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Malignant Neoplasms of Digestive Organs (C15–C26) in the Osijek-Baranja County, Croatia

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A B S T R A C T

The Institute of Public Health for the Osijek-Baranja County (OBC) has processed the data on cancer patients that were collected from mandatory county hospitals data reports, county bureaus of statistics and the County Register of Deaths. The cancers were defined according to the International Statistical Classification of Diseases and Related Health Problems, 10th Revision (ICD-10), codes of malignant neoplasms of digestive organs (C15-C26). The aim of this article is to show the size of the problem and the burden of the health care system caused by cancers of the digestive system (C15-C26) in the OBC in the period 2001–2006. This article deals with cancer incidence and mortality data, appertaining age distribution, cancer survival, median age at diagnosis and at death and length of stay in hospitals. The overall incidence and mortality rate from cancer group C15-C26 (101.1 and 80/100,000, respectively, EU standard population) declined in all age groups, comparing the data originating from the 2001-2003 period to the data referring to the 2004–2006 period. The median age at diagnosis of cancer was 67.8 years with a shift of 0.91 year up in second period (the median age in the first period was 67.3 years and in the second one 68.2 years). The median age at diagnosis of cancer in females was 69.7 years while in males was 66.3 years, which represents a difference of 2.9 years in favour of females. The overall relative survival rate of all ages was 23.6%. This figure was slightly bigger for females (24.3%) than for males (23.1%). Concerning all age groups, the number of hospital admissions of males increased during the observation period while the number of hospital admissions of women decreased at the same time. The average length of stay over the six years did not changed significantly. Group of cancer C15-C26 was the most common group of cancers regarding both genders. The five-year relative survival as one of the reliable benchmarks of the quality of the health care system needs to be raised to a great extent in order to come nearer to the EU average within a short period of time.

Key words: *cancer, digestive organs, ICD-10 codes C15-C26, colorectal cancer, stomach cancer, mortality rate, incidence rate, 5-year relative survival, age at diagnosis, age at death, age distribution, median age, length of stay in hospital, Osijek-Baranja County*

Introduction

Due to different lifestyles, different populations worldwide experience different incidence rates of malignant neoplasms of digestive organs (according to the International Statistical Classification of Diseases and Related Health Problems, 10th Revision (ICD-10), codes C15–C26). Colorectal cancer is one of the most common cancers in this group (C18–C21). The incidence of colorectal cancer has increased in most countries, except for the United States and some areas of Japan. The most significant increases have been observed in eastern European countries and most Asian countries[1].

The incidence rates of cancer group C15–C26 vary a lot worldwide with both genders. The highest rates concern North America and Western Europe whereas the lowest rates characterize Africa and South-Central Asia[2]. Due to an increasing demand of cancer information on cancer prevention, the Institute of Public Health of the Osijek-Baranja County (IPHO) investigated this problem in this article and tried to provide the precise information on the cancer situation in the Osijek-Baranja County (OBC). On average, 4.3 people are diagnosed with some type of cancer and 2.7 people die from cancer in the OBC every day[3]. Among them, there were more males (50.4% of all new cases of cancer and 58.9% of all cancer deaths refer to males).

Both genders as a whole and males separately got C15–C26 cancers more than any other cancer (the incidence rate of 101 and 142/100,000, respectively) while

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this group of cancer was placed second among females (the incidence rate of 73/100,000). In females, the first place was reserved for breast cancer (C50) (79/100,000)[3]. In the USA, as third most common cancer in both males and females, colorectal cancer incidence rates have been decreasing from 66.3/100,000 USA population in 1985 to 48.2/100,000 in 2004[4]. In South Australia, the overall incidence rate of group C15–C26 was 102.7/100.000 (world population)[5]. In the EU and USA, colorectal cancer with an annually estimated of 212,000 deaths a year accounts for 12.3% of all deaths from cancer and is the second most common cause of death from cancer. Stomach cancer occupies the fourth place (117,000 deaths, 6.8%)[6,7]. The incidence rate in colorectal cancer is increasing rapidly, particularly in countries that have recently made the transition from a relatively low-income economy to high-income one[8].

Five-year relative survival of colorectal cancer dependent upon the stage of disease at diagnosis. In general, the earlier the stage at diagnosis, the higher the chance of survival[9]. It is estimated that the rate of gastric cancer in the world in 2008 affected 8% of the total number of patients with cancer and accounts for 10% of all deaths from cancer[10]. Stomachs cancer rates are two times higher in males than in females. The highest incidence rate in Europe is found in its eastern parts. Regional variations in part reflect differences in dietary patterns and the prevalence of *Helicobacter pylori (H. pylori)* infection[11]. Increased use and availability of refrigeration, reductions in chronic *H. pylori* infection and smoking in some parts of the world have decreased stomach cancer rates[12,13]. In Croatia there was difference in incidence rate of stomach cancer (C16) between continental and coastal area[14].

A half of worldwide liver cancer cases and deaths are estimated to occur in China, twice as often among men[2]. This is a consequence of high prevalence of chronic hepatitis B and C virus infection. Interaction viruses and aflatoxin B1 increased the possibility of liver cancer[15]. In the USA and Central Europe, liver cancer incidence rates are increasing due to the obesity and HCV infection (drug users)[16,17]. On the contrary, universal infant and people in risk vaccination for hepatitis B reduced liver cancer incidence rates by about two-thirds in children and young adults due to vaccination programs[18].

The goal of this paper is to stress the complexity of the issue and its influence on the health care system regarding cancers of digestive organs in the OBC in the period from 2001 to 2006. General information on this cancer group has so far existed only on the national level and only for particular sites.

Materials and Methods

Data source

Although the representativeness of their data might be challenged, mandatory county hospitals data reports, IPHO, county bureaus of statistics and the County Register of Deaths still represent the only available source of information on the profile of cancer in the OBC. All data from the 2001–2006 period originate from these institutions. Data obtained from the mandatory hospital reports are accompanied with personal identification number which represents a unique key for making connection with other data obtained from various administrative bodies in the OBC and their integration into a single database. It was used the unique identification number of each person that had the role of the key parameter of linking data from different sources and different reports. That way, every patient got their chronology of hospitalization.

The cohort studied in this article included all people with cancer who were registered as the patients in one of two hospitals in the OBC in the time period from 2001 to 2006 (follow up period from 1996 to 2010). Based on these sources, a database of people who were hospitalized in the area of the OBC for any reason whatsoever (including cancer) has been generated[19,20]. The data on each of the hospitalized patients have been supplemented with data obtained from the Register of Deaths.

