

COLORECTAL CANCER EPIDEMIOLOGY IN REPUBLIC OF SRPSKA

Darijana Antonic^{1*}, Severin Rakic¹

¹Public Health Institute, Jovana Ducica 1, 78 000 Banja Luka,
Republic of Srpska/Bosnia and Herzegovina

*e-mail: darijana.a@gmail.com

Abstract

Cancer of large bowel (colorectal cancer) is a common form of malignancy in developed countries but occurs much less frequently in the developing world. About 500 new cases are diagnosed each year in Republic of Srpska. This is third common cancer for both sex after cancer of lungs and breast. Each year 300 people are dying from colorectal cancer in Republic of Srpska and this cancer is second common cause of death after lung cancer. Numerous dietary factors play important role in colorectal cancer etiology. Daily consuming of red and processed meat (over 120 g), excessive intake of fats of animals and alcohol are directly connected with the development of colorectal cancer.

In this study were used the data from Cancer Registry in Republic of Srpska and those information were compared with data in the world from GLOBOCAN 2008 database. For calculating the age standardized incidence, mortality and prevalence have been used method of direct standardization. Relative survival rates were presented with relationship between observed and expected survival rates of colorectal cancer in the whole population of the Republic of Srpska in relation to sex, age and period of observation (from the study excluded all persons whose had colorectal cancer but died from other causes). Cumulative rate and risk have been re-expressed as a proportion who will be diagnosed or died from colorectal cancer before 65 and 75 years. It was used descriptive statistic for all new cases and all death cases from colorectal cancer in Republic of Srpska in period from 2004 to 2008.

Incidence of colorectal cancer in Republic of Srpska was similar for men and women. Male and female ratio has been 13:10. In the world male and female ratio has been 12:10. Age standardized incidence rates (world population) for colorectal cancer in Republic of Srpska were 25/100,000 (male) and 13.5/100 000 (female) and in the world were about 20/100,000 (male) and about 14/100 000 (female). In Republic of Srpska this cancer was in the third position as the causes of death in both sex. Age standardized mortality (world population) rates in

Republic of Srpska were about 9/100,000 (male) and about 7/100,000 (female) and same situation was in the world (about 10/100,000 (male) and about 7/100,000 (female). Relative five survival rates from colorectal cancer were 61% (male) and 51% (female) in Republic of Srpska.

Colorectal cancer is one of the leading cause of health-care problems in the Republic of Srpska. It is very important for controlling epidemiology situation, implementation measures and activities which will hopefully help to reduce the burden of colorectal cancer in Republic of Srpska.

Key words: Colorectal cancer, Epidemiology, Incidence, Mortality, Survival.

1. Introduction

Cancer is a global health problem, which has been reported in the assessment of Globocan, 2008. According to this estimate, in the world was discovered in 2008 around 12.6 million new cases of malignant neoplasms or 35,000 newly cases discovered daily (Ferlay *et al.*, [1]). Cancer is a disease of the modern world. However in developed countries number of new cases per year is smaller (5.5 million) in relation to the developing countries where is 7.1 million new cases per year (Ferlay *et al.*, [1]).

In the total worldwide mortality the participation of cancer is 12.5% or 7.6 million deaths per year (around 21,000 deaths per day is caused by malignant neoplasms) and represents the second most frequent cause of death in the developed countries of the world, i.e. 9.8% or 2.7 million deaths per year.

In developing countries, according to the frequency, is on third place and participation of cancer in the total mortality rate is 21.6% or 4.8 million deaths per year (Ferlay *et al.*, [1], WHO, [2]).

Increased mortality from cancer occurs as a result of several factors, primarily by reducing mortality from cardiovascular disease (developed countries) and infectious diseases (developing countries), then prolongation of the life expectancy, as well as the effects of environmental factors (use of tobacco products, changes in diet, reduced physical activity and obesity) (Jemal *et al.*, [3]).

