

Epidemiological study of colon cancer in educational hospitals of Birjand University of Medical Sciences (2006-2011)

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ABSTRACT

Background and aims: Among all cancers, colon cancer is common and deadly, yet preventable. The estimated worldwide incidence of colon cancer is more than one million new cases per year. This study was done to identify the epidemiological features and risk factors of colon cancer in different regions of Birjand.

Methods: This retrospective, descriptive analytical study of patients with colon cancer was conducted in Birjand educational hospitals. This study examined the patients whose colon cancers had been confirmed by a pathologist (2006-11). Statistics related to these patients were collected from pathology centers affiliated to Birjand University of Medical Sciences. Data were analyzed using descriptive (frequency and relative frequency) and analytical (chi square test) statistics. SPSS software was used to analyze the collected data.

Results: Results of the present research showed that a total of 38 people with colon cancer were hospitalized in Birjand educational hospitals between 2006 and 2011. In the present study, there was a significant difference between the patients' job and the type of morphology ($P=0.018$) and the therapeutic procedures ($P=0.001$); Adenocarcinoma was mainly reported among housewives ($n=10$, 76.9%). Concerning therapeutic procedures, housewives underwent colectomy surgery more than other groups ($n=8$, 61.5%).

Conclusion: Controlling colon cancer which is one of the most common cancers in the world is a great epidemiologic success. The findings of this study presented a complete and exact image of epidemiology of this cancer in the region and provided the authorities with precious information; therefore, they can make decisions about identifying colon cancer risk factors in the region.

Keywords: Colon cancer, Cancer epidemiology, Prevalence.

INTRODUCTION

Prevalence of cancer in the world is due to increasing aging population. Changes in

fertility patterns associated with urbanization and economic development, smoking,

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overweight and physical inactivity are the most common carcinogenic risk factors.¹

Among all cancers, colon cancer is common and deadly, yet preventable. This cancer has attracted the attention of health centers all around the world. The estimated worldwide incidence of colon cancer is more than one million new cases per year.² It is among the five most common cancers diagnosed in both men and women.³ According to statistics, almost one out of every three patients with colon cancer died.² It must be noted that more than half of these cases (55%) occurred in developing countries.⁴

Despite high incidence of colon cancer in Western countries, its mortality is decreasing due to increased level of people's awareness of the early symptoms of colon cancer and its timely diagnosis. Unlike western countries, incidence of this cancer is low in Iran; it is the fifth most common cancer among men and the third most common one among women. However, statistics show that its incidence in Iran has increased considerably over the last 25 years and among young people is higher than what is expected.⁵⁻⁸ It is predicted that it may increase dramatically in Iran.^{9,10}

Therefore, the importance of examining and studying this cancer as an important health problem is obvious. Colon cancer is highly associated with unhealthy life styles. Several epidemiologic and laboratory studies have examined the relationship between colon cancer and life style factors such as low fiber intake, smoking, low calcium diet, high fat diet and physical inactivity.¹¹⁻¹⁴

Generally, colorectal cancer is widely regarded as an environmental disease because some environmental, geographical, cultural, social and lifestyle factors can have a significant effect on its incidence.¹⁵ Fortunately, although it is progressive and fatal, colon cancer is one of few cancers that

can be prevented. In general, colorectal cancer is much better than other cancers of the digestive system. If diagnosed and treated at an early stage, this cancer will have a good prognosis.^{14,16} Therefore, understanding risk factors of this cancer and encouraging people to do screening tests is important in early diagnosis. Since identifying epidemiologic factors and risk factors of diseases in different regions can help to prevent, control and treat diseases and since no research has been carried out on the epidemiology of colon cancer in Southern Khorasan, this study aimed to investigate the epidemiology of colon cancer in educational hospitals of Birjand University of Medical Sciences during 2006-2011.