Data on every person with cancer are accompanied with their chronological order of illness and hospitalization. The database are involved all hospitalizations and all data on ONKO or BSL forms (mandatory statistical patterns for all hospitalized patients in Croatia). The ONKO form is mandatory statistical reports on every hospitalized cancer patients in Croatia. The BSL form is a mandatory statistical report on every hospitalized person, regardless of the causes of hospitalization. All cancer patients are hospitalized in the state-owned (public) hospitals since there are still the only hospitals here.

Statistical analysis

The cancer group of malignant neoplasms of digestive organs, codes C15–C26, was classified according to the International Statistical Classification of Diseases and Related Health Problems, 10th Revision, Version for 2010 (ICD-10). The cancer incidence and mortality estimates in the period from 2001 to 2006 were prepared for all cancers based on gender and for age groups 0–19, 20–44, 45–64, 65+ by the year at diagnosis of cancer. Based on the 2001 census, the analysis covered a total population of 330.506 people in OBC. The Croatian National Health Insurance is a universal health insurance that covers all or almost all the costs (depends on personal participation) of treatment of Croatian citizens and provides them with the same chances of recovery. Therefore, in this article we write about the entire population of cancer patients treated in the OBC.

Descriptive statistics were used for age and gender. The survival rates denote the outcome up to 5 years after diagnosis for cancer patients who were diagnosed during the 2001–2005 period. All survival estimates were age-adjusted, on the basis of four age groups: 0–19, 20–44, 45–64, 65+ years. The analyses were conducted using age-specific rates, the age-standardization-direct method and 95% confidence intervals (95% CI). The standardized

incidence and mortality ratios as well as the 95% confidence intervals were computed for C15–C26 pursuant to the year at diagnosis of cancer. Also, both ratios were stratified by year at diagnosis of cancer, age and gender and adjusted for 3-years time periods 2001–2003, 2004–2006. The median age was the observation ranked in the middle; that is 50% of patients are diagnosed at an older age and 50% are diagnosed at a younger age compared to the median. The EU standard population was used in the analysis[21]. Length of stay was determined according to the date of admission and to the date of discharge with regard to the index admission. The SAS statistical package (version 9.1, SAS Institute INC., Cary, NC, SAD) was used for statistical analysis[22] and Microsoft® Office Excel® 2007.

Results

According to the 2001 census, the analysis covered a total population of 330,506 people in the OBC. From 2001 to 2006, a total of 2,444 people were registered with cancer C15–C26 and treated at the two hospitals in the OBC. The observed period was divided into two three--year periods, the first one comprises the 2001–2003 period and the second one the 2004–2006. The percentage of females among all patients who were diagnosed with cancer numbers 43.7% (1,068) while this percentage for males was 56.3% (1,376). The mean incidence of new C15–C26 cancers over the 6-year study period (2001–2006) amounted to 407 cases/year, equating to the OBC population age-adjusted incidence rate of 101.1/100,000 (Table 1).

The incidence rate observed in the two periods significantly decreased in females in second period (from 77.3 to 69.1/100,000, Figure 2, R^2=0.822) and for males (from 144.7 to 138.5/100,000) (Table 1). The overall incidence rate of cancer in males was twice as high as the rate for females (141.6/100,000 and 73.2/100,000).

In the OBC 328 patients died of cancer group C15–C26 on a yearly basis on average, which implies the mortality rate of 80/100,000 (Table 1, Figure 2). Regarding both gender, the mortality rate fell from 83.4/100,000 in first period to 76.6/100,000 in second period. The mortality rate in females and males equally fall in both periods (females – from 60 to 53.7/100,000, males – from 117.8 to 110.2/100,000). Like the incidence rate, the death ratio in male and female was almost twice as high in favour of male.

In 2001–2006 period, the median age at diagnosis for C15–C26 cancer was 67.8 years, precisely 66.3 for males and 69.7 for females with median age difference of 3.4 years between genders (Table 2, Figure 1). As far as both genders are concerned, the cancers were on average diagnosed 0.91 years later in the second period. Regarding the oldest age group, the most common cancers were cancer of other and ill-defined digestive organs (C26) and cancer of gallbladder (C23) (72.8 and 72.6 years, respectively) whereas the youngest population was often diagnosed with oesophagus cancer (C15) and small intestine cancer (C17) (63 and 64.9 years, respectively). The median age at death from C15–C26 cancers was 70.2 years, 68.5 years for males and 72.5 years for females, which entails the difference of 4 years between the genders.

The total incidence rate for the entire cancer group was 101.1/100,000 (SD±5.1, CI 91.2–111, Table 3, Figure 2). With respect to all cancer group, females tend to be two times (52% of male cases) less diagnosed to cancer than males (73.2/100,000, SD±5.7, CI 62.2–84.3 and 141.6/100,000, SD±9.3, CI 123.3–159.9, respectively). Pertaining to both genders, colon cancer (C18) and stomach cancer (C16) were the cancer sites with the highest incidence rate. Colorectal cancer (C18–C21) made up almost half of all cancer patients in the C15–C26 group (48/100,000). Colon cancer (C18), gastric cancer (C16) and cancer of rectum (C20) made up 2/3 of all patients (24.2, 21.5 and 19.1/100,000, respectively). The age-standardize incidence rate for colon cancer (C18) as the most frequent malignant tumour in both genders increased from 23.2/100,000 in the first period to 25.3/100,000 in the second one. The incidence rate of the next two most frequent cancers, stomach cancer (C16) and rectum cancer (C20) decreased sharply in the second period (C16, from 25.1 to 17.9/100,000 and C20, from 21.9 to 16.3/100,000, respectively). In females, C18 was the cancer site with the highest incidence rate. It is followed by cancer sites C20 and C16 (18.9, 14.3 and 14.3/100,000, respectively). In males, the highest incidence rate refers to C16 cancer site with incidence rate of 33.8/100,000. Cancer occurs primarily at ages 65+, and was four times

TABLE 1
HISTORICAL DATA ON C15–C26 CANCER AGE-STANDARDIZED INCIDENCE AND MORTALITY NUMBER AND RATE PER 100,000 (USING EU STANDARD POPULATION) COVERED THE PERIOD FROM 2001–2006

Year of data collection	Incidence rate						Mortality rate					
	Males		Females		Both genders		Males		Females		Both genders	
	N	ASR	N	ASR	N	ASR	N	ASR	N	ASR	N	ASR
2001–2003	234	144.7	188	77.3	422	104.9	191	117.8	150	60.0	341	83.4
2004–2005	224	138.5	168	69.1	393	97.2	179	110.2	135	53.7	314	76.6
2001–2006	229	141.6	178	73.2	407	101.1	185	114.0	143	56.8	328	80.0