In Republic of Srpska cancer shows a constant tendency to increase. In the five-year observation period the number of new cases of malignant neoplasms has an average annual growth of 3.56% (both sexes). In male population the average annual growth rate was 3.33% and in female populations was 3.56%.

Cancer of large bowel (colorectal cancer) is a common form of malignancy in developed countries but occurs much less frequently in the developing world. About 500 new cases are diagnosed each year in Republic of Srpska. This is third common cancer for both sex after cancer of lungs and breast. Each year 300 people are dying from colorectal cancer in Republic of Srpska and this cancer is second common cause of death after lung cancer. Numerous dietary factors play important role in colorectal cancer etiology.

2. Materials and Methods

In this research it has been used data of Malignant Diseases Register of the Republic of Srpska, which began with work in 2001. Data in the Registry is collected by using the standard methodology of all public and private health institutions (login malignant neoplasms form 6-07 RS, Ministry of Health and Social Welfare of the Republic of Srpska). The methodology of reporting of malignant neoplasms is written by Agreement of a form of the register and the manner of its management, the application form and the application procedure malignant neoplasms (Official Gazette of the Republic of Srpska no. 28/01, [4]).

For the coding of primary and secondary (metastasis) localization of malignant neoplasms is used X International Classification of Diseases (ICD 10), and for the coding of histopathologic type of malignant neoplasms it has been used III Oncology Classification of malignant neoplasms (ICDO-3) (Fritz *et al.*, [5]).

Register of malignant neoplasms contains data of deaths from malignant neoplasms based on data from the statistical list of case of death (Statistical Form the case of death-DEM-2, Official Gazette of the Republic of Srpska no. 46/05 [6]) whose integral part is the death certificate. Causes of death are coded by X International Classification of Diseases.

Register of malignant neoplasms of the Republic of Srpska is located in the Institute of Public Health, in the service of Social Medicine, Economics and Organization

of Health. The Public Health Institute each year prepares annual publication of "The health status of the population of the Republic of Srpska" where are also published information's from the Register of malignant neoplasms.

Register of malignant neoplasms uses estimates of the population of the Republic of Srpska from Republic Statistical Office of the Republic of Srpska. Statistical Institute of Republic of Srpska is making estimate of the number of inhabitants on the basis of data on the number of newborns, deaths and migration, which is representing a rough approximation of the number of inhabitants in the Republic of Srpska. This study includes all cases of colon cancer (colon and rectum), which were discovered and died in the period from 2004 to 2008 year. To calculate the age-standardized incidence rate and mortality it has been used assessment of the number and structure of population for 2004, 2005, 2006, 2007 and 2008. Research of the five-year prevalence of colon cancer (colon and rectum) included all cases of cancer for the people who were alive by the end of 2008, i.e. 31.12.2008. For calculating the age standardized incidence rate and mortality (by method of direct standardization) it has been used standardized world population (by Segi, 1960, which was modified by Doll and other in 1966.). To calculate the cumulative risk of morbidity and mortality from colon cancer it has been used age limit before age 65 and before age 75. Cumulative risk is representing the probability that some person will get disease or die from malignant neoplasms during certain selected age limits (expressed in %).

From the calculation of the relative one-year and five-year survival rates there were excluded all cases of patients with colon cancer who died from other causes. The analysis included the new cases of colon cancer that are discovered during the period from 2004 to 2008 who were tracked until the end of 2009.

The data that has been used to calculate these rates were: age, sex, date of determination of malignant neoplasms, the end date that was selected for monitoring of survival rate (in this case 31.12.2009.) and vital status at the end of the period of observation in case of malignant neoplasms.

The relative survival rate is the rate that is observed in relation to total mortality in a population under the hypothetical assumption that the malignant neoplasms is the only cause of death. This rate represents the ratio of the observed and the expected rate in the total population in relation to gender, age and period of observation.