METHODS

This retrospective, descriptive and analytical study of patients with colon cancer was conducted in Birjand educational hospitals. This study examined patients whose colon cancer had been confirmed by a pathologist (2006-11). Statistics related to these patients were collected from pathology centers affiliated to Birjand University of Medical Sciences. In order to collect data, patients' medical records were reviewed. Data was extracted using a researcher-made checklist that its validity was confirmed by five faculty members. This checklist consisted of three parts. The first part was related to the patients' demographic data. To collect this data, the researchers reviewed the patients' hospital admission sheets. To ensure the accuracy of the collected data, the researchers telephoned the patients. The second part of the checklist included records of drug abuse, history of family cancer, hypertension, diabetes, hyperlipidemia and surgery. The researchers reviewed the patients' history, summary and physicians' order sheets to collect this part of data. The last part was designed to collect data about

the diagnosis, treatment and morphological type of colon cancer; in this case, patients' summary sheets, surgical operations sheets, pathological reports and physicians' order sheets were studied. Data was analyzed using descriptive (frequency and relative frequency) and analytical (chi square test) statistics. SPSS software was used to analyze the collected data. In order to protect the patients' rights, the data remained confidential.

One of the limitations of this study was difficult access to patients' pathological reports which were kept separately (they were not found in the

patients' files). Medical Records staff helped the researches in this regard and accelerated this process.

RESULTS

Results of the present research showed that a total of 38 people with colon cancer were hospitalized in Birjand educational hospitals between 2006 and 2011. Most patients (n=24, 63.2%) were male aged 60-80 (n=26, 68.4%). The majority of patients lived in the city (n=26, 68.4%), were housewives (n=13, 34.2%) and married (n=36, 94.7%) (Table 1).

Table 1: Frequency distribution of patients with colon cancer based on demographic data

Demographic features		Frequency(%)	
Gender	Male	24(63.2)	
	Female	14(36.8)	
Age	20-39	2(5.3)	
	40-59	9(23.7)	
	60-79	26(68.4)	
	80 and more	1(2.6)	
	Married	36(94.7)	
Marital status	Single	1(2.6)	
	Widowed	1(2.6)	
	Urban	26(68.4)	
Residence	Rural	12(31.6)	
	Birjand districts	2(5.3)	
	Ghaen districts	4(10.5)	
	Ferdows districts	1(2.6)	
	Nehbandan districts	1(2.6)	
	Khosef districts	0(0)	
	Shoosef districts	1(2.6)	
	Sarbishe districts	1(2.6)	
	Darmian districts	2(5.3)	
	Employee	2(5.3)	
	Worker	0(0)	
	Occupation	Farmer	7(18.4)
		Self-employed	2(5.3)
Housewife		13(34.2)	
Other		14(36.8)	

In this study, a family history of cancer was not reported in any of these patients. A

small percentage of patients had a history of substance abuse (n=9, 23.7%), hypertension

(n=5, 13.2%), diabetes (n=3, 7.9%) and hyperlipidemia (n=4, 10.5%). Of all patients, 5.3% (n=2) had a history of prostatectomy surgery, 2.6% (n=1) herniotomy, and 13.2% (n=5) a type of surgery (which wasn't recorded in their medical records). The recorded reports

revealed that most of the patients (n=30, 78.9%) had no history of surgery. Colectomy was the surgical procedure for most patients (n=24, 63.2%). Moreover, the most common diagnostic methods for colon cancer were the combination of colonoscopy and biopsy (n=28, 73.7%) (Table 2).

Table 2: The relationship between peoples' occupation and the cancer morphology type and the therapeutic procedure

Variable		Employee	Farmer	Selfemployed	Housewife	Other	P
		n(%)	n(%)	n(%)	n(%)	n(%)	
Job	Carcinoma	0(0)	0(0)	0(0)	3(23.1)	6(42.9)	0.018
	Adenocarcinoma	2(100)	7(100)	2(100)	10(76.9)	8(57.1)	
Morphology type and the therapeutic measure	Colectomy	1(50)	2(28.6)	1(50)	8(61.5)	4(28.6)	0.001
	Medical treatment	0(0)	0(0)	1(50)	3(23.1)	6(42.9)	
	Other therapeutic procedures	1(50)	5(71.4)	0(0)	2(15.4)	4(28.5)	

Adenocarcinoma was the most common morphology in colon cancer (n=29, 76.3). In the present study, there was a significant difference between the patients' job and the type of morphology (P=0.018) and the therapeutic procedures (P=0.001); Adenocarcinoma was mainly reported among housewives (n=10, 76.9%). Concerning therapeutic procedures, housewives underwent colectomy surgery more than other groups (n=8, 61.5%). Comparison of frequency of colon cancer was not statistically significant in terms of other demographic variables.