N – average number of cases per year, ASR – age-standardized rate (EU)

TABLE 2
THE MEDIAN AGE AT DIAGNOSIS AND AT DEATH FOR C15–C26 CANCER IN OBC, PERIODS 2001–2003 AND 2004–2006, BOTH GENDER

ICD-10	Females – age (number)				Males – age (number)				Both genders – age (number)			
	2001–2006	2001–2003	2004–2006	Difference (years)*	2001–2006	2001–2003	2004–2006	Difference (years)*	2001–2006	2001–2003	2004–2006	Difference (years)*
Median age (in years) at diagnosis												
C15	67.4 (18)	70.3 (7)	65.5 (11)	–4.84	62.2 (102)	61.9 (51)	62.6 (51)	0.77	63.0 (120)	62.9 (58)	63.1 (62)	0.26
C16	68.9 (195)	67.8 (124)	70.8 (71)	3.00	67.7 (329)	66.3 (179)	69.4 (150)	3.19	68.2 (524)	66.9 (303)	69.9 (221)	2.99
C17	69.9 (8)	68.3 (4)	71.4 (4)	3.13	58.3 (6)	50.5 (3)	66.2 (3)	15.65	64.9 (14)	60.7 (7)	69.2 (7)	8.49
C18	69.2 (274)	69.1 (127)	69.3 (147)	0.27	66.3 (312)	66.2 (153)	66.3 (159)	0.10	67.6 (586)	67.5 (280)	67.8 (306)	0.26
C19	68.6 (47)	67.7 (25)	69.6 (22)	1.86	67.4 (61)	67.0 (28)	67.7 (33)	0.70	67.9 (108)	67.3 (53)	68.4 (55)	1.11
C20	68.3 (202)	68.5 (121)	67.9 (81)	–0.64	65.8 (255)	65.5 (141)	66.3 (114)	0.83	66.9 (457)	66.9 (262)	67 (195)	0.08
C21	70.6 (6)	69.8 (3)	71.5 (3)	1.69	61.8 (1)	61.8 (1)	–	–	69.4 (7)	67.8 (4)	71.5 (3)	3.67
C22	71.0 (97)	70.9 (52)	71.2 (45)	0.36	67.1 (123)	67.3 (65)	66.9 (58)	–0.46	68.8 (220)	68.9 (117)	68.8 (103)	–0.13
C23	74.2 (59)	73.1 (27)	75.2 (32)	2.10	68.4 (23)	68.4 (8)	68.4 (15)	0.03	72.6 (82)	72.0 (35)	73.0 (47)	1.02
C24	71.9 (20)	66.6 (2)	72.5 (18)	5.91	71.3 (17)	69.4 (7)	72.5 (10)	3.14	71.6 (37)	68.8 (9)	72.5 (28)	3.75
C25	70.4 (120)	70.3 (57)	70.5 (63)	0.18	64.8 (136)	65.6 (64)	64.1 (72)	–1.58	67.4 (256)	67.9 (121)	67.1 (135)	–0.78
C26	74.9 (22)	74.6 (14)	75.4 (8)	0.71	68.7 (11)	61.4 (3)	71.5 (8)	10.04	72.8 (33)	72.3 (17)	73.4 (16)	1.11
C18–C21	68.8 (529)	68.7 (276)	68.9 (253)	0.20	66.2 (629)	65.9 (323)	66.5 (306)	0.51	67.4 (1158)	67.2 (599)	67.6 (559)	0.35
C23–C24	73.6 (79)	72.6 (29)	74.2 (50)	1.60	69.6 (40)	68.8 (15)	70.1 (25)	1.20	72.3 (119)	71.3 (44)	72.8 (75)	1.49
C15–C26	69.7 (1,068)	69.2 (563)	70.2 (505)	0.91	66.3 (1,376)	65.8 (703)	66.8 (673)	1.00	67.8 (2,444)	67.3 (1,266)	68.2 (1,178)	0.91
Median age (in years) at death												
C15	71.4 (15)	70.8 (7)	71.9 (8)	1.18	63.1 (94)	63.1 (46)	63.1 (48)	–0.07	64.2 (109)	64.1 (53)	64.3 (56)	0.19
C16	71.5 (167)	70.4 (108)	73.4 (59)	2.92	69.1 (303)	68.1 (165)	70.2 (138)	2.12	69.9 (470)	69.0 (273)	71.2 (197)	2.14
C17	69.9 (6)	66.7 (3)	73.2 (3)	6.54	60.6 (4)	47.8 (2)	73.5 (2)	25.75	66.2 (10)	59.1 (5)	73.3 (5)	14.22
C18	72.9 (191)	72.8 (90)	73.0 (101)	0.14	69.9 (207)	69.9 (107)	70.0 (100)	0.07	71.3 (398)	71.2 (197)	71.5 (201)	0.24
C19	74.9 (27)	73.8 (13)	75.8 (14)	2.03	70.1 (33)	67.3 (14)	72.2 (19)	4.91	72.3 (60)	70.4 (27)	73.8 (33)	3.32
C20	72.4 (142)	73.5 (84)	70.7 (58)	–2.79	69.7 (183)	69.3 (105)	70.3 (78)	1.00	70.9 (325)	71.2 (189)	70.5 (136)	–0.70
C21	71.4 (6)	70.2 (3)	72.6 (3)	2.47	–	–	–	–	71.4 (6)	70.2 (3)	72.6 (3)	2.47
C22	71.9 (93)	72.1 (48)	71.8 (45)	–0.24	68 (115)	68.7 (61)	67.1 (54)	–1.59	69.8 (208)	70.2 (109)	69.3 (99)	–0.93
C23	74.5 (59)	73.4 (27)	75.5 (32)	2.10	69.3 (22)	70.2 (7)	68.8 (15)	–1.43	73.1 (81)	72.7 (34)	73.3 (47)	0.62
C24	75.9 (17)	66.7 (2)	77.1 (15)	10.41	72.3 (16)	70.1 (7)	74.0 (9)	3.91	74.1 (33)	69.3 (9)	76.0 (24)	6.63
C25	71.2 (115)	71.4 (54)	71.1 (61)	–0.35	66.3 (122)	68.4 (56)	64.6 (66)	–3.80	68.7 (237)	69.9 (110)	67.7 (127)	–2.17
C26	78.2 (18)	78.2 (12)	78.2 (6)	–0.03	69.5 (10)	62.0 (3)	72.8 (7)	10.80	75.1 (28)	75.0 (15)	75.3 (13)	0.30
C18-C21	72.8 (366)	73.2 (190)	72.4 (176)	–0.71	69.8 (423)	69.4 (226)	70.3 (197)	0.86	71.2 (789)	71.1 (416)	71.3 (373)	0.18
C23-C24	74.8 (76)	72.9 (29)	76.0 (47)	3.09	70.5 (38)	70.1 (14)	70.7 (24)	0.59	73.4 (114)	72.0 (43)	74.2 (71)	2.21
C15-C26	72.5 (856)	72.2 (451)	72.8 (405)	0.58	68.5 (1,109)	68.3 (573)	68.7 (536)	0.40	70.2 (1,965)	70 (1,024)	70.4 (941)	0.44

Difference (in years) = period II (2004–2006) – period I (2001–2003)

more frequent in that age category than in all younger age groups.

