

# Prevalence of Positive Family History of Colorectal Cancer in the Iranian General Population

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## Abstract

**Background:** Individuals with a positive family history of colorectal cancer have an increased risk of developing this type of cancer. The number of affected relatives and the age at diagnosis are two factors that increase the risk of colorectal cancer. The aim of this study was to assess the prevalence of a positive family history of colorectal cancer in a random sample among the Iranian general population.

**Methods:** Five thousand five hundred (5500) subjects' aged  $\geq 20$  years were randomly selected by cluster sampling and invited to participate in an interview about the occurrence of colorectal cancer in their first- or second-degree relatives.

**Results:** Of all the responders, 162 (2.9%) subjects reported a positive family history of colorectal cancer; 71 (1.24%) reported having one first-degree relative with colorectal cancer diagnosed before the age of 50; or reported two or more first-degree relatives with colorectal cancer. In addition, 83 (1.51%) and 14 (0.25%) subjects reported having one and two or more second-degree relatives with colorectal cancer respectively.

**Conclusion:** The prevalence of a positive family history of colorectal cancer in Iran is lower than the United States and European countries. Identifying high-risk population for colorectal cancer and encouraging them to participate in surveillance protocols is the first step in targeting preventive measures.

**Key Words:** Colorectal Cancer, Family History, Prevalence, General Population, Iran

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## Introduction

Colorectal cancer (CRC) is the leading cause of cancer related loss of life throughout the world. There is strong evidence that this cancer can be prevented; therefore, screening is recommended in clinical practice guidelines[1-3]. The incidence of CRC is lower in Iran than in Western countries. CRC is the fifth and third most common cancer in men and women in Iran[4]. Incidence of CRC is increased during the last 25 years of life[5-7].

Recent studies showed that about 43 percent of CRC patients identified in Iran are below the age of 50 in contrast to western countries data[8]. Therefore, genetic factors may play an important role in the development of CRC in young patients in our country.

Individuals who have one or more first-degree relatives (FDR) with cancer are often at increased risk for developing cancer; this phenomenon reflects the interaction of multiple genetic variants that are more prevalent among relatives, and also reflects shared

environmental exposures that are poorly characterized[9]. Accordingly, several clinical practice guidelines suggest that persons meeting family history (FH) criteria for specific cancers may benefit from particular screening programs or initiating screening at an earlier age compared to people in the general population[10-15]. In up to 5% of all CRCs, genetic factors play a dominant role; a positive FH of CRC is observed in 10% to 15% of all the CRC cases [16]. The risk associated with a FH of CRC depends on the number of affected relatives and the age at diagnosis[17-19].

The proportion of the Iranian population with an increased risk of developing CRC on the basis of a positive FH is unknown. We need to know the size of this high risk group when planning for public health programs aimed at reducing incidence and mortality from this disease as those at higher risk can be subject to more intense strategies. The aim of this study was to assess the prevalence of a positive FH of CRC in a random sample among the Iranian population.

## Materials and Methods

**A) Setting:** This study was a community-based cross-sectional survey conducted from May 2006 to December 2007 in north, northeast, east and southeast of Tehran province (including Tehran metropolitan, Damavand, Varamin, Firoozkouh, Pakdasht and their rural areas). A total of 5500 individuals (age  $\geq 20$  years) were randomly selected by cluster sampling. Then, trained health staff from local health centers referred to all these 5500 individuals at their homes and met them face-to-face, asking them to participate in an interview. The individuals were informed that attending the interview was not compulsory. Informed consent for enrolment was obtained, and patient anonymity was preserved. The research protocol was approved by the Ethics Committee of Research Center for

Gastroenterology and Liver Diseases of Shahid Beheshti University of Medical Sciences.

**B) Questionnaire:** All participants completed a valid, reliable and detailed health questionnaire which included questions on smoking (current/past and never, occupation) and FH first or second degree relatives of CRC. The participants completed a question specifying the age of diagnosis for each relative with a history of CRC.

**C) Classification of family history (FH):** FH of first degree relatives (FDR) was defined as parents, siblings, or children; and second degree relatives (SDR) was defined as grandparents, aunts and uncles in this study.

**D) Statistical analysis:** All statistical analyses were carried out using SPSS v.13 software (SPSS, Chicago, IL, USA). Student's t-test was used to

**Table 1.** Sex specific characteristics of study participants relative to the presence or absence of family history of colorectal cancer

Characteristics	Men			Women		
	Family history(n=76)	No family history(n=2568)	P-Value	Family history(n=86)	No family history(n=2770)	P-Value
Mean (SD) age	40.30(15.74)	46.33(16.60)	0.002	42.91(13.87)	43.96(15.27)	0.529
Mean (SD) BMI	25.48(3.49)	25.19(3.85)	0.606	25.68(5.04)	25.75(4.76)	0.916
Cigarette smoking (%)						
Never	39(84.8)	1042(87.9)		63(98.4)	1267(98.0)	
Past/Current	7(15.2)	143(12.1)	0.522	1(1.6)	26(2.0)	0.802
Occupation (%)						
Employee/Retired	22(29.7)	1068(42.2)		13(15.9)	397(14.5)	
Worker	36(48.6)	1181(46.6)		5(6.1)	91(3.3)	
Unemployed	17(21.6)	283(11.2)	0.003	64(78.0)	2246(82.2)	0.358

