

# A Review of the Incidence of Colorectal Cancer in the Middle East

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## Abstract

**Background:** Colorectal cancer (CRC) accounts for about 10% of cancers and is the third most prevalent cancer worldwide. It is also one of the leading causes of cancer-related mortality. The objective of the current study was to investigate the incidence of CRC East by reviewing reports on number and age standardized incidences of CRC in both genders in different areas of the Middle East.

**Methods:** All the published reports citing the incidence of CRC in the Middle East were collected by conducting a literature search using Pubmed. Data was extracted from the included articles, and summarized in tables and charts, according to “country of origin”, “gender”, and “ASR”. Data presented by GLOBOCAN on the incidence/prevalence and mortality rates of CRC are also showed in separate charts and tables.

**Results:** This research identified 194 articles, through the Pubmed search. After removing duplicate and triplicate publications, 96 full-text articles were assessed for eligibility and 78 were excluded. According to data from Reviewed articles, the highest and the lowest ASR for colorectal cancer were respectively 48.3 (European-American Jews) and 4.2 (Shiraz, south Iran) in males and 35 (European-American Jews) and 2.72 (Shiraz, south Iran) in females (1, 2). According to GLOBOCAN, the highest ASR was 35 (Israel) and the lowest was 4.48 (Yemen) in both genders. Except for Jews, the mean age of patients was 53 to 54.9.

**Conclusions:** Although Middle East is generally a low risk region for CRC, the incidence rate of CRC is more in western regions, including countries located on the coast of the Mediterranean sea, compared to eastern and southern regions. Moreover, males and females are at risk at younger ages compared to western countries.

**Keywords:** Incidence, Colorectal Cancer, Middle East

## 1. Introduction

Cancer is the second fatal disease around the world (1). According to the World Health Statistics (2012), the projection of new cases is expected to increase significantly, mostly in developing countries. World health organization (WHO) has predicted the largest rise in the incidence rate of cancer in the Middle East in the upcoming years. Colorectal cancer (CRC) accounts for about 10% of cancers and is the third most prevalent cancer worldwide (2, 3). It is also one of the leading causes of cancer-related mortality.

Colorectal cancer has shown significant international and geographical variations. Traditionally, it was known to be almost exclusive to developed and western countries. While the largest incidence of CRC was reported in Republic of Czech, Australia, New Zealand, Canada and US, the least was from Central Africa, India, and Central Asia (2). Recent studies showed a significant increase in the incidence of CRC in developing nations (3). Although the Middle East has been a low risk region regarding the incidence of CRC, recent studies revealed an increase of incidence in this part

of the world (4, 5).

Even though different countries of the Middle East have many cultural characteristics in common, some have experienced economic, social, and cultural changes resulting in changes in life style. Moreover, registry of diseases by the health system largely differs in different parts of the Middle East (6, 7). Therefore, information regarding CRC, in particular population-based data, is limited in Middle Eastern countries. Considering the increase of the burden of this cancer, the objective of the current study was to investigate the incidence of CRC East by reviewing reports on the number and age standardized incidences of CRC in both genders in different areas of the Middle East.

## 2. Methods

To evaluate the epidemiology of colorectal cancer in the Middle East, the following key words were searched in “Pub Med”. The main key word used in all searches was “colorectal cancer”. In the first step, “colorectal cancer”, and

“epidemiology” and “Middle East” were used. Next, Middle East was replaced with the name of each country and was combined with “Epidemiology” and “colorectal cancer”; for example “colorectal cancer” and “epidemiology”, and “Iran”. Next, “incidence” was replaced with “epidemiology” in the above combinations and the search was performed once again. Finally, “prevalence” was used instead of “epidemiology” with the mentioned words. Search for English articles that had an identified diagnostic method (reported by a pathologist) was done using “Pub Med” from the beginning of 2004 until the present and prevalence/incidence rates were included. Duplicate publications, interventional studies, those describing the biological event or clearly evaluating the risk factors of colorectal cancer or those related to the burden of the disease were eliminated. Data was extracted from the included articles then illustrated in tables and charts according to “Country of origin”, “gender”, and “ASR”. Data presented by WHO and GLOBOCAN on the incidence/prevalence and mortality rates of CRC are also shown in separate charts and tables.