The incidence rate of colorectal cancer decrease from 49.8 to 46.3/100,000 and it was particularly obvious in the 60+ age group (from 270 to 257.2/100,000). In the 45–64 and 65+ age groups, males were two times more inclined to C15–C26 cancers than women whereas in younger age groups, there was no difference between the genders. In both observation periods, a significantly lower mortality rate was determined for all C15–C26 cancer group (from 83.4 to 76.6/100,000) in both gender (Table 4, Figure 3). In the end, a significant decrease in female-to-female incidence and mortality rate ratio (Tables 3 and 4) was observed with the C20 and C16 cancer sites in the 65+ age group in the second period.

The relative 5-year survival rate varies with age and cancer site (Table 5, Figure 4). Patients in the OBC diagnosed with the cancer group C15–C26 were characterized by the overall age-adjusted 5-year relative survival rate of 23.6%. The average survival rate in males amounted to 23.1% and in females to 24.3%.

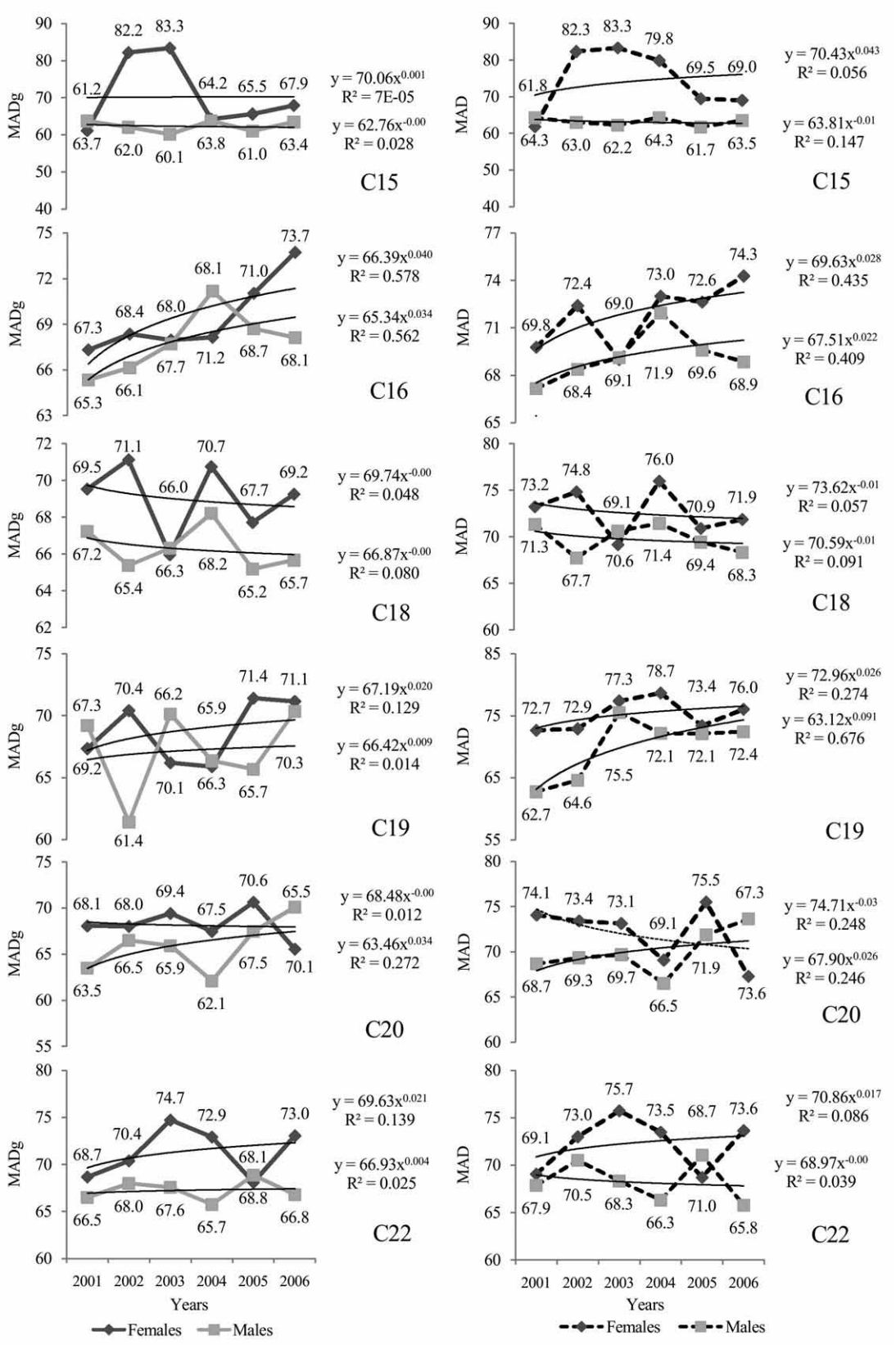

Fig. 1. The median age (in years) of cancer patients at diagnosis (MADg) and at death (MAD) by primary cancer site (C15–C26 in the OBC, periods 2001–2006. The rising trendlines in females suggests that a very strong and extremely dependable relationship exist between the median age at diagnosis and years, R^2=0.849 (R^2>0.80) and strong relationship in males, R^2=0.721 (R^2>0.48<0.81).