Percentages may vary due to missing data

**Table 2.** Number of subjects according to family history status of colorectal cancer

Family history status	Family history status	
	Men(n=2644)	Women(n=2856)
Affected first-degree relative (%)		
1	28(1.1)	39(1.4)
$\geq 2$	1(0.04)	3(0.1)
Affected second-degree relative (%)		
1	41(1.6)	42(1.5)
$\geq 2$	9(0.3)	5(0.18)
1 first-degree relative, diagnosed at age $< 50$ (%)	5(0.09)	9(0.016)
2 first-degree relative, any age (%)	1(0.02)	3(0.06)
• 2 first-degree relative, 1 diagnosed at age $< 50$ (%)	0(0)	1(0.02)
$\geq 3$ first-degree relative, any age (%)	0(0)	4(0.07)
• $\geq 3$ first-degree relative, 1 diagnosed at age $< 50$ (%)	0(0)	1(0.02)

Percentages may vary due to missing data

compare means of continuous variables. Pearson's chi-square and contingency tables were performed to test independence between discrete classifications variables. Continuous variables are presented as mean  $\pm$  standard deviation and other parameters as frequency and percentage. A P-value of 0.05 or less was considered statistically significant and all reported P values were two sided.

## Results

The questionnaires were completed for 5500 subjects. Table 1 demonstrates the characteristics of the study participants (aged  $\geq 20$  years) stratified by sex and the presence or absence of a FH of CRC.

The mean age of men with a positive FH was 40.30 years, a value significantly different from the overall mean of 46.33 years for the men with negative FH. Furthermore, women responders with positive FH had a mean age of 42.91 years, which compared to 43.96 years for women with negative FH, was not significantly different ( $P > 0.05$ ). A positive FH was associated with the age of the interviewed subjects.

Among all the participants ( $n=5500$ ), 162 responders (2.9%) had a history of CRC, 67 (1.22%) had one and 4 (0.07%) had two or more FDRs with CRC. Of the 162 responders with positive FH, 14 patients (9.26%) were diagnosed before the age of 50.

Of all the responders ( $n=5500$ ), 18 subjects (0.33%) reported having two or more FDRs with CRC or one FDR with CRC diagnosed at age  $< 50$  years; and 4 subjects (0.07%) had three or more FDRs with CRC (Table 2).

Of all the responders ( $n=5500$ ), 83 (1.51%) and 14 (0.25%) subjects reported having one and two or more SDRs with CRC respectively (Table 2).

## Discussion

In this large population-based study in which participants are broadly representative of the Iranian population, we have estimated the prevalence of FH of CRC. The prevalence of a positive FH of CRC in Iran is lower than the United States and European countries. In these geographical areas, a family history of CRC which was reported in several cohort studies ranged between 10-15 percent [19-22]. Our findings indicate that 2.9% of Iranian population has a history of CRC in their relatives. This value is lower than the estimate of one study [18] conducted in the Scottish study (9.4%) which reported CRC in a first- or second-degree relatives.

Of all the subjects, 1.24% had at least one FDR with CRC, and 0.07% had two or more FDRs with

CRC. A positive FH was associated with the age of the interviewed subjects. Many surveys on FH of CRC were performed in cohorts of CRC patients [19-21]. These studies reported a proportion ranged between 10 to 15 percent of the patients having one FDR with CRC. Data on the prevalence of a positive FH of healthy subjects (not affected with CRC) may be derived from control groups in case-control studies. The reported FH for CRC in the control groups varied in these studies from 4% to 10% [20, 22, 23].

Our study is based on the self-reported FHs and not on medical records of individuals or pathology findings. Although some studies have shown that self-reported FHs of cancer are reliable for colon cancer risk assessment [24], other studies reported that the accuracy of self-reporting for CRC is in question [25-27]. This issue could be the cause of the over/underestimation of the frequency of a FH of CRC in the present study.

## Conclusion

Based on the findings, we estimate that more than 570,000 subjects in the age group  $\geq 20$  years in Iran have an at least two to three times increased risk of developing CRC. Approximately 14,000 of these subjects have an increased relative risk of four or more who should be identified and encouraged to participate in surveillance protocols. Thus, these results can be helpful to inform the health care providers and planners for those with a FH of CRC. At this time, colonoscopy is the appropriate surveillance method for this high-risk group.

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## Conflicts of Interest

The Authors declare that they have no conflicts of interest in this article.

## Author's Contribution

BMD conceived and designed this study and interpreted the results and drafted the manuscript. AS participated in writing and revise the manuscript. MAP and MV designed and carried out the analyses. MH and AP contributed to data gathering and data entering to the software MRZ revised and approved

the final manuscript. All authors read and improved the final manuscript.

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