### 3. Results

This research identified 194 articles through the database search. After removing duplicate and triplicate publications, 96 full-text articles were assessed for eligibility. However, 78 were excluded due to the following reasons: having details concerning biology, cytology, genetics, clinical and pathologic characteristics, and familial syndromes, being related to risk factors and burden of disease and side effects, interventional studies, evaluating a single region (for example anus), including a specific age group. This left 18 studies suitable for inclusion in the final assessment (Table 1 and Figure 1).

According to data from the reviewed articles, the highest and the lowest ASR for colorectal cancer were respectively 48.3 (European-American Jews) and 4.2 (Shiraz, south Iran) in males and 35 (European-American Jews) and 2.72 (Shiraz, south Iran) in females (1, 2). According to GLOBOCAN, the highest ASR was 35 (Israel) and the lowest was 4.48 (Yemen) in both genders (Table 2).

In almost all studies, male preponderance of CRC was similar to that observed at the national level. However, except for Jews, the mean age of patients was 53 to 54.9.

### 4. Discussion

In this study, the geographic distribution of CRC in the Middle East was outlined. Although the Middle East is generally a low risk region for CRC, an increased incidence rate has been observed. However, the trend is totally different

among the countries of this region. For instance, one of the most significant surges in the incidence rate of CRC in Asia was reported from Kuwait (14) from 6.2 to 13.7 in males during 20 years. A similar trend was seen in the west bank of Jordan River and Gaza Strip. At the same time in Arab Palestinians the incidence rate doubled in both genders (15, 16). It should be noted that Israeli Jews were an exception in this region regarding the incidence of many chronic diseases, including CRC, which means the trend of incidence rate is mildly rising similar to western countries (17, 18). The neighboring country, Jordan, had the highest incidence rate of CRC in the Arab world (ASR = 25.59). According to GLOBOCAN (2012), Jordan had the second place for the incidence of CRC after Israel (graph NO.1). Ismail et al. claimed that CRC was the most common cancer in Jordanian males from 1996 to 2009 (19). Considering the incidence rate of CRC, the next countries in this region were Syria, Turkey, and Lebanon (Table 2. GLOBOCAN, 2012). It should be mentioned that several studies from different parts of Turkey reported different risk rates ranging from 7 to 16 (20, 21). In Saudi Arabia, there was a steady mild increase in the risk of CRC (22-24). As shown in graph No.1, this risk was half of that of Jordan and Arab Palestinians. According to a systematic review, the risk of CRC in Iran, especially in northern and western parts, showed a mild rise during the recent 2 decades, while several studies reported lower incidence rates from southern and eastern parts of this country (25). The southern countries of the Middle East, Oman and Yemen, showed the least risk of CRC, in both the Middle East and worldwide. For Iraq, located in the center of the Middle East, ASR was estimated similar to Iran and Saudi Arabia. Needless to say, this country has encountered local war since the last 2 decades, thus, reports from this region are limited and should be cautiously evaluated.

Considering gender, almost all studies reported male preponderance, similar to that observed at a national level. In Saudi Arabia and Yemen, studies have reported a higher proportion of male to female in patients with CRC. To illustrate, Al-Ahwal et al. reported that more than 60% of CRC cases in Saudi Arabia were male (24). In Iran and Turkey, this proportion was less than Saudi Arabia. However, some studies showed male to female proportion to be less than one. These include studies of Bener et al. from Qatar, which showed that risk of malignancies was more in females compared to males and Haghdoost et al. from southeast of Iran, which reported that the risk of CRC was slightly higher in females than males (26).

The mean age for CRC was 71 years old in the US. This mean age is reported in an acceptable range for almost all developed countries. However, the mean age for colorectal cancer in the Middle East was nearly 10 years less. In a re-

