AN EPIDEMIOLOGICAL STUDY ON PATIENTS WITH COLORECTAL CANCER ADMITTED TO ONE REFERRAL CENTER IN NORTH OF IRAN FROM 2006 TO 2015

G. JANBABAEI[1], A. HEDAYATIZADEH-OMRAN[1], R. ALIZADEH-NAVAEI[1], S. MORADI[1], A. AHMADI[2], M. RASHIDI ALASHTI[1], M. ESLAMIJOUYBARI[1]

[1]Gastrointestinal Cancer Research Center, Mazandaran University of Medical Sciences, Sari, Iran.
[2]Pharmaceutical Sciences Research Center, Mazandaran University of Medical Sciences, Sari, Iran.

Abstract – Objective: *Colorectal cancer (CRC) is a common and lethal disease and is one of the most common cancers worldwide. This study attempted to statistically analyze the epidemiological characteristics rate of colorectal cancer patients admitted to a Referral Center, Northern Iran from 2006 to 2015.*

***Patients and Methods:** This was a descriptive-analytical, cross-sectional and retrospective study. The patients' information and relevant variables were recorded. Data were analyzed through descriptive, in SPSS.*

***Results:** The highest incidence was observed in patients over 60 years of age and it was more common in men than women. In terms of grading, the highest frequency was found in well differentiation, while the lowest frequency was found in poor differentiation. Most of the patients fell under IIA and IIIB staging and the most frequent type of invasion was regional. The most frequent involvement was found in rectum and rectosigmoid, and the involvement distance to anal verge in the majority of patients was more than 8 cm. The CEA Index in the majority of patients ranged from 2.5 to 20 ng/ml. Results also display the positive trends in cancer records, grading, gender segregation and age groups, respectively.*

***Conclusions:** The highest prevalence of colorectal cancer belonged to men patients over 60 years, in rectum, with regional well differentiation and younger age are affected by colorectal cancer in the region. This certainly calls for further attention to preventive planning and training on cancer in developing health policies.*

KEYWORDS: *Epidemiological, Colorectal cancer, Rectosigmoid, Rectum.*

INTRODUCTION

Nowadays, cancer is one of the major health-threatening problems in the US and other parts of the world[1]. It has also affected governments as a major problem in the health system[2]. Colorectal cancer is one of the most important cancers and the second leading cause of cancer death in the US[3,4]. It is the most common cancer of the gastrointestinal tract, accounting for 38% of gastrointestinal tract cancers and ranking the third most common cancer among men and women[5]. Each year, about one million new cases of colorectal cancer are diagnosed worldwide, and nearly half a million people (about 10 percent of cancer-induced deaths) lose their lives due to this disease[5]. The incidence of colorectal cancer has intensified in Iran during the last 25 years[6]. According to a study by Siegel et al [7], colorectal cancer constitutes the third leading cause of cancer death in men and women. According to a report by Iranian Cancer Research Center (ICRC), colorectal cancer is the third and fifth most common cancer among Iranian women and men, respectively[8]. Statistical data play a key role

TABLE 1. Demographic characteristics of patients with colorectal cancer (2006-2015).

Age	Frequency	Percentage	Occupation	Frequency	Percentage
Under 40 years old	89	12.9	Housewife	254	36.9
Between 40 and 60 years old	240	34.9	Farmer	71	10.3
Over 60 years old	359	52.2	Worker	33	4.8
Gender			Employee	36	5.3
Male	381	55.4	Cultural (education)	16	2.4
Female	307	44.6	Driver	10	1.5
			Self-employed	83	12.1
			Retired	142	20.6
			Other	43	6.1

TABLE 2. Histopathologic characteristics of patients with colorectal cancer (2006-2015).

Grading	Frequency	Percentage	Staging	Frequency	Percentage
Well differentiation	374	54.3	I	79	11.5
Moderate differentiation	270	39.3	IIA	238	34.6
Poor differentiation	44	6.4	IIB	36	5.2
Invasion			IIC	3	0.5
In situ	0	0	IIIA	8	1.2
Local	282	40.9	IIIB	174	25.3
Regional	314	45.7	IIIC	46	6.6
Distant	92	13.4	IV	104	15

in decision-making, prevention, and treatment of cancer patients. Moreover, cancer statistics vary in different parts of Iran, and there have been very few comprehensive studies available on the epidemiological characteristics and survival rate of patients with colorectal cancer. Therefore, this study attempted to statistically analyze the epidemiological characteristics rate of colorectal cancer patients admitted to one Referral Center from 2006 to 2015.

