



# Epidemiology of Colorectal Cancer and the Risk Factors in Kermanshah Province-Iran 2009–2014

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## Abstract

**Introduction and Objective** Colorectal cancer is the fourth prevalent cancer in the world and there are several factors effective on development of the disease. These factors vary based on geographical distribution. The present study is aimed at surveying epidemiology of colorectal cancer and its risk factors in Kermanshah-Iran between 2009 and 2014.

**Methodology** A descriptive cross-sectional study was carried out on all colorectal cancer cases in two Kermanshah-based hospitals Imam Reza and Taleghani between 2009 and 2014. Demographic and epidemiological information was collected from the medical files and interviewing the patients. The collected data was analyzed in SPSS.

**Findings** Totally, 336 patients had been registered from 2009 to 2014. Mean and standard deviation of age was  $59.98 \pm 15.26$ . Fifty-four subjects (16.05%) had a history of colorectal cancer among their relatives and 253 (62.5) had no history of physical activity. In addition, 81 subjects (24.1%) had a history of digestive diseases. In terms of diet, 205 subjects (61%) used less than 6 unit/day of grains and bread, and meat consumption in 150 subjects (44.6%) was less than 2 unit/day.

**Conclusion** The results showed that the prevalence of colorectal cancers was growing in Kermanshah. To change the rate, changes in lifestyle and screening tests for more susceptible age groups are recommended.

**Keywords** Epidemiology · Colorectal cancer (CRC) · Kermanshah Province

## Abbreviations

CRC Colorectal cancer

USA United States of America

SPSS Statistical Package for the Social Sciences

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## Introduction

Cancer is one of the most common causes of death in the developed and developing countries including Iran. The disease is highly prevalent and growing so that a large portion of resources of health services is dedicated to it [1]. Lifestyle changes and urbanism have resulted in an increase in prevalence of specific types of cancers such as digestive system cancers [2]. Digestive system cancers represent 38% of cancer cases and cause 44.4% of cancer-caused deaths; these cancers are highly prevalent in Iran [3, 4]. Digestive system diseases are of the most common causes of mortality in Iran [3]. CRC is the fourth prevalent cancer in the world and every year about one million new cases are diagnosed [2]. Prevalence of CRC, as the fourth common type of cancer in the world, is 6–8 cases of each 100,000 individuals. Because of early incidence of the disease (below the age of 40), CRC represents one fifth of all cancer cases in Iran [3]. Changes in lifestyle and expansion of urbanism are of the factors of which the relationship with

CRC has been reported by other studies [2–4]. Wolin et al. (2009) concluded in his epidemiological studies that there was a relationship between physical activities and decrease of development or recurrence of specific cancers that appear in specific parts of the body including CRC [5]. Nikbakht et al. (2015), Benro et al. (2010), and Brand et al. (2015) have listed history of CRC in family, low fiber and high fat diet, smoking, and lack of physical activities as the risk factors of CRC, and among these risk factors, nutrition is of the most important. Moreover, metabolic syndrome disease is another risk factor of CRC. The disease is usually diagnosed along with hypertension, hyperglycemia, and obesity [2, 6, 7]. Denis (2011) argued that the amount of red meat in one's diet is directly related to CRC [8]. Keyghobadi et al. [2013] also argued that high fat diet was a risk factor of CRC [9].

Given the above introduction, prevalence of CRC and the risk factors in Kermanshah Province between 2009 and 2014 were examined. The results can provide a clearer picture of prevalence of the disease, educational needs in this regard, and the risk factors for the health care system.

## Methods

A descriptive cross-section study to survey prevalence of CRC and the risk factors in Kermanshah Province between 2009 and 2014 was carried out. Study population included all positive cases of CRC registered in Kermanshah-based Imam Reza and Taleghani hospitals from 2009 to 2014. Tumors at ascending, descending, and transverse colon, rectosigmoid, and rectum were taken as colorectal tumors. All the patients with a CRC medical file the hospitals were telephoned and asked about their physical and health conditions. The criteria for entry include consent of the patient or his family (in the subjects who their patients were died) to participate in the research and using the information/documents in their records. Exclusion criteria were unwillingness of the patient or his family to participate in research or dissatisfaction with the use of patient records.