3. Results and Discussion

Digestive organs are organ system which is in the five-year period of observation by the number of new cases (3,357 or 27.27%) ranked as a second (male) and is a leading organ system for females with 2,339 or 22.57%

of new cases (Table 1 and Table 2). Despite the fact that this organ system has shown as leading one in female cases in the five-year period of observation, shows that the incidence is about 30% lower than the incidence of males, with a ratio between male and female incidence of this organic system of 14:10.

The number of new cases of malignant neoplasms in this organ system in males cases in the five-year period of observation have an average annual growth of 1.72%, while in females the number of new cases within this organ system has an average annual decline of 0.25%.

Leading localization of malignant neoplasms in the digestive organs are the colon and rectum (rectosigmoid junction, anus) with a percentage of the participation over 20%. The participation of males in newly

diagnosed cases (both localization of malignant neoplasms is over 50%, with the ratio of male and female incidence 13:10 (Table 4, Table 5).

According to estimates from GLOBOCAN's (2008) in the world of 1.2 million new cases of bowel cancer (colon and rectum), about 54%, or 663,000 detected in males, or about 47% or 571,000 at females in the relationship M (Male):F (Female) = 12:10 (Ferlay *et al.*, [1]).

In the Republic of Srpska of 2,574 new cases, 1,365 or 6.0% (fourth place) refers to cancer of the colon, i.e. 1209 or 5.33% (fifth place) in the rectal cancer. On average each year around 515 new cases with the malignant neoplasms are registered, or daily with this malignant neoplasms more than one person is detected (Table 3).

Table 1. The most frequent incidence cancer by organic site and year, male, Republic of Srpska, 2004 - 2008

ICD-10	Organ site	Year					Total	%	Average annual number
		2004	2005	2006	2007	2008			
C00-96	All sites	2333	2307	2337	2667	2666	12310	100	2462
C30-38	Respiratory organs	683	667	683	721	720	3474	28.22	695
C15-25	Digestive organs	663	658	622	702	712	3357	27.27	671
C43-44	Skin	264	237	265	361	372	1499	12.18	300
C64-68	Urinary organs	184	198	192	254	239	1067	8.67	213
C60-63	Male genital organs	188	192	208	234	230	1052	8.55	210
	Other	351	355	367	395	393	1861	15.12	372

Table 2. The most frequent incidence cancer by organic site and year, female, Republic of Srpska, 2004 - 2008

ICD-10	Organ site	Year					Total	%	Average annual number
		2004	2005	2006	2007	2008			
C00-96	All sites	1967	1939	1997	2195	2267	10365	100	2073
C15-25	Digestive organs	459	465	478	482	455	2339	22.57	468
C51-58	Female genital organs	394	354	380	424	429	1981	19.11	396
C50	Breast	354	371	364	426	443	1958	18.89	392
C43-44	Skin	236	261	261	349	395	1502	14.49	300
C30-38	Respiratory organs	183	156	149	142	133	763	7.36	153
	Other	341	332	365	372	412	1822	17.58	364

Table 3. The most frequent incidence cancer by primary site and year, both sexes, Republic of Srpska, 2004 - 2008

ICD-10	Site	Year					Total	%	Average annual number
		2004	2005	2006	2007	2008			
C00-96	All sites	4300	4246	4334	4862	4933	22675	100	4535
C33-34	Lung, trachea	730	691	694	725	732	3572	15.75	714
C44	Skin, non-melanoma	444	444	474	643	701	2706	11.93	541
C50	Breast	360	380	368	436	451	1995	8.80	399
C18	Colon	255	278	249	286	297	1365	6.02	273
C19-21	Rectum, rectosigmoid, anus	237	231	231	249	261	1209	5.33	242
C16	Stomach	224	263	229	240	223	1179	5.20	236
C67	Bladder	162	195	185	213	199	954	4.21	191
C61	Prostate	165	163	179	189	197	893	3.94	179
C53	Cervix uteri	194	148	151	188	201	882	3.89	176
C22	Liver	152	119	150	171	134	726	3.20	145
	Other	1377	1334	1424	1522	1537	7194	31.72	1439

The results show that from 1478 new cases in male population 776 or 6.30% (fourth place) are new cases with colorectal cancer, or cancer of the rectum 702 or 5.70% (seventh place) (Table 4).