PATIENTS AND METHODS

This was a descriptive-analytical, cross-sectional and retrospective study analyzing the epidemiological and demographic characteristics of patients with colorectal cancer. The data were collected from medical records of patients admitted to Tuba Oncology and Chemotherapy Clinic (TOCC), one of the largest referral clinics across Mazandaran (a province in the north of Iran), during 2006-2015. The patients' information and relevant variables were recorded. The sample size was n=690. The population's information including age, gender, occupation, marital status, level of education, clinical and laboratory findings, etc. was entirely collected through a checklist. The inclusion criterion was all patients admitted to TOCC due to colorectal cancer. The exclusion criteria were losing contact with patients.

Statistical Analysis

Data were analyzed through descriptive, in SPSS statistical software (SPSS Inc., Chicago, IL, USA). The data were analyzed using descriptive and single-variable methods, as well as the Mann-Whitney U test for evaluating comparisons, with SPSS statistical software. A *p*-value < 0.05 was considered to be statistically significant.

TABLE 3. Anatomic characteristics of patients with colorectal cancer (2006-2015).

Anatomic area	Frequency	Percentage	Distance to anal verge	Frequency	Percentage
Ascending colon	107	15.6	Less than 4 cm	92	13.4
Descending colon	48	7	Between 4 and 8 cm	226	32.8
Transverse colon	54	7.8	More than 8 cm	370	53.8
Recto-sigmoid	189	27.5			
Rectum	209	30.4			
Cecum	70	10.2			
More than one area	11	1.5			

RESULTS

Table 1 shows the demographic characteristics of patients with colorectal cancer admitted to Bagheban Referral Center (Tuba) from 2006 to 2015. The highest incidence was observed in patients over 60 years of age and it was more common in men than women. The mean age was 59 years. Table 2 displays the histopathologic characteristics of patients with colorectal cancer visiting Bagheban Referral Center (Tuba) from 2006 to 2015. In terms of grading, the highest frequency was found in well differentiation, while the lowest frequency was found in poor differentiation. Most of the patients fell under IIA and IIIB staging and the most frequent type of invasion was regional.

Table 3 shows the Anatomic characteristics of patients with colorectal cancer visiting Bagheban Referral Center (Tuba) from 2006 to 2015. The most frequent involvement was found in rectum and rectosigmoid, and the involvement distance to anal verge in the majority of patients was more than 8 cm.

Table 4 details the metastatic organs, metastasis duration, lymph nodes and the carcinoembryonic antigen (CEA) index in patients with colorectal cancer admitted to Bagheban Referral Center (Tuba) from 2006 to 2015. The CEA Index in the majority of patients ranged from 2.5 to 20 ng/ml. The liver and brain represented the most and least frequent metastatic organs in colorectal cancer patients, respectively. The most common clinical symptoms in these patients were rectorrhagia and obstruction.

TABLE 4. Metastasis profile and lymph node status in patients with colorectal cancer (2006-2015).

The frequency of metastasis by organ (n=209)					
Organ	Frequency	Percentage	Organ	Frequency	Percentage
Liver	112	53.6	Brain	2	1
Bones	8	3.8	Peritoneum (ascites)	9	4.3
Lungs	9	4.3	Other	14	6.7
Ovary	6	2.9	More than one organ	49	23.4

Metastasis duration (month)	
Interquartile rang (IQR)	Median
0-12.5	0
0=at presentation	

Lymph node status (n=301)				
IQR	Median	SD	Mean	Lymph node
4 to 12	8	6.3	8.6	Resected
0 to 2	0	2.9	1.7	Metastatic

CEA (n=186)	
Interquartile rang (IQR)	Median
2.35-38.4	5.2

Percent	Frequency	Range
26.9	50	Less than 2.5 ng/ml
43.5	81	2.5-20 ng/ml
29.6	55	More than 20 ng/ml

Frequency of symptoms					
Symptom/sign	Frequency	Percentage	Symptom/sign	Frequency	Percentage
Obstruction	99	14.3	Anemia	32	4.7
Rectorrhagia	138	20	Hematochezia	37	5.5
Abdominal pain	61	8.9	Melena	2	0.3
Change in bowel habits	12	1.8	Occult blood	7	1
Constipation	15	2.2	Incidental diagnosis during colonoscopy	5	0.7
Hematuria	5	0.7	More than one symptom/sign	262	38
Weight loss	13	1.9			