Data gathering was carried out through census method. Data gathering tool was a demographics tool with 21 statements about gender, age, economic condition, education level, occupation, physical activity capability, history of digestive system disease, family history of the disease, history of medication, diet, smoking and drinking habits, and type of the disease. To determine validity of the information form, content validity method was used. To this end, the forms were provided to 12 faculty board members in Kermanshah Medical Science University and their feedbacks were used to modify the tool.

Data gathering was done after securing a letter of permission from Ethics Committee of the university under ethics code of 195 dated: 9 June 2016. The letter was provided to officials of the hospitals. Reasonable measures were taken to ensure confidentiality of information of the research subjects.

The checklists were filled out using the medical files and through interviewing the patients. The collected data was analyzed in SPSS-20 using descriptive statistics (simple and relative frequency, mean, and standard deviation) were used.

**Availability of Data and Material** Data are available by contacting to the corresponding author.

## Findings

Totally, 336 CRC patients who referred to the hospitals between 2009 and 2014 were surveyed. Of the 336 patients with colorectal cancer, seven died, and the researcher took more information from their families. The results showed 58% ( $n = 195$ ) of the subjects were men and mean age and standard deviation was  $59.98 \pm 15.26$ . Majority of the patients (53%) were older than 60 years old. Moreover, 94.6% ( $n = 318$ ) were married, 47.6% ( $n = 160$ ) were poorly literate, and 38.4% ( $n = 129$ ) were housekeepers. In terms of economic condition, 32.1% ( $n = 108$ ) of the patients were in average class (Table 1).

Family history of CRC was observed in 16.05% ( $n = 54$ ) of the patients, 24.1% ( $n = 81$ ) had history of digestive diseases, and 36% ( $n = 121$ ) had history of using digestive disease medicines.

Average time of physical activity of the patients was  $132.11 \pm 79.42$  min; and 62.5% ( $n = 253$ ) had no physical activity (Table 2).

Nutrition of the patients in most of the patients showed that 44.6% ( $n = 150$ ) used less than 2unit/day meat and proteins, 44.6% used less than 2unit/day vegetables and fruits, and 61% ( $n = 205$ ) used less than 6unit/day grains and bread.

As to the most bothering problems with CRC, blood in the stool (58.84%), stomachache (20.54%), and loss of weight (15.5%) were the top bothering problems.

## Discussion

The results showed that 336 CRC cases had been registered in Kermanshah Province from 2009 to 2014. Bashiri et al. (2013) surveyed anatomic distribution of CRC in a 6-year period and reported 91 CRC cases in Kermanshah [10]. Number of CRC cases in Markazi Province between 2006 and 2011 was 444, which is higher than that of Kermanshah [11]. Incidence of CRC in wealthy countries is high and growing so that 71,830 men and 65,000 women diagnosed with CRC lived in the USA in 2014. Thanks to quality health and welfare services, the main risk factor of CRC in developed countries is aging [12]. Given the above and the results, it is notable that urbanism, machine life, lack of physical activity, and unhealthy diet and habits (smocking) are of the key risk factors of CRC. More than one half of the subjects (44.6%) used less than

**Table 1** Frequency of demographic characteristics

Variable	Value	N (%)
Gender	Male	195 (58)
	Female	141 (42)
Marital status	Single	18 (5.4)
	Married	318 (94.6)
Age (year)	< 39	38 (11.3)
	40–49	53 (15.8)
	50–59	67 (19.9)
	60–69	83 (24.7)
	>70	95 (28.3)
Occupation	Unemployed	49 (14.6)
	Businessman	85 (25.3)
	Farmer	30 (8.9)
	Office employee	9 (8.9)
	Housekeeper	129 (38.4)
	Retired	34 (10.1)
Education	Illiterate	160 (47.6)
	Poorly-literate	98 (29.2)
	Junior high school	63 (18.8)
	High school	15 (4.5)
Economic condition (revenue/Rls)	< 5000.000	45 (13.4)
	5.000.000–10.000.000	76 (22.6)
	10.000.000–15.000.000	108 (32.1)
	15.000.000–20.000.000	81 (24.1)
	< 20.000.000	26 (7.7)
Regular physical activity	Positive	83 (24.7)
	Negative	253 (75.3)
Smoking habit	Positive	126 (37.5)
	Negative	210 (62.5)
Family history of cancer	Positive	54 (16.07)
	Negative	282 (83.93)
History of digestive diseases	Positive	81 (24.1)
	Negative	255 (75.9)
History of using digestive drugs	Positive	121 (36)
	Negative	215 (64)

