

## Demographic and Medical History of Patients with Colorectal Neoplasia: A Descriptive Study based on Colonoscopy Findings

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### Abstract

**Background:** Colorectal cancer is one of the most prevalent types of cancer in Iran. Detection and removal of polyps in colorectal cancer can significantly decrease the morbidity and mortality of the disease. The present study aimed to describe the characteristics of patients who had been detected with colorectal neoplasia.

**Method:** This descriptive study was conducted on all the people who had been referred to the Research Institute for Gastroenterology and Liver Diseases for receiving colonoscopy services during 2017-2019. Information was collected through questionnaires designed based on four categories, namely personal information, clinical history, pharmacological history, and pathological results. We used logistic regression analysis to investigate the relationship between independent risk factors and colorectal neoplasia.

**Results:** The total number of the patients referred to the hospital was 2826. The percentage of males was 43.06. There was a low statistically significant relationship between gender and having neoplasia ( $P = 0.053$ ). We found that the history of diabetes was associated with neoplasia ( $P = 0.007$ ). Watery diarrhea and abdominal pain had a relationship with colorectal neoplasia and  $P$ -values; they were both below 0.001. Moreover, weight loss and inflammatory bowel disease had a significant statistical relationship and  $P$ -values were 0.02 and  $<0.001$ , respectively.

**Conclusion:** In Iran, most colonic polyps are located in the left colon and also polyps that are situated in different locations. Our study could strongly suggest some important risk factors, such as age, smoking, and body mass index, whose impact on colorectal neoplasia has been reported by other papers.

**Keywords:** Neoplasm, Diagnostic techniques, Medical history taking

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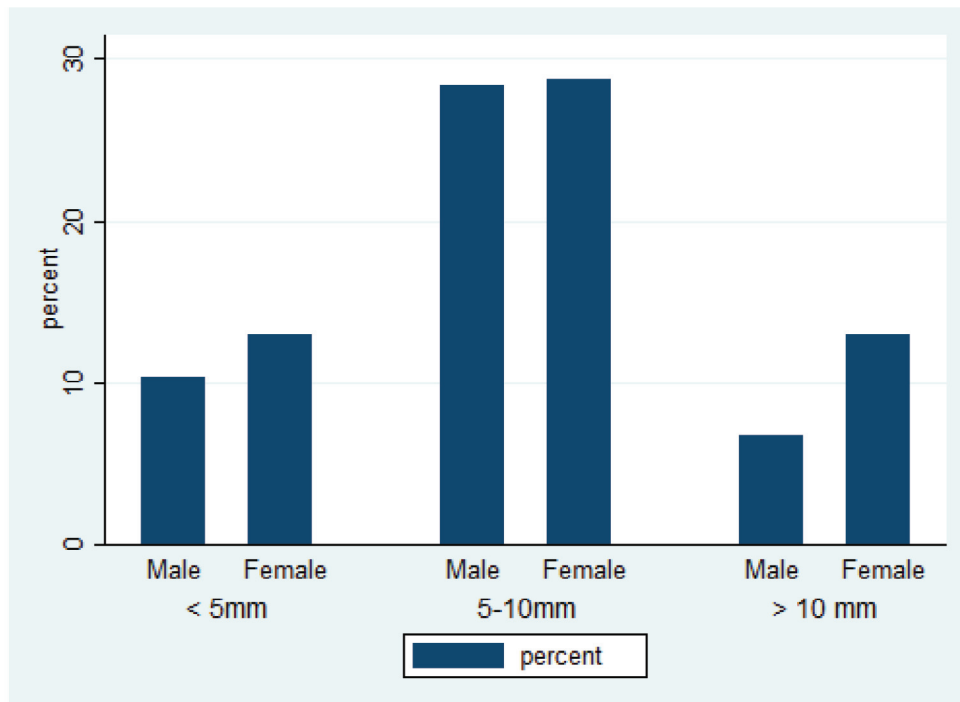
## Introduction

