9), and obese ($\geq$ 30). A pilot study was performed on 15 cases to explore the difficulties that might emerge during data collection and all comments from the participants of the pilot study were taken in consideration for the study. Data analysis was performed using statistical package for social sciences (SPSS, version 21), Odds ratio (OR) and 95% confidence interval (CI) were calculated. P $\leq$0.05 was considered statistically significant.

RESULTS

Patients with CRC have a mean ± SD age of 53.85 ± 15.9 years (ranged from 18 to 90 years) and the controls have a mean ± SD age of 53.69 ± 13.7 years (ranged from 19 to 87 years). In both cases and controls males constituted 52.5% of the sample, giving a male: female ratio of 1.1:1. Around two-thirds of cases were in the 5th to 7th decades of life with the highest rate in those in the 5th decade.

Family history of CRC was reported by 28.5% of cases in comparison with 2.8% of controls. Family history of CRC, personal history and family history of polyp were associated with increased risk for CRC (OR=14.10, 95% CI= 7.19-27.64, OR=32.35, 95% CI= 4.24-246.75 and OR=19.68, 95% CI=4.52-85.72, respectively). About two thirds of the CRC cases were obese in comparison with 14.3% of the controls (OR=12.50, 95% CI= 8.31-18.79), and 20.5% of cases were alcohol

drinkers in comparison with 5.5% of controls (OR= 4.43, 95% CI=2.55-7.68). Around 50% of cases were smokers compared with 17.3% of controls (OR=4.89, 95% CI=3.48-7.15), and 84.5% of the cases were not practicing exercise in comparison to 55.5% of controls (OR=0.23, 95% CI=0.15-0.35). Details are shown in Table 1.

Using bicycles and walking for daily transport was reported by 75.8% of controls in comparison with 40.5% of cases (OR=0.22, 95% CI= 0.15-0.31) and 18.8% of controls reported practicing vigorous intensity sports in comparison with only 4% of cases (OR=0.18, 95% CI= 0.08-0.38). Moderate intensity sports were reported by only 6.5% of cases and 47.3% of controls (Table 2).

Increased risk of CRC was associated with drinking of carbonated beverages (OR=13.04, 95% CI= 18.55-19.89), energizers beverages (OR=3.89, 95% CI= 8.55-19.89) and canned juices (OR=7.26, 95% CI= 4.93-10.67). On the other hand drinking of fresh juices was associated with decreased risk for CRC (OR=0.19, 95% CI=0.13-0.27). However, drinking of coffee and tea has no significant association with CRC (Table 3).

Logistic regression analysis revealed that there are positive statistical significant associations of colorectal cancer with family history of CRC (OR=8.489, 95% CI=3.285-21.941), smoking (OR=3.392, 95% CI=1.774-6.485), overweight and obesity (OR=6.034, 95% CI=3.386-10.755), drinking of carbonate beverages (OR=5.822, 95% CI=3.286-10.314) and canned juice (OR=3.448, 95% CI=1.972-6.028). However, negative statistical significant association between colorectal cancer and practicing exercise (OR=0.535, 95% CI= 0.290-0.987) and drinking of fresh juice (OR=0.283, 95% CI=0.163-0.491) was detected (Table 4).

Table 1. Risk factors for colorectal cancer (CRC) cases

Risk factors	Cases		Controls		P-value	OR	(95% CI)
	No.	%	No.	%			
Family history of CRC							
Yes	57	28.5	11	2.8	**< 0.001**	**14.10**	**(7.19-27.64)**
No	143	71.5	389	97.2			
Personal history of polyp							
Yes	15	7.5	1	0.3	**< 0.001**	**32.35**	**(4.24-246.75)**
No	185	92.5	399	99.7			
Family history of polyp							
Yes	18	9.0	2	0.5	**< 0.001**	**19.68**	**(4.52-85.72)**
No	182	91.0	398	99.5			
Obesity							
Obese and overweight	135	67.5	57	14.3	**< 0.001**	**12.50**	**(8.31-18.79)**
Normal weight	65	32.5	343	85.8			
Alcohol drinking							
Yes	41	20.5	22	5.5	**< 0.001**	**4.43**	**(2.55 -7.68)**
No	159	79.5	378	94.5			
Smoking							
Yes	101	50.5	69	17.3	**< 0.001**	**4.89**	**(3.48-7.15)**
No	99	49.5	331	82.8			
Exercise							
Yes	31	15.5	178	44.5	**< 0.001**	**0.23**	**(0.15-0.35)**
No	169	84.5	222	55.5			
Total	**200**	**100.0**	**400**	**100.0**			

Table 2. Physical activity of cases and controls

Physical activities	Cases		Controls		P-value	OR	(95% CI)
	No.	%	No.	%			
Using bicycle and walking for daily transportation							
Yes	81	40.5	303	75.8	**< 0.001**	**0.22**	**(0.15-0.31)**
No	119	59.5	97	24.3			
Practicing vigorous-intensity sports							
Yes	8	4.0	75	18.8	**< 0.001**	**0.18**	**(0.08-0.38)**
No	192	96.0	325	81.3			
Practicing moderate-intensity sports							
Yes	13	6.5	189	47.3	**< 0.001**	**0.08**	**(0.04-0.14)**
No	187	93.5	211	52.8			
Total	**200**	**100**	**400**	**100**			