In the case of women, from 1096 new cases, 589 or 5.68% (fifth place) is a cancer of the colon, i.e. 507 or 4.89% (seventh place) with cancer of the rectum (Table 5).

Table 4. The most frequent incidence cancer by primary site and year, male, Republic of Srpska, 2004 - 2008

ICD-10	Site	Year					Total	%	Average annual number
		2004	2005	2006	2007	2008			
C00-96	All sites	2333	2307	2337	2667	2666	12310	100	2462
C33-34	Lung, trachea	564	559	567	600	610	2900	23.56	580
C44	Skin, non-melanoma	235	210	240	332	343	1360	11.05	272
C61	Prostate	165	163	179	189	197	893	7.25	179
C18	Colon	141	158	132	168	177	776	6.30	155
C16	Stomach	141	177	133	158	151	760	6.17	152
C67	Bladder	125	147	144	168	157	741	6.02	148
C19-21	Rectum, rectosigmoid, anus	137	125	135	145	160	702	5.70	140
C32	Larynx	106	88	100	104	99	497	4.04	99
C22	Liver	104	71	85	92	78	430	3.49	86
C25	Pancreas	79	72	71	81	75	378	3.07	76
	Other	536	537	551	630	619	2873	23.34	575

Table 5. The most frequent incidence cancer by primary site and year, female, Republic of Srpska, 2004 - 2008

ICD-10	Site	Year					Total	%	Average annual number
		2004	2005	2006	2007	2008			
C00-96	All sites	1967	1939	1997	2195	2267	10365	100	2073
C50	Breast	354	371	364	426	443	1958	18.89	392
C44	Skin, non-melanoma	209	234	234	311	358	1346	12.99	269
C53	Cervix uteri	194	148	151	188	201	882	8.51	176
C33-34	Lung, trachea	166	132	127	125	122	672	6.48	134
C18	Colon	114	120	117	118	120	589	5.68	118
C54	Corpus uteri	113	102	112	123	114	564	5.44	113
C19-21	Rectum, rectosigmoid, anus	100	106	96	104	101	507	4.89	101
C16	Stomach	83	86	96	82	72	419	4.04	84
C56	Ovary	67	78	89	87	91	412	3.97	82
C22	Liver	48	48	65	79	59	296	2.86	59
	Other	519	514	546	552	589	2720	26.24	544

Median age of new cases of bowel cancer in the five-year period of observation in both sexes is over 65 years, in males population is 68 (colon) or 67 years (rectum, etc.). In female population, the median age is 69 years (colon and rectum). In the Republic of Srpska in

more than 2/3 (or 7 out of 10) person who have cancer of the colon and rectum, this cancer was detected after the age of 65. Males have a higher risk of developing cancer of the colon and rectum before age 65 (30%) and 40% (before age of 75 years) (Table 6).

Table 6. Median age (years) and cumulative risk (%) of developing bowel cancer by the age of 65 and 75 by sex, Republic of Srpska, 2004 - 2008

ICD-10	Site	MALES					FEMALES				
		Median age (years)	Cumulative risk before age of 65		Cumulative risk before age of 75		Median age (years)	Cumulative risk before age of 65		Cumulative risk before age of 75	
			%	1 out of	%	1 out of		%	1 out of	%	1 out of
C18	Colon	68	0.6	167	1.5	67	69	0.4	250	0.9	111
C19-21	Rectum, rectosigmoid, anus	67	0.6	167	1.4	71	69	0.4	250	0.8	125

In the Republic of Srpska, age-standardized incidence rate (world) for cancer of the bowel (colon/rectum) for males in 2008 (around 25 per 100 000) was higher around 12% compared to 2004 (22/100 000), while for females was around 8% less than for males from 14.7/100 000 (2004) to 13.5/100 000 (2008) (Figure 1). The ratio of male and female incidence rate is 1.7:1.