Sample size: 688, Age: Mean (SD): 59(15) [M:59.7 (14.8), F:58.2 (14.2)]
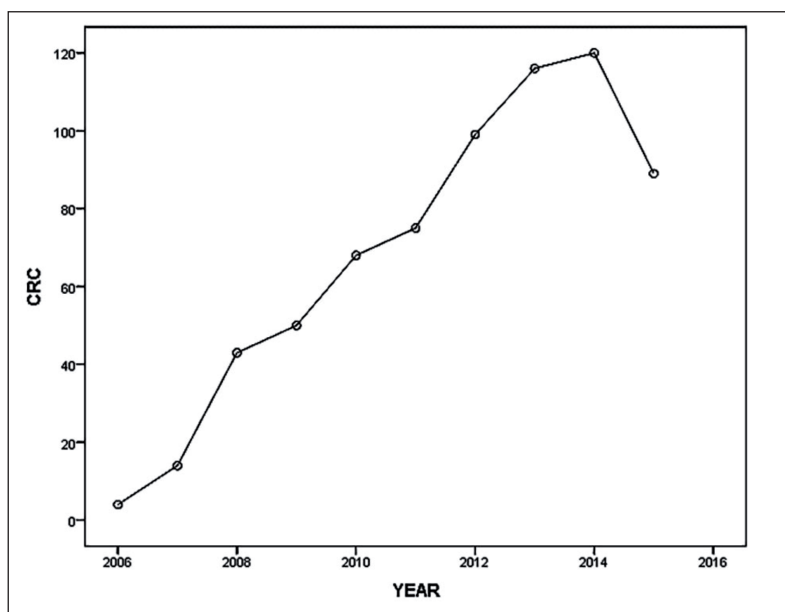
Fig. 1. Recording of colorectal cancer cases at TOCC during (2006-2015).

Figures 1 to 4 display the positive trends in cancer records, grading, gender segregation and age groups, respectively. Figure 1 shows that the linear correlation increasing in cases of colorectal cancer at TOCC is capable of correctly predicting the values by almost 86%. Nonetheless, the sudden drop in the number of recorded cases in 2015 calls for further examination. Figure 2 displays the trend of colorectal cancer by grade at TOCC during (2006-2015). In Figure 3, the gender separation trend indicates that, since 2011, the multiplicative trend of colorectal cancer diagnosis was steeper among men compared to women. In Figure 4 the trend of age groups (under 40, 40 to 60 and more than 60 years old) reflects a sinusoidal decrease and increase in cases among the three age groups.
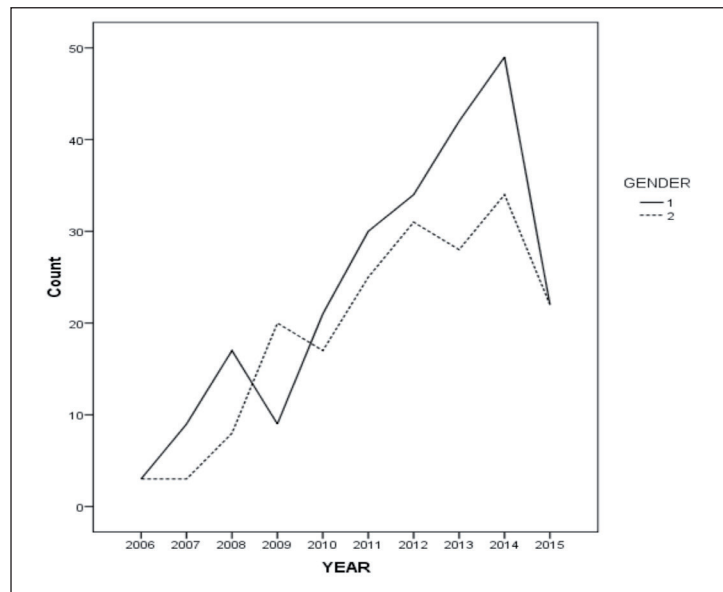
DISCUSSION