DISCUSSION

This study showed that patient job is an important risk factor in incidence of different morphological type of colon cancer. Some risk factors such as age, the place of residence and gender could be effective in incidence of this cancer. Further research is required to confirm these findings. Previous

family history of colon cancer or history of other underlying diseases were not frequent among affected patients.

Studies have revealed that the possibility of diagnosis of colon cancer increases after the age of 40. The incidence risk of this cancer gradually starts at the age of 40 and increases dramatically at the age of 50. It is estimated that more than 90% of colon cancers occur at the age of 50 or more.^{17,18} However, some studies have shown that this cancer also occurs among young people; colon cancer has become one of the 10 most common cancers among young people aged 20-49 in the United States of America.¹⁹ In this study, only about 5% of patients were under 40. Findings of this study also confirmed that the incidence of colon cancer was about 35% to 40% more in men than in women. The reasons have not been understood well but it might be due to complex physical and hormonal differences between men and women or to the different levels of exposure

to risk factors.²⁰ Owing to their jobs, some men are directly exposed to carcinogenic risk factors. In addition, men smoke more in Iran, and it is an important carcinogenic risk factor. In this regard, another study showed that men who worked a lot and those who had laborious jobs were at lower risks of colon cancer due to high physical activities.²¹ These issues may explain the higher incidence of this cancer among housewives. Another studies showed that several lifestyle-related factors have been linked to colorectal cancer. Two modifiable and interrelated risk factors, physical inactivity and excess body weight, are reported to account for about a fourth to a third of colorectal cancers.^{22,23}

The findings of the present study revealed that the majority of people with colon cancer lived in the cities. Colon cancer is highly associated with the lifestyle. Shifts to the Western lifestyle, physical inactivity and obesity, air pollution and poor diet are all colon cancer risk factors.^{22,24} City dwellers are more prone to this common cancer.

Another studies showed that there are some other geographic factors such as the place of residency influencing differences in incidence of colorectal cancer. The incidence is typically higher among individuals living in urban areas. Current residence in an urban area is more important risk factor than an urban location of birth. This excess incidence in urban areas is more apparent among men than women, and for colon cancer than for rectal cancer.^{25,26} Colorectal cancer is widely considered to be an environmental disease, with “environmental” defined broadly to include a wide range of often ill-defined cultural, social, and lifestyle factors.²⁷

The results of this study showed that none of the patients with colon cancer had the family history of this cancer. Other studies have also shown that most cases of

colon cancer occurred in people with no previous family history or underlying diseases. However, another study showed that about 20% of patients had a family history of cancer.²⁸ Other research also showed that people with a history of colon cancer in their close relatives were at higher (2 to 3 times more) risks of this disease.²⁹

In this study, a small percentage of the subjects had diabetes, while evidence suggested that diabetes was associated with an increased risk of colorectal cancer.^{30,31} Results of a meta-analysis study showed that people with diabetes were 30% more likely to develop colorectal cancer than those who did not have diabetes.³²

In this study, the majority of patients with colon cancer had no history of smoking. Unlike the results of this study, other studies have shown that smoking is one of the most dangerous risk factors for colorectal cancer, and it accounts for 12% of mortality.³³ Tobacco used in cigarettes causes the growth of malignant tumors, and smokers are at higher risks of cancer.¹⁸ Several factors can justify the differences between the results of this study and other studies. Some of these factors are cultural differences, peoples’ different attitudes in different regions, a small number of subjects examined in this study and lack of accurate and complete information in the medical records. In this study, 73.7% of patients with colon cancer underwent colonoscopy; findings of some studies confirmed the results of the present study.^{34,35} Swiderska findings showed that endoscopy is the most precise diagnostic method.² Another study showed that the incidence of colon cancer was less in people who underwent colonoscopy than those who did not.³⁵ Deaths from colorectal cancer have decreased with the use of colonoscopies and fecal occult blood tests.¹

However Studies have shown that risk factors related to lifestyle such as

nutrition, obesity and physical activity affect colon cancer.^{22,24,36} The present study couldn't examine these factors due to unavailability of data.

One of the strengths of this study was that it examined all colon cancer cases in the region over a 5-year period. Therefore, it can be stated that although the number of patients with colon cancer was low and data analysis was performed on a limited number of patients, the results could be generalizable because all the patients participated in this study. In order to collect accurate and exact data, the researchers tried to review documents available in the medical records and pathology reports and to telephone the patients, if necessary. Other limitation of this study is that this study was conducted as retrospective and did not follow up the patients to examine the factors influencing the treatment process of these patients.