Table 1. Summary of the Articles

Year	Country	Authors	Journal	Total Colorectal Cancer, (CRC) No.	CRC in Males, No.	CRC in Females, No.	ASR of Total CRCs	ASR of CRCs in Males	ASR of CRCs in Females	Mean Age Total	Mean Age of Men	Mean Age of Women	Male Proportion	Female Proportion	Rectal Cancer Proportion
2012	Egypt	Veruttipong et al. (8)	World J Gastroenterol	1364	737	627	5.5	6.1	4.9				54	46	37.2
2012	Saudi Arabia	Mosli	Asian Pacific J Cancer Prev	644	374	270				57			58	42	24.2
2012	Saudi Arabia	Mosli	Asian Pac J Cancer Prev	4201						58	59	57	54.1	45.9	28
2013	Turkey	Seydaoglu	Turk J Gastroenterol	2749						56.9			55.5	44.5	20.9
2012	Turkey	Tas	Arch Gerontol Geriatr	4209						58					
2015	Iran	Nikfarjam et al. (9)	Asian Pac J Cancer Prev	514	290	224				53	52.6	53.5	56.4	43.6	
2013	Iran	Nikbakht	Asian Pac J Cancer Prev	792	413	379				59.4			52	48	
2012	Iran	Safae et al. (10)	Asian Pac J Cancer Prev	19617	10991	8626				58.9	59.6	58.1	56	44	24
2005	Iran kerman	Pahlavan	Tumori	378	199	179	5.9	5.9							
2005	Iran Ardabil	Pahlavan	Tumori	180	106	74	7.8	5.8							
2005	Iran Mazandaran	Pahlavan	Tumori	688	383	305	9.9	8.4							
2004	Iran Shiraz	Hosseini	ANZ J Surg.				4.2	2.72							
2006	Iran	Ansari	Cancer Lett				8.2	7							
2006	Iran	Pahlavan	J Gastrointest Liver Dis	200	114	86				55.15	55.7	54.3	57	43	
2010	Israel	Glushko	Familial Cancer	72 Arabs	41	31				58.3			56.9	43.1	25
2010	israel	Glushko	Familial Cancer	408 Jews	217	191				67.1			53.2	46.8	29.2
2010	Israel	Shemesh-Bar (11)	World J Surg	406	181	225							45	55	38
2007	Israel	Rozen	Int. J. Cancer	1207 Arab	612	595	16.9	17.3	16.9				50.7	49.3	35
2007	Israel	Rozen	Int. J. Cancer	9081 Jews	4530	4551	37.4	41.2	31.9				49.8	50.2	20.55
2005	Israel Central	Fireman (12)	Digestion	562 Jews	247	315				70.8			44	56	29.8
2005	Israel Central	Zvi Fireman	Digestion	62 Arabs	24	38							38.7	61.3	41.9
2004	Israel	Barchana	Familial Cancer	European-American Jews				48.3	35						
2004	Israel	Barchana	Familial Cancer	Israeli born Jews				32.7	26						
2004	Yemen	Basaleem and Al-Sakkaf (13)	Saudi Med J				3.1						54.2	45.8	50

