RESEARCH ARTICLE

Temporal Epidemiological Assessment of Colorectal Cancer Incidence and Mortality in East Kazakhstan, 2004-2013

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Abstract

Colorectal cancer incidence and mortality in Kazakhstan are relatively high but exact statistics have hitherto been lacking and trends over time are unclear. The present study was therefore undertaken to retrospectively assess data for East Kazakhstan, accessed from the central registration office, for the period 2004-2013. Approximate age standardized data for incidence and mortality were generated and compared across age groups, gender and year. It was determined that during the studied period 3,417 new cases of colorectal cancer were registered and 2,259 died of this pathology. Average cancer cancer incidence and mortality over the ten years were 24.1/10^5 and 15.9/10^5 respectively, and the overall ratio of mortality/incidence (M/I) was 0.69:1 (range 0.58-0.73). Both incidence and mortality tended to remain constant in both males and females. The male to female ratios also did not significantly vary over time but a trend for improvement of the mortality to incidence ratio was observed, especially for rectum. Whether this might be related to screening remains unclear. These preliminary data indicate that whereas colorectal cancer continues to be important, change in environmental factors are not having a great impact on incidence in East Kazakhstan.

Keywords: Colorectal cancer - incidence - mortality - trends - age dependence - East Kazakhstan

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Introduction

Colorectal cancer is generally less common in Asia than in the Western world (Ferlay et al., 2013; 2013; Liu et al., 2015) but is becoming of greater importance and is generally on the increase, for example in Korea (Jung et al., 2015), Turkey (Seydaoğlu et al., 2013) and in Iran, for example in Kermanshah and Hamadan provinces; however, change did not reach significance in Ilam and Kurdistan provinces (Abdifard et al., 2013), increasing East Azerbaijan (Somi et al., 2014) and Kerman (Roya and Abbas, 2013). In China, age-specific rates of colorectal remained relatively stable in one study (Zhou et al., 2015) and in Japan, colorectum and lung (males), showed a pattern of increasing incidence and mortality rates until the mid-1990s, stabilizing or decreasing thereafter (Katanoda et al., 2013). Thus there are considerable differences across Asian countries. Males and people in high income Asia Pacific and East Asia countries appear at greater risk of death from colon and rectum cancer, while South Asia region have the lowest rates of mortality due to this cancer (Zayeri et al., 2015).

Concerning colorectal cancer incidence in South-East Sibiria, it was lower during 2001-2005 and 2006-2010 as compared to the period of 1991-1996 (Kutikhin et al., 2012), where risk factors include smoking and being overweight. In the Aral-Syr Darya region of Kazakhstan, slight increase of colon and decrease of rectal cancer has been described over time (Igissinov et al., 2011), in line with data for the country as a whole (Igissinov et al., 2012).

Since very limited information is available in the international literature regarding recent colorectal cancer staistics in Kazakhstan, the present descriptive study was performed to provide baseline data for more analytical analyses in the future, focusing on any change over the the last decade.

Materials and Methods

The main sources of information for this research were materials of the state registration about colorectal

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Table 1. Colorectal Cancer Incidence Data for East Kazakhstan, 2004-2013, According to Age Group