CONCLUSION

Controlling colon cancer which is one of the most common cancers in the world is a great epidemiologic success. The findings of this study presented a complete and exact image of epidemiology of this cancer in the region and provided the authorities with precious information; therefore, they can make decisions about identifying colon cancer risk factors and take steps to reduce cancer rate by teaching people, having long-term programs and changing patients' cultures and lifestyle of patients in the region.

CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest.

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REFERENCES

1. Risk factors for cancers. Available from: <http://www.cancer.gov/about-cancer/causes-prevention/risk>. [Accessed Jul 2014].
2. Swiderska M, Choromanska B, Dabrowska E, Konarzewska-Duchnowska E, Choromanska K, Szczurko G, et al. The diagnostics of colorectal cancer. *Contemp Oncol*. 2014; 18(1): 1-6.
3. WHO fact sheet on cancer, Available from: <http://www.who.int/mediacentre/factsheets/fs297/en/>. [Accessed Sep 2014].
4. Thun MJ, DeLancey JO, Center MM, Jemal A, Ward EM. The global burden of cancer: Priorities for prevention. *Carcinogenesis*. 2010; 31(1): 100-10.
5. Hosseini SV, Izadpanah A, Yarmohammadi H. Epidemiological changes in colorectal cancer in Shiraz, Iran: 1980-2000. *ANZ J Surg*. 2004; 74(7): 547-9.
6. Ansari R, Mahdavinia M, Sadjadi A, Nouraei M, Kamangar F, Bishehsari F, et al. Incidence and age distribution of colorectal cancer in Iran: Results of a population-based cancer registry. *Cancer Lett*. 2006; 240(1): 143-7.
7. Foroutan M, Rahimi N, Tabatabaeifar M, Darvishi M, Hashemi M, Hossein-Panah F, et al. Clinical features of colorectal cancer in Iran: A 15-year review. *J Dig Dis*. 2008; 9(4): 225-7.
8. Safaee A, Moghimi-Dehkordi B, Fatemi SR, Pourhoseingholi MA, Vahedi M, Pourhoseingholi A, et al. Frequency of colorectal cancer in healthy individual's relatives: A cross-sectional population-based study. *Koomesh*. 2011; 12(2): 129-33.
9. Kashfi SM, Behboudi Farahbakhsh F, Golmohammadi M, Nazemalhosseini Mojarad E, Azimzadeh P, Asadzadeh Aghdaie H. Frameshift Mutations (Deletion at Codon 1309 and Codon 849) in the APC gene in