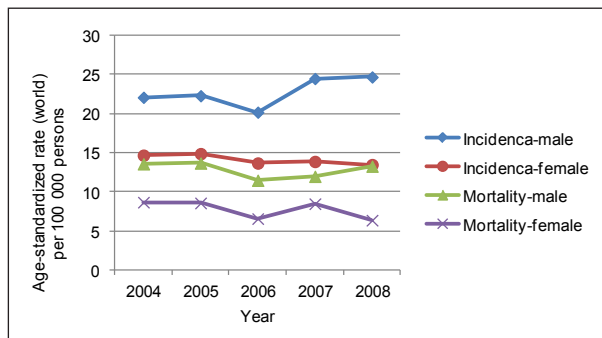


Figure 1. Age-standardized rates (world) incidence and mortality rates per 100 000 persons for bowel cancer by sex and year, Republic of Srpska, 2004 - 2008

According to estimates from GLOBOCAN's (2008) the biggest number of new cases of malignant neoplasms in the colorectum was in developed countries (about 59%). According to the same estimate in the most developed regions of the world, the highest age-standardized incidence rate (world) for colorectal cancer was more than 40 per 100,000 in male population (Australia/New Zealand and Western Europe) and less than 40 per 100,000 for male population (North America and all other regions of Europe). In female population the same regions have the highest age-standardized incidence rate (world), which are on average about 1.4 times (33.0 New Zealand - 22.1, Central/Eastern Europe) per 100,000 females) less than the age-standardized incidence rate of males. The country with the highest age-standardized incidence rate in male population is Slovakia (about 60.6/100,000), and for females, New Zealand (about 37.5/100,000) and of the European countries, Norway and Denmark (about 34 to 100,000). In the region of Southern Europe largest age standardized incidence rates are Slovenia (about 46.5 per 100,000 in male population) and Italy (29.9 per 100,000 in female population). The lowest incidence rates for both sexes were in Africa (excluding South Africa), followed by South/Central Asia and moderately in Latin America (Ferlay *et al.*, [1]).

In general, the risk of colorectal cancer is growing in countries with a low risk, especially in Japan (in males, after World War II) (Jemal *et al.*, [3]), but also in Asia, while in countries with a high risk growth has stabilized (northern and western Europe) or dropped

(North America) as a result of wide use of screening in the population, or the detection and removal of precancerous polyps and identification of disease in early stage. (Giovannucci and Wu, [7], Winawer *et al.*, [8], Philips *et al.*, [9], Magalhaes *et al.*, [10]).

Differences in the geographical distribution of cancer of the bowel (colon and rectum) is the result of exposure to various environmental factors. The incidence of malignant neoplasms are growing in populations that have adopted Western eating habits, higher representation of people with a higher body weight or obese people and physically inactive persons (McMichael [11]).

As the most important risk factors for developing colon cancer (colon rectum) which was reported was daily consumption of red meat of 120 g (Norat *et al.*, [12]), also fat intake (especially animal meat that is above 65 g) (Michels and Willett [13]). Furthermore, the risk of developing colon cancer (more distal than proximal) is caused by insufficient physical activity, weight gain and central deposition of adipose tissue (Giovannucci and Wu, [7], Vainio and Bianchini, [14])

The studies that have been done among immigrants shows that increasing risk after moving from areas with less risk in areas with high risk of getting the disease from malignant neoplasms localized to the intestine, especially in the first generation of immigrants, as a result of the adoption of food and other habits of the new environment (Kolonel *et al.*, [15]).