Table 3. Drinking of beverages by both cases and controls

Drinking beverage	Cases		Controls		P-value	OR	(95% CI)
	No.	%	No.	%			
Carbonated beverage							
Yes	163	81.5	101	25.3	**< 0.001**	**13.04**	**(18.55-19.89)**
No	37	18.5	299	74.8			
Energizer beverage							
Yes	31	15.5	18	4.5	**< 0.001**	**3.89**	**(8.55-19.89)**
No	169	84.5	382	95.5			
Coffee							
Yes	83	41.5	162	40.5	**0.81**	**1.04**	**(0.74-1.47)**
No	117	58.5	238	59.5			
Tea							
Yes	193	96.5	371	92.8	**0.07**	**2.15**	**(0.93-5.00)**
No	7	3.5	29	7.3			
Fresh juice							
Yes	59	29.5	276	69.0	**< 0.001**	**0.19**	**(0.13-0.27)**
No	141	70.5	124	31.0			
Canned juice							
Yes	150	75.0	117	29.3	**<0.001**	**7.26**	**(4.93-10.67)**
No	50	25.0	283	70.8			
Total	**200**	**100**	**400**	**100**			

Table 4. Logistic regression analysis of risk factors of colorectal cancer

Risk Factors	β	P-value	OR	(95% CI)
Family history of CRC	2.139	< 0.001	8.489	(3.285-21.941)
History of polyp	1.397	0.251	4.043	(0.372-43.960)
Family history of polyp	0.516	0.615	1.676	(0.225-12.502)
Smoking	1.221	< 0.001	3.392	(1.774-6.485)
Alcohol drinking	-0.514	0.303	0.598	(0.225-1.591)
Practicing exercise	-0.625	0.045	0.535	(0.290-0.987)
Obese and overweight	1.797	< 0.001	6.034	(3.386-10.755)
Drinking carbonated beverages	1.762	< 0.001	5.822	(3.286-10.314)
Drinking energizer beverages	0.046	0.927	1.047	(0.391-2.798)
Drinking coffee	-0.221	0.439	0.802	(0.458-1.404)
Drinking tea	0.418	0.502	1.519	(0.448-5.151)
Drinking fresh juice	-1.262	< 0.001	0.283	(0.163-0.491)
Drinking canned juice	1.238	< 0.001	3.448	(1.972-6.028)
Constant	-4.884	0.001	0.008	

DISCUSSION

In the current study demographic data showed that the main affected age group for cases was 40-49 years, with gradual slight decline after this age group. The United States SEER database and other Western cancer registries suggests that the incidence rates are higher under 50 years of age, while they are decreasing in older age groups [6, 7]. Family history of CRC in this study carried 14 times risk of getting CRC; this finding supports the genetic causality of the disease. Two studies, the first one from Saudi Arabia and the second one from North America both supported genetic causality of CRC [8-10]. Personal history of intestinal polyp carried a risk of 32 times to develop colorectal cancer. Studies from the United Kingdom and the United States showed that personal history of adenomatous polyps and polyps with villous or tubulovillous histology increase the risk of CRC, particularly if multiple [11, 12], while family history of polyp increased the risk of developing CRC by nearly 20 times. It is commonly believed that patients who have a family member with an adenomatous colonic polyp may also be at increased risk for adenoma or colorectal cancer [13].

Alcohol consumption increased the risk of developing CRC by 4.43 times, which is supported by the findings of other studies performed in the United States, Germany and Czech Republic [14-16]. Obesity in this study confer a risk of developing CRC of more than 12 times; a finding which agrees with that of other studies [17]. Tobacco smoking carried a risk of developing CRC by 4.89 times. This result is consistent with that of three studies revealed that the risk of developing CRC was higher among cigarette smokers than among those who never smoked, and thus, the risk of dying from CRC was also increased among smokers. Cigarette smoking is also a risk factor for essentially all types of colonic polyps [16-18]. Practicing of moderate and vigorous intensity sports on recreational activities significantly decreased the risk of developing CRC; similarly depending on biking and walking for daily transportation also reduced the risk of developing CRC. Other studies support the finding that inactivity has a significant association with CRC [12].

This study revealed that daily eating of meat carried a greater risk for CRC. This finding is consistent with that of a study from India which reported that long-term consumption of red meat or processed meats may be associated with an increased risk of CRC, particularly left sided tumors [19]. Carbonated beverages, energizer beverages and canned juice increased the risk for CRC; a finding which is consistent with that of a study done in Scotland [20]. Since the sample is and taken only from Sulaimani city and is hospital based study, the findings

cannot be generalized to all patients with CRC in Iraq

In conclusion, the most common risk factors for CRC in the study are family history of CRC, smoking, overweight and obesity, drinking of carbonated beverages and canned juice, while practicing exercise and drinking of fresh juices are decreasing the risk for CRC.

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