It is reported by the Global Health Observatory of the World Health Organization that 13% of all deaths originate from cancer.<sup>1</sup> Colorectal cancer (CRC) is said to be the fourth most prevalent cancer in the United States and the second leading cause of cancer-related mortality.<sup>2,3</sup> Additionally, there were 1.4 million new cases in 2012. Moreover, CRC is the fourth leading cause of cancer with 693,333 annual deaths worldwide.<sup>4</sup> Moreover, in Iran, CRC is one of the most common types of cancer. It is the third most prevalent cancer among the Iranians and the fourth most common cancer in women.<sup>5</sup> In 1997, autopsy studies from Iran reported the incidence of colorectal polyps to be 1.6%<sup>6,7</sup> with 5000 new cases each year.<sup>8</sup> Furthermore, studies have shown that the incidence of CRC is expected to increase over the next decades due to the ageing population and demographic changes in both developed and developing countries.<sup>9-11</sup> Colorectal polyps are found to be highly frequent among middle-aged people, with a prevalence as high as up to 30%.<sup>12</sup> The most common form of colorectal polyps is the epithelial type (either adenomatous or hyperplastic), followed by non-epithelial

(inflammatory and juvenile) polyps.<sup>13</sup> The risk to develop CRC can also be associated with environmental, socioeconomic, and lifestyle-related factors.<sup>14</sup> Ageing, male gender, high consumption of fat, alcohol or red meat, obesity, smoking, and lack of exercise have been also reported to be some described risk factors leading to the disease.<sup>15,16</sup>

Detection and removal of polyps in CRC can significantly decrease the morbidity and mortality of the disease.<sup>17</sup> Thus, screening for CRC can provide an opportunity to detect patients at risk for developing CRC, remove precursor lesions, or detect patients at an earlier stage of cancer.<sup>18</sup> The tests employed to early diagnose cancer and adenomatous polyps have been recommended for average-risk subjects aged 50 years and above, including colonoscopy and flexible sigmoidoscopy.<sup>19</sup>

To date, there have been numerous studies describing the risk factors of colorectal neoplasia in addition to the characteristics of polyps detected via colonoscopy. We conducted this study to describe the characteristics of the patients with colorectal neoplasia. Herein, both polyps and tumor were considered as colorectal neoplasia.



**Figure 1.** This figure shows the range of polyp size in genders in the patients with colorectal neoplasia.

**Table 1.** Distribution of gender and age differences pertaining to neoplasia

	Neoplasia		Total
	Yes	No	
<b>Gender</b>			
Male	307 (25.25)	(74.75) 909	1216 (100%)
Female	356 (22.13)	1253 (77.87)	1609 (100%)
Total	663 (23.47)	2162 (76.53)	2825 (100%)
<b>Age</b>			
<45	871 (42.03)	116 (18.12)	987 (36.39)
45-65	881 (42.51)	326 (50.93)	1207 (44.50)
>65	321 (15.44)	198 (30.93)	518 (19.10)
Total	2072 (76.4%)	640 (23.5%)	2712