Age	2004 N (Inc)	2005 N (Inc)	2006 N (Inc)	2007 N (Inc)	2008 N (Inc)	2009 N (Inc)	2010 N (Inc)	2011 N (Inc)	2012 N (Inc)	2013 N (Inc)
Both sexes										
Till 30	3 (0.4)	4 (0.6)	1 (0.2)	4 (0.6)	2 (0.3)	1 (0.2)	1 (0.2)	3 (0.5)	2 (0.3)	0 (0.0)
30-39	10 (4.9)	3 (1.5)	5 (2.5)	4 (2.0)	2 (1.0)	11 (5.4)	7 (3.4)	12 (5.9)	11 (5.4)	4 (2.0)
40-49	26 (11.7)	29 (13.2)	27 (12.5)	24 (11.3)	28 (13.5)	19 (9.4)	22 (11.1)	26 (13.4)	22 (11.6)	19 (10.1)
50-59	61 (43.1)	63 (41.2)	54 (33.3)	61 (36.1)	63 (36.5)	65 (36.7)	61 (34.3)	67 (36.8)	74 (40.1)	90 (48.3)
60-69	110 (97.5)	101 (94.3)	105 (103.8)	95 (98.5)	83 (88.8)	84 (91.0)	83 (91.2)	95 (103.4)	100 (105.2)	106 (105.7)
70+	140 (161.6)	151 (177.3)	147 (172.3)	135 (153.3)	131 (142.4)	135 (141.0)	143 (148.2)	170 (171.6)	171 (172.0)	141 (143.6)
total	350 (24.0)	351 (24.3)	339 (23.7)	323 (22.7)	309 (21.8)	315 (22.2)	317 (22.7)	373 (26.7)	380 (27.2)	360 (25.8)
Males										
Till 30	3 (0.9)	3 (0.9)	0 (0.0)	1 (0.3)	1 (0.3)	1 (0.3)	0 (0.0)	2 (0.6)	1 (0.3)	0 (0.0)
30-39	6 (6.0)	1 (1.0)	2 (2.0)	0 (0.0)	1 (1.0)	4 (4.0)	6 (6.0)	7 (7.0)	2 (2.0)	1 (1.0)
40-49	11 (10.4)	11 (10.5)	16 (15.6)	15 (14.9)	14 (14.2)	10 (10.4)	10 (10.6)	13 (14.2)	11 (12.2)	15 (16.9)
50-59	25 (39.0)	31 (45.0)	21 (28.8)	28 (37.0)	32 (41.4)	26 (32.8)	24 (29.8)	30 (36.3)	31 (37.0)	37 (43.7)
60-69	55 (119.6)	41 (94.7)	48 (118.6)	42 (109.7)	39 (105.5)	44 (119.7)	35 (94.1)	50 (132.0)	47 (119.4)	49 (118.1)
70+	56 (209.2)	63 (239.6)	61 (230.1)	62 (224.2)	59 (202.1)	52 (170.8)	55 (175.9)	81 (252.1)	81 (252.0)	61 (193.1)
total	156 (22.5)	150 (21.9)	148 (21.8)	148 (21.9)	146 (21.7)	137 (20.4)	130 (19.6)	183 (27.6)	173 (26.1)	163 (24.6)
Females										
Till 30	0 (0.0)	1 (0.3)	1 (0.3)	3 (0.9)	1 (0.3)	0 (0.0)	1 (0.3)	1 (0.3)	1 (0.3)	0 (0.0)
30-39	4 (3.9)	2 (1.9)	3 (2.9)	4 (3.9)	1 (1.0)	7 (6.8)	1 (1.0)	5 (4.8)	9 (8.7)	3 (2.9)
40-49	15 (12.9)	18 (15.6)	11 (9.7)	9 (8.1)	14 (12.8)	9 (8.4)	12 (11.5)	13 (12.8)	11 (11.0)	4 (4.1)
50-59	36 (46.4)	32 (38.2)	33 (37.0)	33 (35.5)	31 (32.5)	39 (39.9)	37 (38.0)	37 (37.2)	43 (42.7)	53 (52.1)
60-69	55 (82.3)	60 (94.0)	57 (93.9)	53 (91.1)	44 (77.9)	40 (72.0)	48 (89.2)	45 (83.3)	53 (95.1)	57 (96.8)
70+	84 (140.3)	88 (149.4)	86 (146.2)	73 (120.9)	72 (114.6)	83 (127.1)	88 (134.9)	89 (133.0)	90 (133.7)	80 (120.1)
total	194 (25.4)	201 (26.6)	191 (25.4)	175 (23.4)	163 (21.9)	178 (23.9)	187 (25.5)	190 (25.9)	207 (28.3)	197 (26.9)

N (Inc), number (incidence)

Table 2. Colorectal Cancer Mortality Data for East Kazakhstan, 2004-2013, According to Age Group