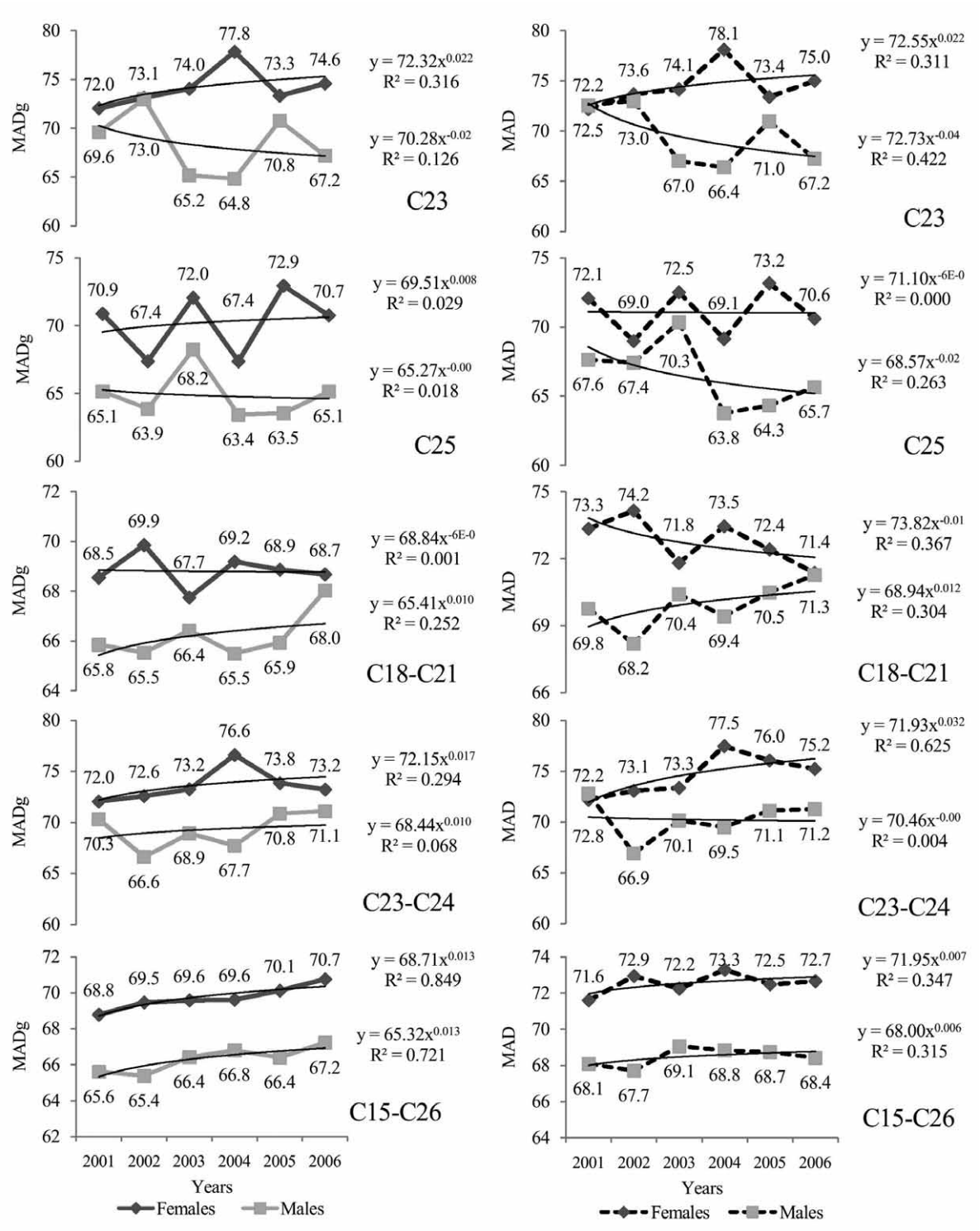

Fig. 1. continued.

The lowest survival rates were found with gallbladder cancer (C23) and cancer of liver and intrahepatic bile ducts (C22) (3.3% and 7.7%, respectively). No females survived cancer site C23 for five years or more. In the entire cancer group, the difference in 5-year relative survival rate between males and females was 1.2 percentage points in favour of females. Males with cancer of pancreas (C25) had the survival rate of 12.7%, while females'