## Materials and Method

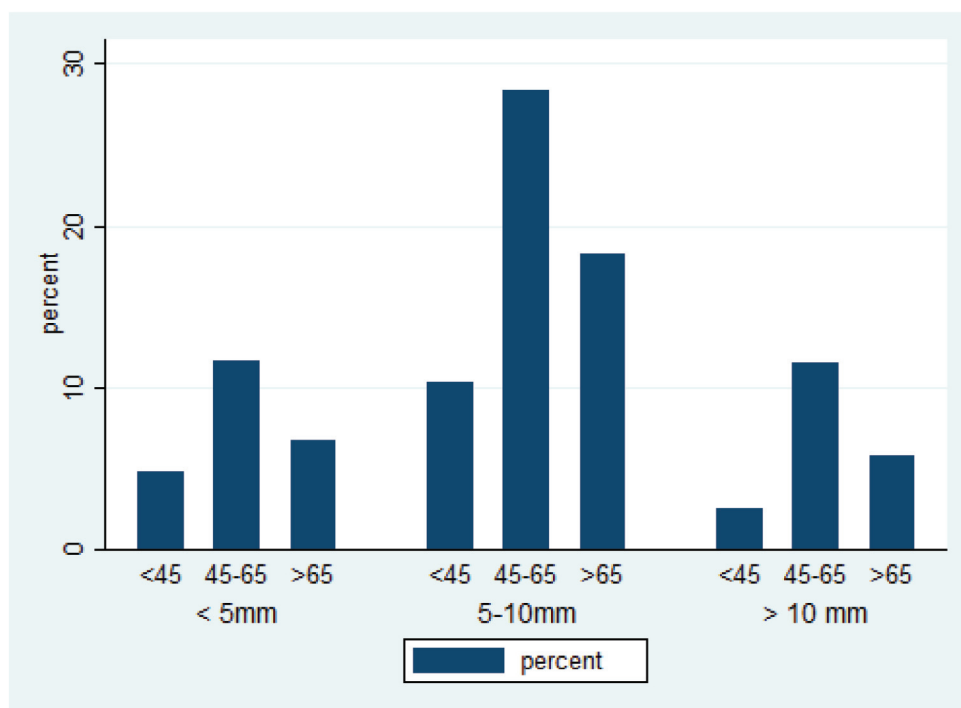
### Study population

This descriptive study was conducted on all the people who had been referred to the Research Institute for Gastroenterology and Liver Diseases at Shahid Beheshti University of Medical Sciences for receiving colonoscopy services in view of their symptoms during 2017-2019 in Tehran. The population came from two sectors of those with a positive test for FIT or with one or more CRC-associated risk factors, based on the guidelines of detecting high-risk groups in Iran; some had been referred to the hospital for receiving colonoscopy services, and some for colonoscopy

due to the early symptoms of colorectal disease detected by general or specialist physicians in gastrointestinal clinics or hospitals.

### Data collection

Information was collected through questionnaires designed based on four categories, namely personal information, clinical history, pharmacological history, and pathological results. All the questionnaires were completed by experts, who were educated for interviewing. For categorizing drugs, we used the Martindale classification references. The personal information included variables like age, gender, weight, height, ethnicity, education, smoking status, addiction,



**Figure 2.** This figure shows the range of polyp size in different ages in the patients with colorectal neoplasia.

**Table 2.** Distribution of neoplasia based on historical signs

Outcome	Constipation		Watery diarrhea		Hematochezia		Weight loss		Abdominal pain		IBD	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Not having neoplasia	1265 (59.22)	871 (40.78)	1825 (86.04)	296 (13.96)	1801 (84.95)	319 (15.05)	1891 (89.11)	231 (10.89)	1412 (66.60)	708 (33.40)	1958 (92.36)	162 (7.64)
Having neoplasia	402 (62.13)	245 (37.87)	593 (92.22)	50 (7.78)	555 (86.45)	87 (13.55)	592 (92.21)	50 (7.79)	475 (73.99)	167 (26.01)	625 (97.35)	17 (2.65)
Total	1667 (59.90)	1116 (40.10)	2418 (87.48)	346 (12.52)	2356 (85.30)	406 (14.70)	2483 (89.83)	281 (10.17)	1887 (68.32)	875 (32.68)	2583 (93.52)	179 (6.48)

IBD: Inflammatory bowel disease

fruit and vegetables consumption status, occupational exposure, and physical activity. The patients' clinical history consisted of inflammatory bowel disease (IBD), coronary heart disease, heart stroke, brain stroke, orchiectomy, gastrectomy, hysterectomy, stomach polyp, stomach cancer, prostate cancer, thyroid nodule, ovary cancer, endometrial cancer, and family polyp. The category of pharmacological history comprised drugs related to special diseases, like heart disease, hypertension, diabetes, stroke, depression, hormone therapy, and immunosuppressive drugs. At the end of the questionnaire, the results of colonoscopy were collected for each person.

Shahid Beheshti University of Medical Sciences approved this study under the ethical code of IR.SBMU.PHNS.REC.1400.010. The requirement for informed consent was waived since only de-identified data were assessed.