Age	2004 N (Inc)	2005 N (Inc)	2006 N (Inc)	2007 N (Inc)	2008 N (Inc)	2009 N (Inc)	2010 N (Inc)	2011 N (Inc)	2012 N (Inc)	2013 N (Inc)
Both sexes										
Till 30	4 (0.6)	1 (0.1)	0 (0.0)	0 (0.0)	2 (0.3)	0 (0.0)	0 (0.0)	1 (0.2)	3 (0.5)	0 (0.0)
30-39	4 (2.0)	1 (0.5)	4 (2.0)	6 (3.0)	3 (1.5)	3 (1.5)	1 (0.5)	1 (0.5)	6 (2.9)	4 (2.0)
40-49	19 (8.5)	13 (5.9)	17 (7.8)	9 (4.2)	13 (6.3)	10 (4.9)	11 (5.5)	9 (4.7)	18 (9.5)	7 (3.7)
50-59	34 (24.0)	28 (18.3)	34 (21.0)	36 (21.3)	31 (18.0)	33 (18.6)	33 (18.6)	38 (20.9)	30 (16.3)	53 (28.4)
60-69	66 (58.5)	74 (69.1)	58 (57.3)	70 (72.6)	59 (63.1)	46 (49.8)	53 (58.2)	56 (60.9)	56 (58.9)	40 (39.9)
70+	128 (147.7)	114 (133.8)	106 (124.2)	112 (127.2)	119 (129.3)	120 (125.3)	106 (109.9)	136 (137.3)	112 (112.6)	108 (110.0)
Total	225 (17.5)	231 (16.0)	219 (15.3)	233 (16.4)	227 (16.0)	212 (15.0)	204 (14.6)	241 (17.2)	225 (16.1)	212 (15.2)
Males										
Till 30	1 (0.3)	1 (0.3)	0 (0.0)	0 (0.0)	1 (0.3)	0 (0.0)	0 (0.0)	1 (0.3)	1 (0.3)	0 (0.0)
30-39	2 (2.0)	1 (1.0)	1 (1.0)	2 (2.0)	1 (1.0)	1 (1.0)	0 (0.0)	0 (0.0)	3 (3.0)	1 (1.0)
40-49	9 (8.5)	5 (4.8)	10 (9.7)	4 (4.0)	7 (7.1)	5 (5.2)	6 (6.4)	4 (4.4)	12 (13.3)	6 (6/7)
50-59	17 (26.5)	11 (16.0)	14 (19.2)	18 (23.8)	16 (20.7)	16 (20.2)	15 (18.6)	19 (23.0)	12 (14.3)	27 (31.9)
60-69	29 (63.0)	37 (85.5)	19 (46.9)	39 (101.9)	26 (70.3)	21 (57.1)	27 (72.6)	29 (76.6)	30 (76.2)	13 (31.3)
70+	63 (235.4)	41 (155.9)	37 (139.6)	50 (180.8)	49 (167.9)	55 (180.7)	46 (147.1)	55 (171.2)	65 (202.2)	48 (152.0)
Total	121 (17.5)	96 (14.0)	81 (11.9)	113 (16.7)	100 (14.9)	98 (14.6)	94 (14.2)	108 (16.3)	123 (18.5)	95 (14.3)
Females										
Till 30	3 (0.9)	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.3)	0 (0.0)	0 (0.0)	0 (0.0)	2 (0.7)	0 (0.0)
30-39	2 (1.9)	0 (0.0)	3 (2.9)	4 (3.9)	2 (2.0)	2 (1.9)	1 (1.0)	1 (1.0)	3 (2.9)	3 (2.9)
40-49	10 (8.6)	8 (6.9)	7 (6.2)	5 (4.5)	6 (5.5)	5 (4.7)	5 (4.8)	5 (4.9)	6 (6.0)	1 (1.0)
50-59	17 (21.9)	17 (20.3)	20 (22.4)	18 (19.3)	15 (15.7)	17 (17.4)	18 (18.5)	19 (19.1)	18 (17.9)	26 (25.6)
60-69	37 (55.4)	37 (58.0)	39 (64.2)	31 (53.3)	33 (58.4)	25 (45.0)	26 (48.3)	27 (50.0)	26 (46.7)	27 (45.9)
70+	65 (108.5)	73 (124.0)	69 (117.3)	62 (102.7)	70 (111.4)	65 (99.5)	60 (92.0)	81 (121.0)	47 (69.8)	60 (90.1)
Total	134 (17.6)	135 (17.8)	138 (18.4)	120 (16.0)	127 (17.0)	114 (15.3)	110 (15.0)	133 (18.1)	102 (13.9)	117 (16.0)