2 units of fruits and vegetables. The relationship between diet and CRC has been examined by researchers over the past three decades; still, there are no definite evidences about such relationship [13, 14]. It is believed that fruit- and vegetable-rich diet, thanks to higher fiber, A, E, C, D vitamins, and folic acid content, reduces risk of CRC [15]. Consistent with our results, Karimi et al. (2016), Ward et al. (2013), and Murphy et al. (2012) reported that majority of CRC patients had low-fiber high-fat diet [16, 17].

In this study, the majority of the subjects (75.3%;  $n = 253$ ) did not have regular physical activity and this is consistent with Ma Yanlei et al. (2013) [18]. There are evidences of a

**Table 2** Frequency of using different foods

Variable	Value (unit)	N (%)
Grains and bread	< 6	205 (61)
	6–11	131 (39)
Fruits	< 2	150 (44.64)
	2–4	131 (39)
	> 4	55 (16.36)
Meat	< 2	126 (37.5)
	2–3	99 (29.5)
	> 3	111 (33)

relationship between life-style variance (e.g. physical activity) and CRC. Fatima et al. (2009) showed that 1.3–1.4% of CRC were due to overweight and lack of physical activity. Adding physical activity as a part of life style might decrease risk of CRC [19]. Studies on the relationship between CRC and obesity and lack of physical activity have concluded that obesity and lack of physical activity are among risk factors of CRC [9, 20].

Our results showed that 37.5% of the subject had a smoking history, this is consistent with Cleary et al. (2010) and Limsui et al. (2010) studies. The carcinogens found in tobacco increase risk of CRC [21, 22]. Shin et al. (2012) stated that 44.6% of CRC patients used to be or were smokers and about 70% of them had drinking history [23].

Mean age of the subjects was  $59.98 \pm 15.26$  and incidence age of the disease in both men and women was about 40 years, and the higher prevalence rate was observed at the age of 50 years old, so that 92% of the cases were at this age and higher. In this regard, other studies in Europe and the USA also showed the similar results [23–25].

The results also showed that 16.07% of the patients had family history of CRC. Zhang et al. (2014) examined the relationship of family history and genetics with CRC in a 6-year period and concluded that the relationship was significant relationship [26]. Consistently, Ghanadi et al. (2013) reported that 20% of CRC patients had a history of the disease in their blood relatives [27]; these results are in line with our findings. This shows that genetics and environment both may increase risk of CRC. In other words, family history can be a key element for diagnosing or screening [28]. Given the increasing trend of prevalence of digestive system cancer in the world, future works can examine prevalence of other digestive system cancers in Kermanshah Province and determine the indigenous risk factors of different digestive system cancers in the province.

## Conclusion

The findings confirmed the ascending trend of CRC in Kermanshah Province. The risk factors were unhealthy life style, lack of physical activity/low-fiber diet, family history

of digestive system cancers, and smoking history. Screening and determining environmental risk factors can be a step toward preventing CRC. This needs public education using the mass media to promote the prevention measures and participation in screening programs. Such measures can be helpful to decrease prevalence of the disease and increase the chance of timely diagnosis.

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## Compliance with Ethical Standards

**Conflict of Interest** The authors declare that they have no conflict of interest.

**Ethics Approval and Consent to Participate** The study was approved by research ethics committee of Kermanshah University of medical sciences.

**Consent for Publication** All the authors and the Kermanshah University of Medical Sciences consented to publish the study in your Journal.

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