### Statistical analysis

Mean/median and standard deviation/interquartile range were used to describe continuous variables, while absolute and relative frequencies were applied to summarize categorical variables. Moreover, with logistic regression analysis, we assessed the relationship between different types of variables included in the study. It was also used to investigate the relationship between the independent risk factors and colorectal neoplasia.

## Results

### Demographic analysis

The total number of the patients referred to the Research Institute for Gastroenterology and Liver Diseases were 2826. The percentage of the patients who were referred from health care centers was 17.43%, from gastroenterologists

80.18%, and the remainders were referred from consultant physicians. The gender distribution of those who had done colonoscopy was 43.06% male (1216 in number) and the rest were female (1609 in number). The mean of age of the subjects was 51.13 years (standard deviation: 14.96), with the minimum age being 8 and the maximum being 92 years. Approximately half of the patients had Fars (Persian) ethnicity (53.22%) and Turk ethnicity was in the second rank (21.05%). Regarding different levels of education, people who had primary and secondary education accounted for 55.70% and those with college-level education, including bachelor's, master's, and doctoral degrees constituted 32.90% of the patients; the rest were illiterate people. Among all the people who had done colposcopy, the number of those with polyp was 630 (22.2%), and 51 patients (1.8%) had tumor.

### Characteristics of polyps

The total number of tumor and polyps was 51 and 631, respectively. Of all the polyps observed, 101 (15.25%) were located in rectum, 86 (12.9%) in sigmoid, 80 (12.08%) in transverse colon, 76 (11.48%) in descending colon, 62 (9.36%) in ascending colon, 21 (3.17) in cecum, and the rest were related to polyps which were multiple and located in different locations. In addition, among all the patients, 67.5% only had one polyp, 21.63% had two polyps, 6.73% had three polyps, and the rest had more than three polyps.

### Gender and age-specific analyses

There was a weak statistical relationship between gender and having neoplasia ( $P = 0.053$ ). In fact, women had a fairly higher risk of having a neoplasia compared with men (Table 1). However, the relationship between age and neoplasia showed a statistically significant relation between different age categories ( $P = 0.001$ ).

**Table 3.** Distribution of neoplasia based on medical history

Outcome	Diabetes		Coronary heart disease		CVA		CKD		Colectomy		Gastrectomy	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
No	1991 (94.00)	127 (6.00)	1990 (93.69)	134 (6.31)	2118 (99.86)	3 (0.14)	2120 (99.95)	1 (0.05)	319 (99.07)	3 (0.93)	2110 (99.48)	11 (0.52)
Yes	585 (90.98)	58 (9.02)	599 (92.72)	47 (7.28)	645 (100.00)	0 (0.00)	645 (100.00)	0 (0.00)	127 (97.69)	3 (2.31)	643 (99.69)	2 (0.31)
Total	2576 (93.30)	185 (6.70)	2589 (93.47)	181 (6.53)	2765 (99.89)	3 (0.11)	2765 (99.96)	1 (0.04)	446 (98.67)	6 (1.33)	2753 (99.53)	13 (0.47)

CVA: Cerebrovascular accident; CKD: Chronic kidney disease

These results indicated that increased age is correlated with having polyp or tumor (odds ratio (OR) = 1.14, confidence interval (CI) 95% = 1.12, 1.16). A high percentage of polyps had a small size (80.33%) and only 19.67% of them had a large size (> 1cm). Distribution of gender in terms of the levels of polyp size showed that polyps with 5-10 mm were observed in a higher percentage of the patients in both men and women. In different sizes of polyp, the percentage of men was lower than that of women (Figure 1). Analysis of age distribution concerning the levels of polyp size indicated that the highest percentage belonged to the age group of 45-65 years in all age groups (Figure 2).