N (Inc), number (incidence)

cancer patients. The research sources were registration and reporting documents of oncological establishments of the republic about patients who for the first time in their lives were diagnosed to have colorectal cancer. The studied period made 10 years (2004-2013). Data of Committee statistics of the Ministry of National Economy of the Republic of Kazakhstan on the number of the total, male and female populations of the Republic in general were used in order to generate . Since nation-wide population-based data were not available, estimates of incidence and mortality per 100,000 population were generated using data for females and males of the different age groups and the respective population numbers. The data were used directly to generate graphs for age distribution and by simple division for mortality;incidence and male:female ratios.

Results

During 10 years (2004-2013) 3,417 new cases of colorectal cancer were registered in East Kazakhstan and 2,259 people died of this pathology. Data for age group

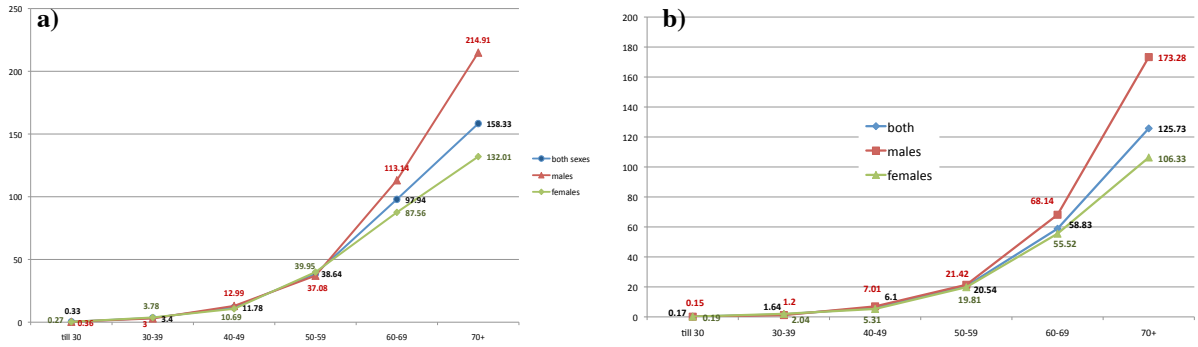

Figure 1. Age Distribution of Colorectal Cancer a) Incidence and b) Mortality in East Kazakhstan, 2004-2013

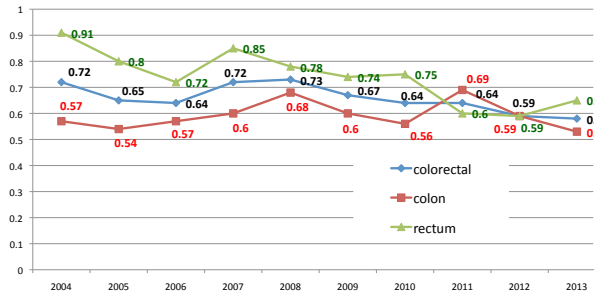

Figure 2. Dynamics of Cancer Mortality:Incidence Ratios (Both Sexes Combined)