In the five-year period of observation in the Republic of Srpska from bowel cancer (colon and rectum) died 1520 people, 57% or 871 were males and 43% or 649 females (Table 7, Table 8). The relationship between the mortality of colon cancer of male and female is 14:10. If this is taken together, the participation of these two localization of malignant neoplasms in the list of leading causes of death in both sexes is on third place. Separately, this localization in the five-year period of observation as a cause of the death for males are in fourth place, apropos in sixth place, with a participation of about 6% (colon) and about 5% (rectum, etc.) (Table 7). In females population is on third place or fifth place with participation as a cause of death for female population, with about 7% (colon) and 6% (rectum, etc.) (Table 8).

From cancer of bowel (colon and rectum) in the Republic of Srpska, after age of 65 years, more than 2/3 of people is dying. The median age of death in male and female of the localization of malignant neoplasms was 70 years old (Table 9).

Male population (before age of 65) have about 33% (0.3% male; 0.2% female) bigger risk of dying from malignant neoplasms of the colon and rectum (Table 9).

Table 7. The most frequent cancer deaths by primary site and year, male, Republic of Srpska, 2004 - 2008

ICD-10	Site	Year					Total	%	Average annual number
		2004	2005	2006	2007	2008			
C00-96	All sites	1483	1614	1501	1605	1671	7874	100	1575
C33-34	Lung, trachea	476	495	486	514	545	2516	31.95	503
C16	Stomach	102	145	119	120	112	598	7.59	120
C61	Prostate	99	89	100	117	119	524	6.65	105
C18	Colon	84	90	85	103	109	471	5.98	94
C22	Liver	93	78	74	87	78	410	5.21	82
C19-21	Rectum, rectosigmoid, anus	83	88	77	69	83	400	5.08	80
C67	Bladder	60	94	50	78	74	356	4.52	71
C25	Pancreas	73	72	59	75	70	349	4.43	70
C32	Larynx	54	66	60	51	52	283	3.59	57
C70-72	Central nervous system	49	59	50	56	46	260	3.30	52
	Other	310	338	341	335	383	1707	21.68	341

Table 8. The most frequent cancer deaths by primary site and year, female, Republic of Srpska, 2004 - 2008

ICD-10	Site	Year					Total	%	Average annual number
		2004	2005	2006	2007	2008			
C00-96	All sites	1016	1066	1008	1095	1062	5247	100	1049
C50	Breast	181	167	162	191	170	871	16.60	174
C33-34	Lung, trachea	141	119	108	101	104	573	10.92	115
C18	Colon	53	77	63	75	77	345	6.58	69
C16	Stomach	59	70	72	61	53	315	6.00	63
C19-21	Rectum, rectosigmoid, anus	62	64	49	70	59	304	5.79	61
C56	Ovary	50	67	56	48	56	277	5.28	55
C22	Liver	47	50	52	74	53	276	5.26	55
C25	Pancreas	54	55	49	50	49	257	4.90	51
C53	Cervix uteri	38	44	57	59	45	243	4.63	49
C54	Corpus uteri	40	40	36	46	43	205	3.91	41
	Other	291	313	304	320	353	1581	30.13	370

Table 9. Median age (years) and cumulative risk (%) of dying from bowel cancer by the age of 65 and 75 by sex, Republic of Srpska, 2004 - 2008

ICD-10	Site	MALES					FEMALES				
		Median age (years)	Cumulative risk before age of 65		Cumulative risk before age of 75		Median age (years)	Cumulative risk before age of 65		Cumulative risk before age of 75	
			%	1 out of	%	1 out of		%	1 out of	%	1 out of
C18	Colon	70	0.3	333	0.9	111	70	0,2	500	0.5	250
C19-21	Rectum, rectosigmoid, anus	70	0.3	333	0.7	143	70	0,2	500	0.5	200

The risk of dying before the age of 75 from colon cancer in males is about 56% (1 of 111 male; 1 of 250 female) is higher compared to females, the risk of dying (before 75 years) from cancer of the rectum is about 29% (1 out of 143 men, one of 200 female) is higher in males compared to females (Table 9).