This study was performed to examine the demographic and epidemiological characteristics of colorectal cancer as well as the trends of indicators
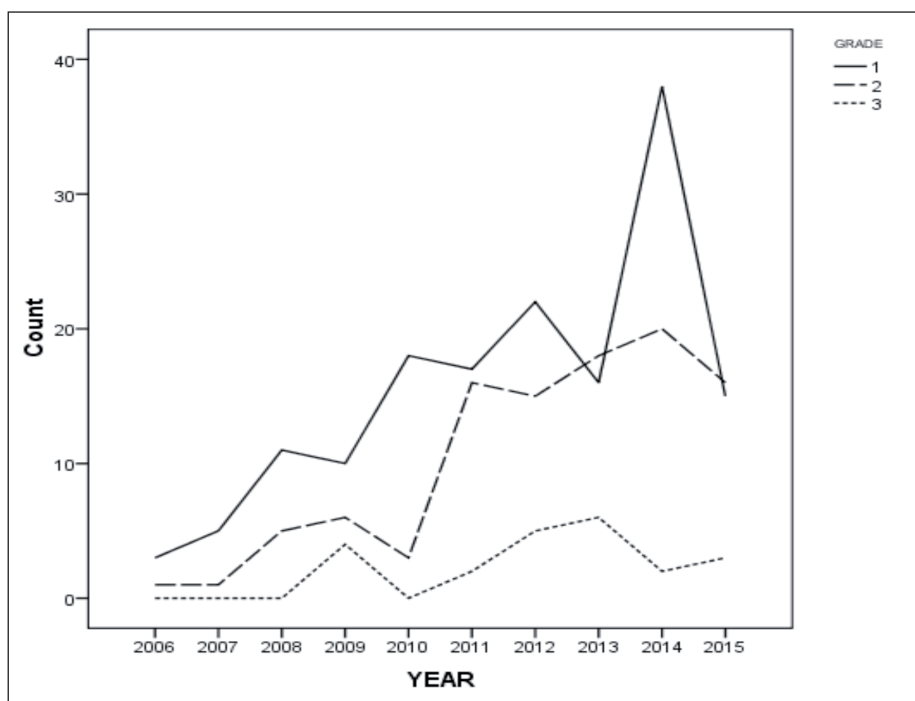

Fig. 2. Trend of colorectal cancer by grade at TOCC during (2006-2015).

Fig. 3. Trend of colorectal cancer by gender at TOCC during (2006-2015).

in comparison with relevant studies. In this study, 12.9% of subjects were under 40 years of age while this subject has been reported as 6-8% in the world's leading sources[9]. However, further studies are needed to discover the true etiology of this difference. This implies a younger age at which people are affected by colorectal cancer in the region. In this regard, Jalali et al[5] found that faster onset of the disease in the Iranian population can be associated with environmental factors such as feeding habits, especially among the youth (increased consumption of refined carbohydrates, processed protein, and fat consumption), lifestyle (obesity and inactivity) and potential genetic fac-

tors. This certainly calls for further attention to preventive planning and training on cancer in developing health policies. According to the histopathological characteristics of colorectal cancer patients, the highest frequency was found in well differentiation and Stage II, which is consistent with the results obtained by Jalali et al[5]. The highest type of invasion was regional, indicating a lack of correspondence with the global sources reporting *localized* as the most frequent type[10]. Regarding the anatomic location of cancer, rectum was the most common involvement zone, inconsistent with Western sources reporting a higher incidence of right colon cancers in the study
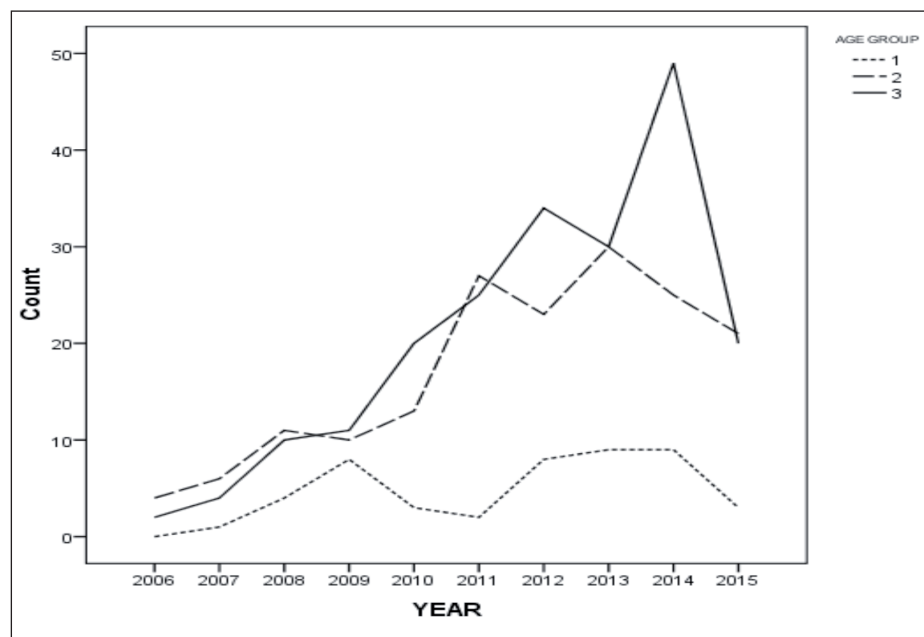
Fig. 4. Trend of groups by age.