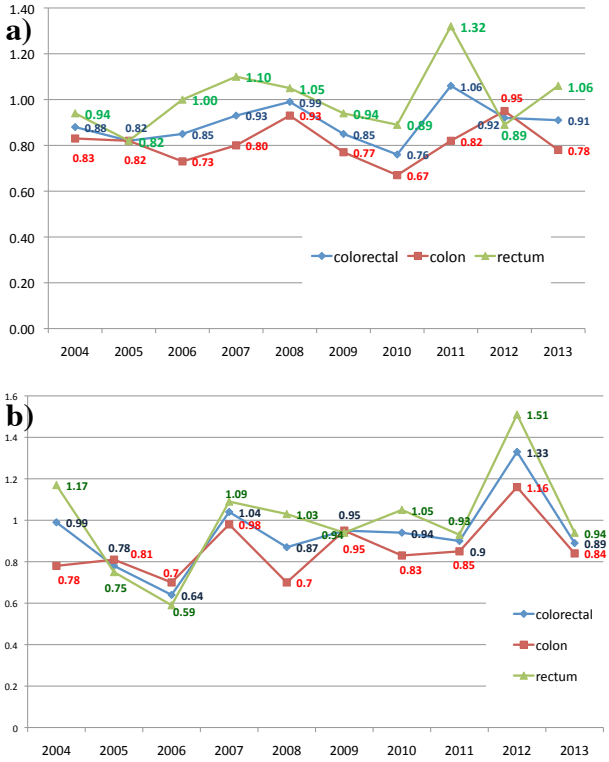

Figure 3. Dynamics of Colorectal Cancer Male:Female Ratios a) Incidence and b) Mortality in Kazakhstan in 2004-2013

distribution for incidence and mortality are summarized in Tables 1 and 2. Highest rates were noted in males of the 70+ age group. As shown in Figure 1, both for incidence and mortality, increase was observed with age, the gap between males and females starting to open from age 50 years.

The mortality:incidence ratio for colon cancer was approximately 0.68:1 for the entire period with very little change over time (see Figure 2). In contrast, that for rectal cancer showed a tendency for decrease, from 0.9 to 0.6, over the ten year period. The gender distribution (see Figure 3) was equal for rectal cancer but a slight predominance on females was noted for the colon cases. A similar situation was found for mortality but here the difference was less pronounced. There did not appear to be any variation over time in these ratios, with the exception of peaks observed in 2011 for male incidence and in 2012 for mortality.

Discussion

The present study showed that the average incidence of colorectal cancer in East Kazakhstan was around 24/100,000 with very little change over time, with again a relatively constant value of 15.9/100,000 for mortality. Comparison with other countries in the region is made difficult by the fact that our data are not age-adjusted.

A large number of questions remain to be answered. For example, it is well known that ethnicity can play a role in determining risk and future work should focus on any differences between the main Russian and Kazakh populations. Regarding age dependence, we did not observe any clear shift over time. This is in contrast with Australia, for example, where examined trends in national incidence rates for CRC demonstrated that rates in people under age 40 years have been rising for the last two decades (Young et al., 2015)

Different mechanisms are thought to be operating in the development of colon and rectal cancer (Robsahm et al., 2013) Obesity is linked significantly to adipose tissue dysfunction and to alteration of adipokines in blood; in particular, obesity-induced inflammation is thought to be an important link between obesity and colon cancer (Janakiram and Rao, 2014 Joshi and Lee, 2014). However, the ratios of colon to rectum cancer did not appear to demonstrate any clear shift over time in the present study, in contrast to the situation in Japan which has seen a marked predominance of colon in more recent years (Long et al., 2010), In China also, the percentage of colon cancer in all CRCs increased significantly, especially in the descending colon and sigmoid colon (Zhou et al., 2015). A proximal shift of colon cancers has also been demonstrated in Turkey for females, but not for males (Seydaoğlu et al., 2013). More attention needs to made

to subsite in future studies.

Regarding the relative improvement in rectal cancer mortality:incidence ratios, this could be linked to screening. The 5-year survival rates in Korea improved in all subsites between 1993 and 2010, especially in younger persons(Park et al., 2013). In the US population which suggest that more than fifty percent of the decline in colorectal cancer mortality can be attributed to the increased acceptance and uptake in colorectal cancer screening (Zauber, 2015).

In conclusion, our data provide an initial survey of colorectalin Kazakhstan, a Central Asia country with great geographical and ethnic variation. Hopefully future work will provide a clearer picture of the efficacy of screening, with possible attention to high risk groups.

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