In the Republic of Srpska, age-standardized mortality rate (world) for cancer of the bowel (colon/rectum) for males in 2008 (13.3 per 100 000) was lower around 2% compared to 2004 (13.6/100 000). For females age-standardized mortality rate was also around 26% less (from 8.7/100,000 (2004) to 6.4/100,000 (2008)) (Figure 1). The ratio of male and female incidence rate is 1.7:1.

According to estimates from GLOBOCAN, in world in 2008 from bowel cancer (colon and rectum) died 608,000, i.e. 320,000 or 53% of males and 288,000 or 47% of females. Cancer of the bowel (colon and rectum) is responsible for 8% of deaths in the world, of which 52% of deaths from these localization of malignant neoplasms occurs in developed countries. The highest age-standardized mortality rate (world) in males is in Central/Eastern Europe, which on average is about 20 of 100 000 of male population. In other regions (all other regions of Europe, Australia / New Zealand and South Africa), the mortality rate at 100 000 males were about 1.4 times less than the average for Central/Eastern Europe. The highest age-standardized mortality rates, over 20 of 100 000 males, have countries that belong to the Central/Eastern Europe (Hungary 31.4, Slovakia and the Czech Republic 30.3 26.3) and Southern Europe (25.4 Croatia, Slovenia 22.5 and 22.1 Serbia). The highest age-standardized mortality rates of bowel cancer are in the regions of Central / Eastern Europe (12.2 per 100,000), followed by Australia / New Zealand (10.3 per 100,000) and other regions of Europe (about 9 per 100,000). Hungary, with 16.2 deaths from 100,000 people, has the highest age-standardized mortality rate in female population.

The prognosis of patients with colon cancer (colon and rectum) is relatively good, because in the world of colon cancer dies something about half of new cases of malignant neoplasms localized to the intestine, the total five-year prevalence takes second place (3.2 million). The largest number of people living five years after diagnosis of the disease of a malignant neoplasm localized to the intestine is in the developed countries of the world (more than 2/3) (Ferlay *et al.*, [1]). Although in developed countries and developed regions of the world where we have the most people living five years after diagnosis of malignant neoplasms localized on the intestine, there is also a significant difference in five-year living rate (the Americas and Europe).

Differences arise as a consequence of the difference in the percentage of those who have been treated surgically, then stage disease, as well as differences in the methods of diagnosis and surgical procedures (Ciccolallo *et al.*, [16]). Results indicate that 85% (Europe) or 92% (the United States) with malignant neoplasms localized to intestines surgically untreated. Results of analysis indicate that 85% (Europe) or 92% (the United States) people with malignant neoplasms localized to the intestine has been surgically untreated. From 92% of surgically treated patients in the US, 50% of them has a localized malignant neoplasm to the intestine and just over ¼ of them have expanded malignant neoplasm to lymph nodes (12 affected lymph nodes). The differences observed between the relative five-year survival rates between Europe and the United States, most likely apply to the differences that exist in the five-year survival between the developed regions of Europe (Western Europe) and less developed regions of Europe (Central/Eastern Europe) (Parkin *et al.*, [17]).

The estimated five-year survival rates from bowel cancer (in male population) are to 65% (North America), 57% (Europe), 54% (Western Europe), 34% (Central/Eastern Europe), 30% (India) and 15% of Sub-Saharan Africa (Parkin and Bary [18], Boyle *et al.*, [19]).

In the Republic of Srpska, five-year prevalence of colon cancer in both sexes is about 6% (fifth and sixth), with the exception of non-melanoma types of malignant neoplasms localized to the skin, the participation was 15.7% (second place) (Table 10).