by ML, C[11] and the proximal colon in the study by Siegel et al[10]. In the current study, the highest and lowest frequent organs in which the patients with colorectal cancer showed metastases were liver and brain, respectively. Moreover, the most common clinical symptom was rectorrhagia. Accordingly, it can be argued that the closer the tumor to the terminal zones, the greater the symptoms of obstruction and bleeding[12], which stresses that the most common site of involvement was rectum in this study. Given the cancer recording trend in the prediction equation, the constant value was approximately 0.27 and the multiplier was 12.28. For instance, it is predicted that 184 cases of colorectal cancer will be recorded at TOC C in 15 years from the time of the present study (2025). In simple terms, the linear graph illustrates an average annual increase by 12 cases, which is inconsistent with the decreasing trend in Western sources[10]. Such conflict might have been due to the concentrated effort on the part of western countries in adopting long-term preventive health-related policies. Given the age groups of patients, the multiplicative trend of the colorectal cancer diagnosis is steeper in men than women consistent with international studies [10]. This could be due to the positive relationship between smoking and rectal cancer in men according to multiple studies[13]. Given the higher number of male smokers, this study was limited and should be complemented by further studies. The current study demonstrated that the incidence rate decreased in a sinusoidal descending and ascending trend among the triple age groups. In 2014, for example, an increase in cancer cases in the over-60-years age group was accompanied by a decrease in other age groups. Conversely, the global sources reported that the trend in the 0-49-years age group had a regular gentle slope with a slight increase, while it exhibited a regular downward trend in other age groups.

CONCLUSIONS

The highest prevalence of colorectal cancer belonged to men patients over 60 years, in rectum, with regional well differentiation and younger age are affected by colorectal cancer in the region. Given the high geographical variations in the field of cancer[14] this certainly calls for further attention to preventive planning and training on cancer in developing health policies.

CONFLICT OF INTERESTS

The authors declare that there is no conflict of interests regarding the publication of this paper.

REFERENCES

1. Parkin DM, Bray F, Ferlay J, Pisani P. Estimating the world cancer burden: Globocan 2000. Int J Cancer 2001; 94: 153-156.
2. Boyle P, Langman J S. ABC of colorectal cancer: epidemiology. BMJ 2000; 321: 805-808.
3. James AS, Campbell MK, Hudson MA. Perceived barriers and benefits to colon cancer screening among African Americans in North Carolina: how does perception relate to screening behavior?. Cancer Epidemiol Biomarkers Prev 2002; 11: 529-534.
4. Stone WL, Krishnan K, Campbell SE, Ann NY Acad Sci. Tocopherols and the treatment of colon cancer. Ann N Y Acad Sci 2004; 1031: 223-233.
5. Jalali SM, Kordjazi I, Jalali SA. Epidemiological characteristics of colorectal cancer in patients referred to Imam Khomeini Hospital during (1981-2001). Razi Journal of Medical Sciences 2004; 11: 723-730 [In Persian].
6. Darabi M, Asadi Lari M, Motevalian SA, Motlagh A, Arsang-Jang S, Karimi Jaberi M. Trends in gastrointestinal cancer incidence in Iran, 2001-2010: a joinpoint analysis. Epidemiol Health 2016; 38: e2016056.
7. Siegel R, Jemal A. Colorectal cancer facts & figures 2014-2016. American Cancer Society Report, 2014; pp. 1-28.
8. Etemad K GM, Ramezani R, Modirian M, Pattovipor E, Arjmandipor M. Iranian Annual National Cancer Registration Report 2009 [In Persian].
9. Schwartz SI. Principles of surgery. 7th ed, New York: McGraw-Hill,1999; pp. 1328-1352 [In book].
10. Siegel R, Desantis C, Jemal A. Colorectal cancer statistics. Cancer J Clin 2014; 64: 104-117.
11. Corman ML. Colon and Rectal surgery. 4th ed. Philadelphia: Lippincott-Raven, 1998.; pp. 625-762.
12. Mirzaeipour A. Demographic and Clinical Characteristics of Patients with Colorectal Cancer. J Mazandaran Univ Med 2015; 25: 66-73 [In Persian].
13. Shimizu N. Height weight and alcohol consumption in relation to the risk of colorectal cancer in Jappan: a prospective study. Br J Cancer 2003; 88: 1038-1043.
14. Hedayatizadeh-Omran A, Rafiei A, Alizadeh-Navaei R, Tehrani M, Valadan R, Moradzadeh K, Panbechi M. Role of HER2 in brain metastasis of breast cancer: a systematic review and meta-analysis. Asian Pac J Cancer Prev 2015; 16: 1431-1434.