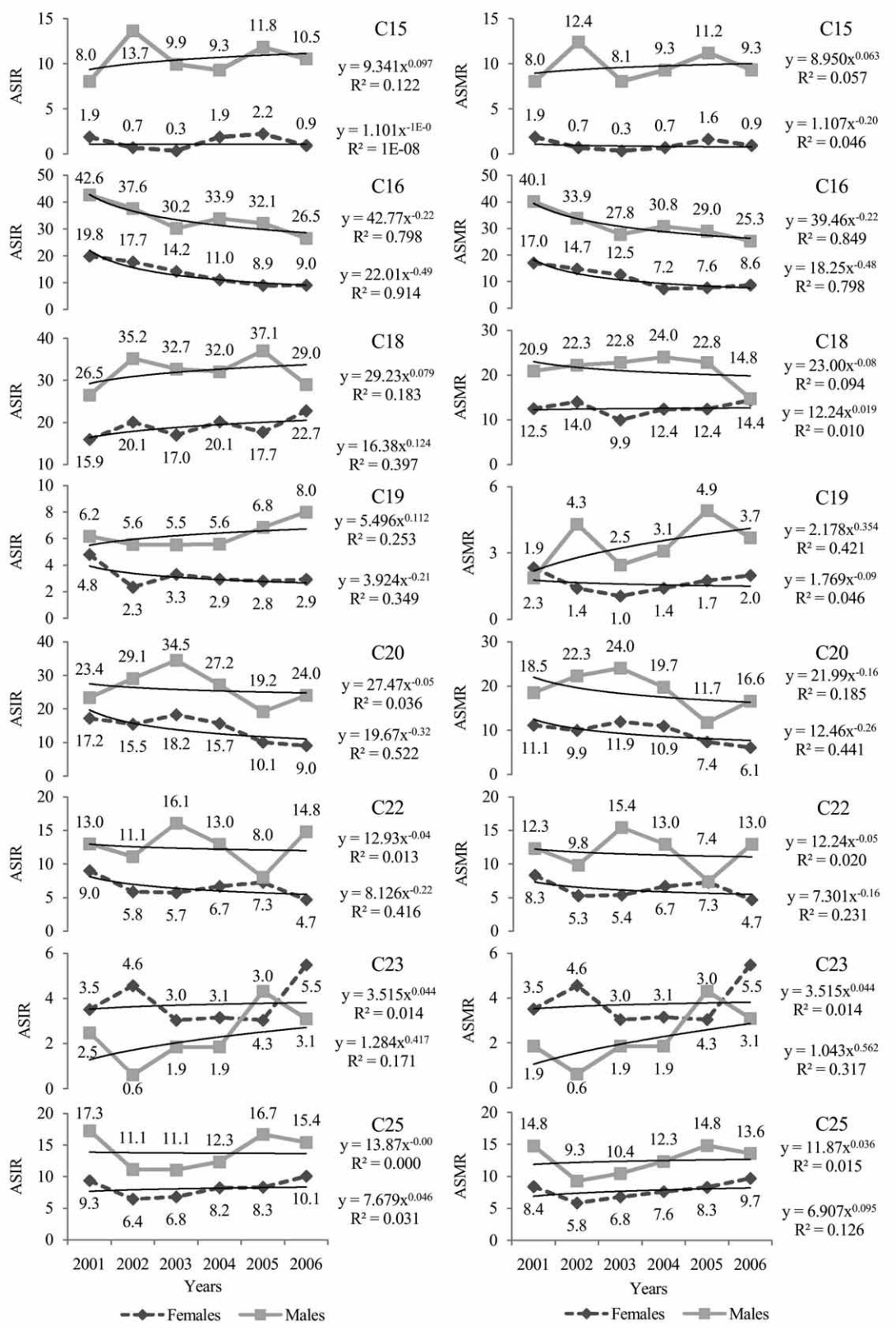

Fig. 2. The cancer age-standardized incidence rate (ASIR) for cancer group C15–C26 in the period 2001–2006 in the OBC per 100,000 inhabitants using the EU standard population. The downward trendline in females suggest that a very strong and extremely dependable relationship exists between ASIR and years, R^2=0.822 (R^2>0.80) and moderate downward trendline relationship in males (R^2=0.365, (R^2>0.16<0.49)).

TABLE 3
THE AGE-STANDARDIZED INCIDENCE RATE OF C15–C26 CANCERS IN THE OBC PER 100,000 IN THE TWO PERIODS (BY AGE GROUP AND GENDER), USING THE EU STANDARD POPULATION

Age-standardize incidence rate															
Females															
ICD-10	0–19			20–44			45–64			65+			All ages		
	I	II	T	I	II	T	I	II	T	I	II	T	I	II	T
C15	–	–	–	–	–	–	1.6	3.9	2.7	5.3	6.4	5.8	1.0	1.7	1.3
C16	0.8	–	0.4	4.6	1.7	3.2	19.6	10.9	15.2	95.4	57.2	76.3	17.2	9.6	13.4
C17	–	–	–	0.6	–	0.3	–	–	–	3.2	4.2	3.7	0.6	0.5	0.5
C18	–	–	–	1.7	2.9	2.3	25.8	25.8	25.8	96.4	115.5	106.0	17.7	20.2	18.9
C19	–	–	–	0.6	0.6	0.6	4.7	2.3	3.5	19.1	19.1	19.1	3.5	2.9	3.2
C20	–	–	–	2.9	1.7	2.3	24.2	18.8	21.5	90.1	57.2	73.6	17.0	11.6	14.3
C21	–	–	–	–	–	–	0.8	0.8	0.8	2.1	2.1	2.1	0.4	0.4	0.4
C22	–	–	–	0.6	–	0.3	7.0	9.4	8.2	44.5	35.0	39.7	6.9	6.2	6.5
C23	–	–	–	–	–	–	5.5	1.6	3.5	21.2	31.8	26.5	3.7	3.9	3.8
C24	–	–	–	–	–	–	–	1.6	0.8	2.1	17.0	9.5	0.2	2.3	1.2
C25	–	–	–	0.6	0.6	0.6	7.8	14.1	10.9	48.7	46.6	47.7	7.5	8.9	8.2
C26	–	–	–	–	–	–	0.8	1.6	1.2	13.8	6.4	10.1	1.7	1.1	1.4
C18–C21	–	–	–	5.2	5.2	5.2	55.5	47.7	51.6	207.7	193.9	200.8	38.6	35.1	36.8
C23–C24	–	–	–	–	–	–	5.5	3.1	4.3	23.3	48.7	36.0	3.9	6.1	5.0
C15–C26	0.8	–	0.4	11.6	7.5	9.6	97.8	90.7	94.2	441.9	398.4	420.1	77.3	69.1	73.2
Males															
ICD-10	0–19			20–44			45–64			65+			All ages		
	I	II	T	I	II	T	I	II	T	I	II	T	I	II	T
C15	–	–	–	–	–	–	23.4	23.4	23.4	42.8	40.9	41.8	10.5	10.6	10.6
C16	–	–	–	2.9	1.1	2.0	49.2	49.2	49.2	213.9	208.3	211.1	36.8	30.8	33.8
C17	–	–	–	0.6	–	0.3	1.7	1.7	1.7	–	3.7	1.9	0.6	0.6	0.6
C18	–	–	–	2.3	3.4	2.9	42.6	42.6	42.6	182.3	189.7	186.0	31.5	32.7	32.1
C19	–	0.8	0.4	0.6	–	0.3	5.8	5.8	5.8	37.2	46.5	41.8	5.8	6.8	6.3
C20	–	–	–	4.6	2.3	3.4	39.2	39.2	39.2	159.9	132.0	146.0	29.0	23.5	26.2
C21	–	–	–	–	–	–	0.8	0.8	0.8	–	–	–	0.2	–	0.1
C22	–	–	–	0.6	2.3	1.4	16.7	16.7	16.7	81.8	68.8	75.3	13.4	11.9	12.6
C23	–	–	–	–	–	–	2.5	2.5	2.5	9.3	20.5	14.9	1.6	3.1	2.4
C24	–	–	–	–	–	–	1.7	1.7	1.7	9.3	13.0	11.2	1.4	2.1	1.7
C25	–	–	–	1.1	1.7	1.4	16.7	16.7	16.7	78.1	78.1	78.1	13.2	14.8	14.0
C26	–	–	–	0.6	–	0.3	–	–	–	3.7	13.0	8.4	0.6	1.6	1.1
C18–C21	–	0.8	0.4	7.4	5.7	6.6	88.5	88.5	88.5	379.4	368.2	373.8	66.4	63.0	64.7
C23–C24	–	–	–	–	–	–	4.2	4.2	4.2	18.6	33.5	26.0	3.1	5.1	4.1
C15–C26	–	0.8	0.4	13.1	10.8	12.0	200.3	200.3	200.3	818.3	814.6	816.5	144.7	138.5	141.6
Both genders															
ICD-10	0–19			20–44			45–64			65+			All ages		
	I	II	T	I	II	T	I	II	T	I	II	T	I	II	T
C15	–	–	–	–	–	–	12.1	12.1	12.1	18.9	18.9	18.9	5.1	5.5	5.3
C16	0.4	–	0.2	3.7	1.4	2.6	33.9	33.9	33.9	138.4	112.1	125.2	25.1	17.9	21.5
C17	–	–	–	0.6	–	0.3	0.8	0.8	0.8	2.0	4.1	3.0	0.6	0.5	0.6
C18	–	–	–	2.0	3.2	2.6	33.9	33.9	33.9	127.6	142.4	135.0	23.2	25.3	24.2
C19	–	0.4	0.2	0.6	0.3	0.4	5.2	5.2	5.2	25.7	29.0	27.3	4.3	4.4	4.4
C20	–	–	–	3.7	2.0	2.9	31.5	31.5	31.5	115.4	84.4	99.9	21.9	16.3	19.1
C21	–	–	–	–	–	–	0.8	0.8	0.8	1.4	1.4	1.4	0.4	0.2	0.3
C22	–	–	–	0.6	1.1	0.9	11.7	11.7	11.7	58.1	47.3	52.7	9.5	8.5	9.0
C23	–	–	–	–	–	–	4.0	4.0	4.0	16.9	27.7	22.3	2.9	3.6	3.3
C24	–	–	–	–	–	–	0.8	0.8	0.8	4.7	15.5	10.1	0.7	2.2	1.5
C25	–	–	–	0.9	1.1	1.0	12.1	12.1	12.1	59.4	58.1	58.7	9.9	11.3	10.6
C26	–	–	–	0.3	–	0.1	0.4	0.4	0.4	10.1	8.8	9.5	1.3	1.3	1.3
C18–C21	–	0.4	0.2	6.3	5.5	5.9	71.5	71.5	71.5	270.0	257.2	263.6	49.8	46.3	48.0
C23–C24	–	–	–	–	–	–	4.8	4.8	4.8	21.6	43.2	32.4	3.6	5.9	4.7
C15–C26	0.4	0.4	0.4	12.4	9.2	10.8	147.4	147.4	147.4	578.5	549.5	564.0	104.9	97.2	101.1