*Medical history and symptoms*

Among the symptoms about which the patients were asked, watery diarrhea and abdominal pain were related to the outcome ( $P < 0.001$ ). Moreover, weight loss and IBD had a significant statistical relationship and the  $P$ -values were 0.02 and 0.001, respectively. Other factors, like constipation and hematochezia, were not associated with neoplasia (Table 2). There were also certain diseases whose history was asked and among them, only the history of diabetes had a positive association with neoplasia ( $P = 0.007$ ). Table 3 represents the distribution of medical history. We could find a close relationship between smoking and hookah with the outcome ( $P = 0.003$  and  $0.005$ , respectively). Furthermore, the results of logistic regression demonstrated that a number of factors, such as smoking, hookah, body mass index (BMI), weight loss, and drugs, can increase the odds of the outcome. Table 4 demonstrates the results of logistic regression.

**Discussion**

The database included 2826 patients and the prevalence of neoplasia in people who were referred to the hospital was 24.02%. Absolute and relative frequency of tumors was 51 (7.51%) and that of polyps was 628 (92.48%) among the neoplastic cases. Of all the polyps observed, 83 (12.53%) were located in the right side, 80 (12.08%) in transverse colon, 263 (39.63%) in left-side colon, and the rest were observed in polyps which were multiple and situated in different locations. Other studies have illustrated a variety of distribution levels about the location of polyps. Meanwhile, in a study by Tony, approximately 90% of polyps were located in the left colon.<sup>20</sup> Additionally, in western studies, the same distribution has been indicated in symptomatic and asymptomatic patients,<sup>21, 22</sup> and in Hoffman’s study, 72% of polyps were located in the left colon and 12% were located in the right colon.<sup>23</sup> However, in an Iranian study, 51% were left-sided, 20% right-sided, and the rest were synchronous.<sup>17</sup>

Adjusted OR for increased age was 1.4 related to colorectal neoplasia and it was 2.78 for the age of 45 to 64 years and 4.81 for an age over 65.

Several studies have shown that the occurrence of proximal adenomas increases with age beyond the age of 60.<sup>20, 24, 25</sup> Overall, adjusted OR in this study was consistent with Hodadoostan’s study in which the OR for age and high-grade dysplasia in patients was 1.8.<sup>17</sup> Hui-Hsiung Liu reported that both colonic polyps and advanced adenomas occurred more frequently in patients over the age of 50.<sup>26</sup> In agreement with the mentioned research, our study indicated that 82.2% of polyps and 72.34% of advanced neoplasia belonged to the

**Table 4.** Results of adjusted logistic regression model

Variable	Odds Ratio	Standard Error	P-value	Confidence interval
<b>Smoking</b>	1.41	0.16	0.003	1.12, 1.77
<b>Alcohol</b>	1.31	0.32	0.27	0.8, 2.1
<b>Hookah</b>	0.38	0.13	0.005	0.2, 0.75
<b>Physical activity</b>	0.94	0.05	0.32	0.84, 1.06
<b>BMI</b>				
<18.5	1.77	0.24	0.0001	1.34, 2.35
18.5-24.9	1.81	0.34	0.001	1.25, 2.63
25-29.9	2.39	0.67	0.002	1.37, 4.15
30-34.9	5.30	5.3	0.09	0.73, 38.2
35-40	0.66	0.70	0.70	0.08, 5.38
<b>Constipation</b>	0.88	0.08	0.20	0.74, 1.06
<b>Abdominal pain</b>	0.70	0.07	0.001	0.57, 0.85
<b>Weight loss</b>	0.69	0.11	0.024	0.50, 0.95
<b>IBD</b>	0.48	0.09	< 0.001	0.32, 0.73
<b>Hematochezia</b>	0.88	0.11	0.34	0.68, 1.14
<b>Cardiovascular drugs</b>	1.88	0.59	0.045	1.01, 3.5
<b>Depression drugs</b>	0.63	0.14	0.04	0.40, 0.98
<b>Diabetes drugs</b>	1.65	0.22	< 0.001	1.26, 2.17
<b>Gastrointestinal drugs</b>	0.75	0.09	0.03	0.58, 0.97