Table 10. Cancer with the highest five year prevalence to the end at 31st December 2008, both sexes, Republic of Srpska

ICD-10	Site	Total five-year prevalence	%
C00-96	All sites	11017	100
C44	Skin, non-melanoma	2501	22.70
C50	Breast	1377	12.50
C53	Cervix uteri	695	6.31
C33-34	Lung, trachea	693	6.29
C19-21	Rectum, rectosigmoid, anus	663	6.02
C18	Colon	656	5.95
C67	Bladder	576	5.23
C61	Prostate	445	4.04
C54	Corpus uteri	397	3.60
C16	Stomach	340	3.09
	Other	2674	24.27

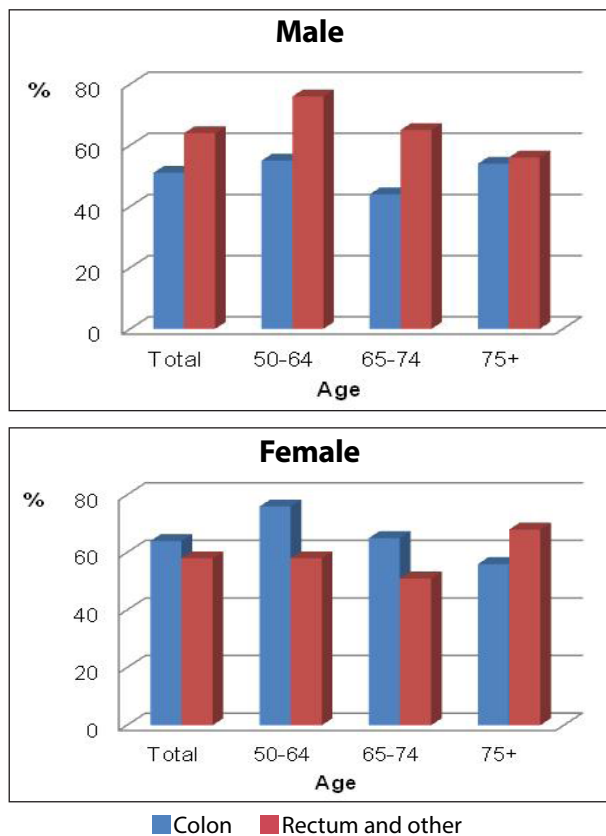


Figure 2. Relative five-year survival rates for bowel (colon and rectum) cancer by sex and age, Republic of Srpska

The relative five-year survival rate of colon cancer in female population is significantly higher and it is around 61%, while in male population is around 51%. In contrast to this, male population have a bigger relative five-year survival rate of rectal cancer (about 64%), while in female population the relative five-year survival rate is approximately 58%. Compared with the age group the largest relative five-year survival rate of colon cancer is in the age group of 50-64 years in male population 76% (rectum) and in female population 71% (colon) (Figure 2).

4. Conclusions

- Colorectal cancer is one of the leading cause of healthcare problems in the Republic of Srpska. In the Republic of Srpska in the five-year observation period (2004 - 2008) colorectal cancer in both sexes takes the second position and participation of 14.33% in male population and 11.52% in female population. Each year about 550 new cases of cancer colorectal are registered.

- It is very important for controlling epidemiology situation, implementation measures and activities which will hopefully help to reduce the burden of colorectal cancer in Republic of Srpska.

- Measures and actions to control colorectal measures are including primary and secondary prevention. Measures of primary prevention are focused at the prevention of formation of diseases, reducing the risk factors and causes of colorectal cancer, which primarily relates to the change in dietary habits and increasing physical activity. Secondary prevention includes measures for early detection of patients who have disease or people at risk, which should be implemented on a large scale as well as primary prevention measures, but also satisfying effect can be achieved through measures directed to the high-risk groups.

- Therefore, it is necessary to develop programs of knowledge about screening of colorectal cancer based on evidence (evidence based).

- The purpose of these programs is to increase the knowledge of the general population about the importance of screening; also that target population recognizes the importance of early detection of colorectal cancer.

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