Years of data collection: I – 2001–2003, II – 2004–2006, T – 2001–2006

TABLE 4
AGE-STANDARDIZED MORTALITY RATES FOR C15–C26 CANCERS IN TWO PERIODS (BY AGE GROUP AND GENDER) IN OBC PER 100,000 USING EU STANDARD POPULATION

Age-standardize mortality rate												
Females												
ICD-10	20–44			45–64			65+			All ages		
	I	II	T	I	II	T	I	II	T	I	II	T
C15	–	–	–	1.6	1.6	1.6	5.3	6.4	5.8	1.0	1.1	1.0
C16	2.3	0.6	1.4	18.0	8.6	13.3	85.8	49.8	67.8	14.7	7.8	11.3
C17	0.6	–	0.3	–	–	–	2.1	3.2	2.6	0.4	0.3	0.4
C18	–	1.2	0.6	16.4	10.9	13.7	73.1	90.1	81.6	12.1	13.0	12.6
C19	–	–	–	0.8	0.8	0.8	12.7	13.8	13.2	1.6	1.7	1.7
C20	0.6	1.2	0.9	10.9	11.7	11.3	73.1	43.4	58.3	11.0	8.1	9.5
C21	–	–	–	0.8	0.8	0.8	2.1	2.1	2.1	0.4	0.4	0.4
C22	0.6	–	0.3	6.3	9.4	7.8	41.3	35.0	38.1	6.3	6.2	6.3
C23	–	–	–	5.5	1.6	3.5	21.2	31.8	26.5	3.7	3.9	3.8
C24	–	–	–	–	–	–	2.1	15.9	9.0	0.2	1.7	1.0
C25	0.6	–	0.3	6.3	14.1	10.2	47.7	45.6	46.6	7.0	8.5	7.8
C26	–	–	–	–	0.8	0.4	12.7	5.3	9.0	1.4	0.8	1.1
C18–C21	0.6	2.3	1.4	28.9	24.2	26.6	161.1	149.4	155.2	25.2	23.3	24.2
C23–C24	–	–	–	5.5	1.6	3.5	23.3	47.7	35.5	3.9	5.6	4.8
C15–C26	4.6	2.9	3.8	66.5	60.2	63.3	379.3	342.3	360.8	60.0	53.7	56.8
Males												
ICD-10	20–44			45–64			65+			All ages		
	I	II	T	I	II	T	I	II	T	I	II	T
C15	–	–	–	19.2	19.2	19.2	42.8	37.2	40.0	9.5	9.9	9.7
C16	2.9	1.1	2.0	39.2	39.2	39.2	210.2	189.7	199.9	33.9	28.4	31.1
C17	0.6	–	0.3	0.8	0.8	0.8	–	3.7	1.9	0.4	0.4	0.4
C18	0.6	1.1	0.9	23.4	23.4	23.4	145.1	137.6	141.3	22.0	20.5	21.3
C19	0.6	–	0.3	3.3	3.3	3.3	16.7	31.6	24.2	2.9	3.9	3.4
C20	1.7	1.7	1.7	26.7	26.7	26.7	130.2	104.1	117.2	21.6	16.0	18.8
C21	–	–	–	–	–	–	–	–	–	–	–	–
C22	0.6	1.7	1.1	13.4	13.4	13.4	81.8	63.2	72.5	12.5	11.1	11.8
C23	–	–	–	1.7	1.7	1.7	9.3	20.5	14.9	1.4	3.1	2.3
C24	–	–	–	1.7	1.7	1.7	9.3	11.2	10.2	1.4	1.9	1.6
C25	1.1	1.7	1.4	10.0	10.0	10.0	78.1	70.7	74.4	11.5	13.6	12.5
C26	0.6	–	0.3	–	–	–	3.7	11.2	7.4	0.6	1.4	1.0
C18–C21	2.9	2.9	2.9	53.4	53.4	53.4	292.0	273.4	282.7	46.5	40.5	43.5
C23–C24	–	–	–	3.3	3.3	3.3	18.6	31.6	25.1	2.9	4.9	3.9
C15–C26	8.6	7.4	8.0	139.4	139.4	139.4	727.2	680.7	703.9	117.8	110.2	114.0
Both genders												
ICD-10	20–44			45–64			65+			All ages		
	I	II	T	I	II	T	I	II	T	I	II	T
C15	–	–	–	10.1	10.1	10.1	18.9	17.6	18.2	4.6	5.0	4.8
C16	2.6	0.9	1.7	28.3	28.3	28.3	131.0	100.6	115.8	22.4	15.9	19.1
C17	0.6	–	0.3	0.4	0.4	0.4	1.4	3.4	2.4	0.5	0.4	0.4
C18	0.3	1.1	0.7	19.8	19.8	19.8	99.2	107.3	103.3	16.0	16.0	16.0
C19	0.3	–	0.1	2.0	2.0	2.0	14.2	20.3	17.2	2.2	2.5	2.3
C20	1.1	1.4	1.3	18.6	18.6	18.6	93.8	65.5	79.7	15.4	11.1	13.3
C21	–	–	–	0.4	0.4	0.4	1.4	1.4	1.4	0.2	0.2	0.2
C22	0.6	0.9	0.7	9.7	9.7	9.7	56.0	45.2	50.6	8.8	8.2	8.5
C23	–	–	–	3.6	3.6	3.6	16.9	27.7	22.3	2.8	3.6	3.2
C24	–	–	–	0.8	0.8	0.8	4.7	14.2	9.5	0.7	1.9	1.3
C25	0.9	0.9	0.9	8.1	8.1	8.1	58.7	54.7	56.7	8.8	10.7	9.7
C26	0.3	–	0.1	–	–	–	9.5	7.4	8.4	1.1	1.0	1.1
C18–C21	1.7	2.6	2.2	40.8	40.8	40.8	208.6	194.4	201.5	33.7	30.0	31.9
C23–C24	–	–	–	4.4	4.4	4.4	21.6	41.9	31.7	3.5	5.5	4.5
C15–C26	6.6	5.2	5.9	101.7	101.7	101.7	505.6	465.1	485.3	83.4	76.6	80.0