BMI: Body mass index; IBD: Inflammatory bowel disease

subjects above 45 years old. Women accounted for 56.94% and the adjusted OR for this group was 0.83, which showed that women have a lower chance for neoplasia than men. In contrast with the study by Thomas, in which men had a higher probability for proximal and distal neoplasms after adjustment for age and distal findings,<sup>20</sup> in our study women had more polyps; meanwhile, as for advanced neoplasia, men were at a higher risk. Herein, we investigated the risk factors and their relationship with neoplasia. As can be seen in table 4, there are some factors that can predict the odds of neoplasia (both polyps and tumor), including smoking, hookah use, BMI, abdominal pain, IBD, weight loss, and consumption of depression, gastrointestinal, and diabetes drugs. These results were consistent with those reported by Kim who demonstrated smoking, alcohol intake, and BMI as independent risk factors for both overall colorectal neoplasia and advanced colorectal neoplasia.<sup>27</sup> Smoking and alcohol are important risk factors for colorectal neoplasia, whose effect has been revealed in many studies.<sup>28, 29</sup> It should be emphasized that our results showed that smoking and alcohol enhance the odds of neoplasia by 1.41 and 1.31 times. Another determining risk factor, whose role in colorectal neoplasia has been indicated in many studies, is obesity.<sup>27, 30</sup> The results of our study are consistent

with these papers, which obviously shows that an increase in BMI affects the risk of neoplasia. In fact, a BMI of between 25-30 increases the odds of neoplasia by 2.39 times in comparison with the reference group, or a BMI of between 30-35 enhances the odds by 5.3 times. Other variables, such as IBD, had a strong association with the outcome (OR = 0.48,  $P = 0.00$ ). This finding was inconsistent with that reported by Bansal who showed that male gender, white race, and IBD (OR = 1) cannot be significant risk factors for CRC mortality.<sup>31</sup> Among the signs that the patients reported, abdominal pain and weight loss (OR = 0.70 and 0.69,  $P = 0.00$ , 0.02) had a strong relationship, while constipation and hematochezia had a weak relationship (OR = 0.88 and 0.88 and,  $P = 0.20$  and 0.34, respectively). The results of weight loss were also inconsistent with other studies, including that by Adelstein (AUC weight loss = 0.67, LR+ 2.5, LR - 0.9).<sup>32</sup> However, Hamilton concluded that rectal bleeding (OR = 15,  $P = 0.001$ ), weight loss (OR = 2.7,  $P = 0.001$ ), and constipation (OR = 2,  $P = 0.006$ ) can be risk factors for earlier diagnosis of CRC, but abdominal pain (OR = 0.56,  $P = 0.003$ ) is not a good index.<sup>33</sup> Regarding pharmacological history, the use of diabetes drugs (OR = 1.65,  $P = 0.00$ ) had a significant relationship with colorectal neoplasia. Despite the controversial

results of various studies concerning the relationship between diabetes and CRC, the results of the meta-analysis conducted by Larsson obviously showed a substantial association for diabetes (RR = 1.26, 95% CI = 1.05 to 1.50).<sup>34</sup>

Our study has certain strengths and limitations. One of the strengths of this study is believed to be the large number of participants. In fact, we included all the patients who were referred to the institute for three years. Nonetheless, the probability of selection bias could not be avoided. The patients referred to the research center were screened by FIT test, and this study was conducted in a single research center in Tehran. In addition, there are demographic and cultural differences in Tehran compared with other cities. Consequently, our research cannot be generalized to the entire Iranian population.

One of the limitations was missing data on the results of colonoscopy findings in 331 patients, whose information had to be removed. The missing data for some variables is another limitation of the current study. On account of the objective of our study, which was describing colorectal neoplasia patients' characteristics, complete case was used for each variable.

## Conclusion

Our study strongly suggested a number of pivotal risk factors, such as age, smoking, and BMI. Other studies have shown the impact of these factors on colorectal neoplasia. We could recommend that the effect of these risk factors be investigated in population-based cohort studies for developing a country-based diagnostic prediction model.

## Conflict of Interest

None declared.

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