- Iranian FAP patients: A case series and review of the literature. *Int J Mol Cell Med*. 2014; 3(3): 196-202.
10. Shemirani AI, Haghighi MM, Zadeh SM, Fatemi SR, Taleghani MY, Zali N, et al. Simplified MSI marker panel for diagnosis of colorectal cancer. *Asian Pac J Cancer Prev*. 2011; 12(8): 2101-4.
 11. Johnson JJ, Mukhtar H. Curcumin for chemoprevention of colon cancer. *Cancer Lett*. 2007; 255(2): 170-81.
 12. Terry P, Giovannucci E, Michels KB, Bergkvist L, Hansen H, Holmberg L, et al. Fruit, vegetables, dietary fiber, and risk of colorectal cancer. *J Natl Cancer Inst*. 2001; 93(7): 525-33.
 13. Vece MM, Agnoli C, Grioni S, Sieri S, Pala V, Pellegrini N, et al. Dietary total antioxidant capacity and colorectal cancer in the Italian EPIC cohort. *PLoS One*. 2015; 10(11): e0142995.
 14. Colorectal cancer facts and figures, Available from: <http://www.cancer.org/acs/groups/content/@epidemiologysurveillance/documents/document/acspc-028312.pdf>. [Accessed Feb 2014].
 15. Hagggar FA, Boushey RP. Colorectal cancer epidemiology: Incidence, mortality, survival, and risk factors. *Clin Colon Rectal Surg*. 2009; 22(4): 191-7.
 16. Johnson IT, Lund EK. Review article: Nutrition, obesity and colorectal cancer. *Aliment Pharmacol Ther*. 2007; 26(2): 161-81.
 17. Ries LA, Harkins D, Krapcho M, Mariotto A, Miller BA, Feuer EJ, et al. SEER cancer statistics review, 1975-2003. NIH; 2006.
 18. NIH. What you need to know about cancer of the colon and rectum. Department of Health, Education, and Welfare, Public Health Service, National Institutes of Health; 1978.
 19. O'Connell JB, Maggard MA, Livingston EH, Yo CK. Colorectal cancer in the young. *Am J Surg*. 2004; 187(3): 343-8.
 20. Murphy G, Devesa SS, Cross AJ, Inskip PD, McGlynn KA, Cook MB. Sex disparities in colorectal cancer incidence by anatomic subsite, race and age. *Int J Cancer*. 2011; 128(7): 1668-75.
 21. Shephard RJ. Exercise in the prevention and treatment of cancer. An update. *Sports Med*. 1993; 15(4): 258-80.
 22. De Jong AE, Morreau H, Nagengast FM, Mathus-Vliegen EM, Kleibeuker JH, Griffioen G, et al. Prevalence of adenomas among young individuals at average risk for colorectal cancer. *Am J Gastroenterol*. 2005; 100(1): 139-43.
 23. Lee KJ, Inoue M, Otani T, Iwasaki M, Sasazuki S, Tsugane S, et al. Physical activity and risk of colorectal cancer in Japanese men and women: The Japan Public Health Center-based prospective study. *Cancer Causes Control*. 2007; 18(2): 199-209.
 24. Bazensky I, Shoobridge-Moran C, Yoder LH. Colorectal cancer: An overview of the epidemiology, risk factors, symptoms, and screening guidelines. *Medsurg Nurs*. 2007; 16(1): 46-51.
 25. Boyle P, Langman JS. ABC of colorectal cancer: Epidemiology. *BMJ*. 2000; 321(7264): 805-8.
 26. Janout V, Kollarova H. Epidemiology of colorectal cancer. *Biomed Pap Med Fac Univ Palacky Olomouc Czech Repub*. 2001; 145(1): 5-10.
 27. Hagggar FA, Boushey RP. Colorectal cancer epidemiology: Incidence, mortality, survival, and risk factors. *Clin Colon Rectal Surg*. 2009; 22(4): 191-7.
 28. Van't Veer P, Kampman E. Food, nutrition, physical activity, and the prevention of cancer: A global perspective: World Cancer Research Fund/American Institute for Cancer Research; 2007. Available from: <https://www.nih.gov/>.
 29. Butterworth AS, Higgins JP, Pharoah P. Relative and absolute risk of colorectal cancer for individuals with a family history: A meta-analysis. *Eur J Cancer*. 2006; 42(2): 216-27.
 30. He J, Stram DO, Kolonel LN, Henderson BE, Le Marchand L, Haiman CA. The association

of diabetes with colorectal cancer risk: The multiethnic cohort. *Br J Cancer*. 2010; 103(1): 120-6.

31. Jee SH, Ohrr H, Sull JW, Yun JE, Ji M, Samet JM. Fasting serum glucose level and cancer risk in Korean men and women. *JAMA*. 2005; 293(2): 194-202.

32. Larsson SC, Orsini N, Wolk A. Diabetes mellitus and risk of colorectal cancer: A meta-analysis. *J Natl Cancer Inst*. 2005; 97(22): 1679-87.

33. Zisman AL, Nickolov A, Brand RE, Gorchow A, Roy HK. Associations between the age at diagnosis and location of colorectal cancer and the use of alcohol and tobacco: implications for screening. *Arch Intern Med*. 2006; 166(6): 629-34.

34. Somi MH, Alizadeh N, Farhang S, Mirynejad K, Jazayeri O, Sadeghi M. The diagnosis and treatment of patients with gastric cancer and problems in the province. *Med J Tabriz Univ Med Sci*. 2010; 4: 57-63.

35. Ananthakrishnan AN, Cagan A, Cai T, Gainer VS, Shaw SY, Churchill S, et al. Colonoscopy is associated with a reduced risk for colon cancer and mortality in patients with inflammatory bowel diseases. *Clin Gastroenterol Hepatol*. 2015; 13(2): 322-9.

36. Kirkegaard H, Johnsen NF, Christensen J, Frederiksen K, Overvad K, Tjønneland A. Association of adherence to lifestyle recommendations and risk of colorectal cancer: A prospective Danish cohort study. *BMJ*. 2010; 341.

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