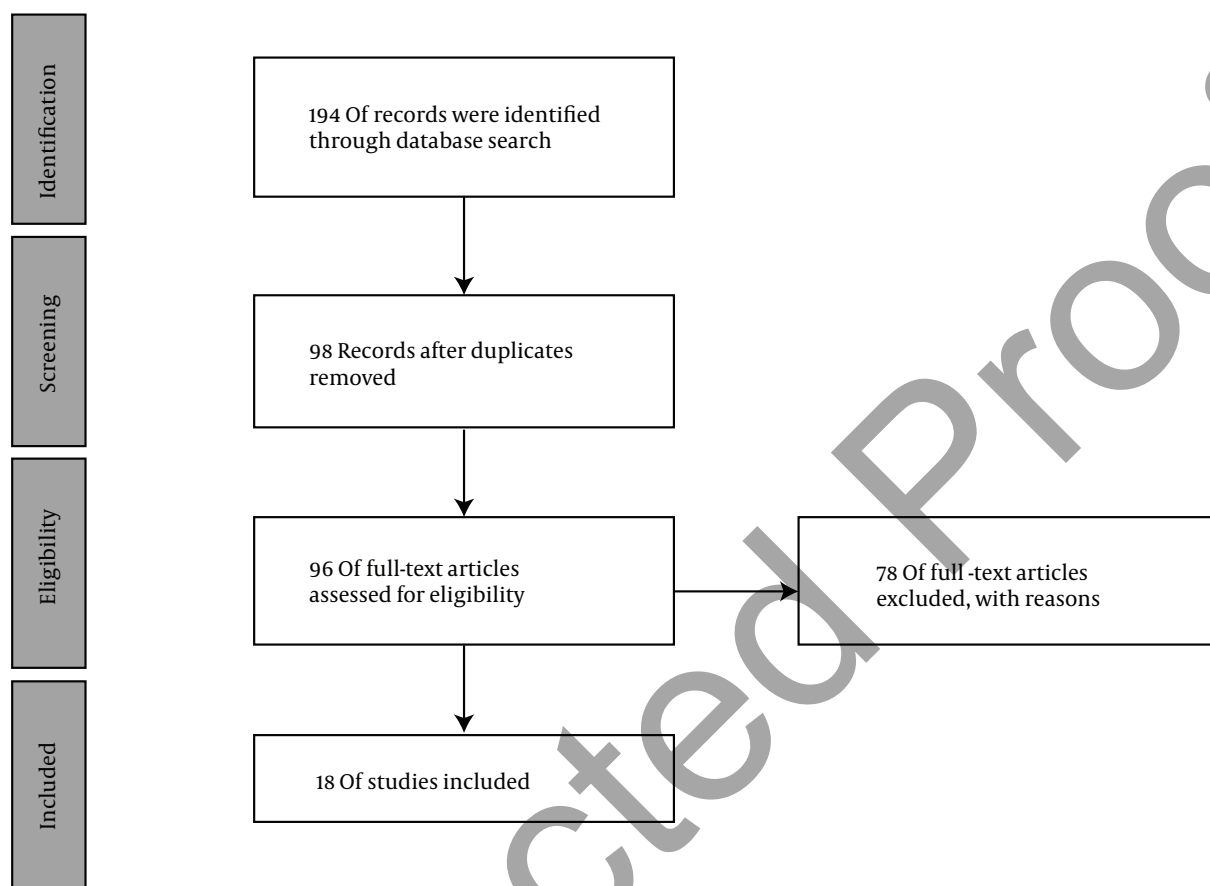


Figure 1. PRISMA Flow Diagram

port from Yemen, the mean age was 49.8 for females and 56.9 for males (27). In Saudi Arabia, Albasri et al. counted 324 cases of CRC from 2006 to 2013 in Medina, from which 61% were male and the mean age was 57.9 (28). In another study on 549 patients with colorectal cancer from 1996 to 2004, the mean age was 53.4. Pahlavan et al. reported 200 CRC cases from Tehran (Iran) between 2000 and 2003, with a mean age of 55 (29). Several studies from Iran have reported the same mean age with an acceptable range (27). In a study by Bafande et al. between 2005 and 2007, mean age for cases, who had a polyp in accidental colonoscopy was 49. Considering the transition time for a polyp to turn cancerous in colon and rectum, the above-mentioned mean age for CRC was expected (30). In Turkey, in a study for 20 years up to 2007, the mean age of CRC was 58 (21). As a result, in this part of the world, the proportion of young (less than 40 years old) patients with CRC was more than western countries. This fraction is 19.3% in Yemen and 38% in Egypt (4). Similar findings are seen in Saudi Arabia, Iran, and Turkey (3, 12). In a study published by Malekzadeh et

**Table 2.** GLOBOCAN (2012) ASR, Prevalence and Mortality of Colorectal Cancer

Country	Incidence/ASR	Prevalence	Mortality
Yemen	4.48	9.07	3.45
Egypt	5.61	15.91	3.71
Iraq	7.06	14.39	5.02
UAE	8.55	12.96	4.96
Iran	11.05	26.37	6.63
Bahrain	11.35	20.52	3.95
Saudi Arabia	11.61	22.27	6.62
Qatar	12.55	22.57	7.42
Kuwait	12.84	28.26	6.66
West Bank	15.37	31.1	10.57
Lebanon	16.06	49.05	8.82
Turkey	16.55	46.34	9.99
Syria	16.6	36.63	10.76
Jordan	25.59	50.54	15.5
Israel	35.86	208.19	11.09

al. in 2009, one-fifth of patients with CRC were under 40 years old, which is significantly more than that of western countries, which is 2% to 8% (31). In Saudi Arabia, Iran, and Arab Palestinians, the decrease in the age of patients is associated with the increase in the number of lesions located in the Rt. Colon (15, 17, 32).

To sum up, although the Middle East is generally a low risk region for CRC, the incidence rate of CRC is more in western parts, including countries located on the coast of the Mediterranean Sea, compared to eastern and southern parts. While male preponderance, similar to that observed at a national level, is reported for risk of CRC in this part of the world, males and females are at risk at younger ages compared to western countries. These findings show the necessity to consider CRC screening as an important issue in health policy priorities in the Middle East.

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