Years of data collection: I – 2001–2003, II – 2004–2006, T – 2001–2006, Age 0–19 – no death

TABLE 5
OVERALL FIVE YEARS RELATIVE SURVIVAL RATES FOR C15–C26 CANCERS IN THE OBC, BOTH GENDERS, PERIOD 2001–2005

ICD-10	Females – % (number of survival cases)				
	0–19	20–44	45–64	65+	All ages
C15	–	–	50.5 (3)	0.0	19.0 (3)
C16	100.1 (1)	58.4 (7)	21.3 (8)	15.9 (18)	20.0 (34)
C17	–	0.0	–	64.0 (3)	50.6 (3)
C18	–	66.7 (4)	47.9 (27)	29.6 (43)	34.4 (74)
C19	–	100.1 (2)	80.8 (8)	34.3 (9)	48.1 (19)
C20	–	66.7 (6)	54.7 (26)	27.5 (32)	35.8 (64)
C21	–	–	0.0	0.0	0.0
C22	–	0.0	18.4 (4)	5.2 (3)	8.3 (7)
C23	–	–	0.0	0.0	0.0
C24	–	–	101 (1)	8.9 (1)	15.6 (2)
C25	–	50.1 (1)	9.6 (2)	2.9 (2)	5.3 (5)
C26	–	–	50.5 (1)	15.2 (2)	19.0 (3)
C18–C21	–	70.7 (12)	52.7 (61)	28.9 (84)	35.8 (157)
C23–C24	–	–	11.2 (1)	2.2 (1)	3.6 (2)
C15–C26	100.1 (1)	60.7 (20)	37.6 (80)	18.7 (113)	24.3 (214)
ICD-10	Males – % (number of survival cases)				
	0–19	20–44	45–64	65+	All ages
C15	–	0.0	13.3 (7)	0.0	8.3 (7)
C16	–	16.7 (1)	25.8 (23)	7.9 (14)	13.5 (38)
C17	–	0.0	50.5 (1)	0.0	20.3 (1)
C18	–	75.1 (6)	51.6 (47)	27.8 (43)	36.7 (96)
C19	100.1 (1)	0.0	57.7 (8)	53.3 (16)	52.8 (25)
C20	–	54.6 (6)	47.1 (41)	22.8 (25)	33.8 (72)
C21	–	–	101.0 (1)	–	101.3 (1)
C22	–	20.0 (1)	16.8 (5)	1.7 (1)	7.2 (7)
C23	–	–	20.2 (1)	8.2 (1)	11.3 (2)
C24	–	–	16.8 (1)	0.0	7.2 (1)
C25	–	20.0 (1)	27.8 (11)	1.6 (1)	11.9 (13)
C26	–	0.0	–	15.2 (1)	12.7 (1)
C18–C21	100.1 (1)	60.1 (12)	50.3 (97)	28.5 (84)	37.1 (194)
C23–C24	–	–	18.4 (2)	5.1 (1)	9.5 (3)
C15–C26	100.1 (1)	38.5 (15)	35.0 (146)	15.6 (102)	23.1 (264)
ICD-10	Both genders – % (number of survival cases)				
	0–19	20–44	45–64	65+	All ages
C15	–	0.0	17.1 (10)	0.0	10.0 (10)
C16	100.1 (1)	44.5 (8)	24.5 (31)	11.0 (32)	15.9 (72)
C17	–	0.0	50.5 (1)	45.7 (3)	36.8 (4)
C18	–	71.5 (10)	50.2 (74)	28.6 (86)	35.6 (170)
C19	100.1 (1)	66.7 (2)	67.4 (16)	44.4 (25)	50.6 (44)
C20	–	60.1 (12)	49.8 (67)	25.2 (57)	34.7 (136)
C21	–	–	33.7 (1)	0.0	16.9 (1)
C22	–	16.7 (1)	17.5 (9)	3.4 (4)	7.7 (14)
C23	–	–	7.8 (1)	2.2 (1)	3.3 (2)
C24	–	–	28.9 (2)	5.3 (1)	11.3 (3)
C25	–	28.6 (2)	21.5 (13)	2.3 (3)	8.8 (18)
C26	–	0.0	50.5 (1)	15.2 (3)	16.9 (4)
C18–C21	100.1 (1)	64.9 (24)	51.2 (158)	28.7 (168)	36.5 (351)
C23–C24	–	–	15.2 (3)	3.1 (2)	5.7 (5)
C15–C26	100.1 (2)	48.7 (35)	35.9 (226)	17.1 (215)	23.6 (478)

– "–" – no cases, 0.0 – no survival cases

TABLE 6
THE AGE DISTRIBUTION OF CANCER PACIENTS AT DIAGNOSIS AND AT DEATH FOR C15–C26 CANCERS IN PERIOD 2001–2006, BOTH GENDERS

ICD-10	Age distribution (%) at diagnosis									Frequency (number of cases)			Frequency (%)		
	Females			Males			Both genders								
	0–44	45–64	65+	0–44	45–64	65+	0–44	45–64	65+	F	M	T	F	M	T
C15	–	38.9	61.1	2.0	59.8	38.2	1.7	56.7	41.7	18	102	120	1.7	7.4	4.9
C16	6.7	21.5	71.8	2.1	31.6	66.3	3.8	27.9	68.3	195	329	524	18.3	23.9	21.4
C17	12.5	–	87.5	16.7	50.0	33.3	14.3	21.4	64.3	8	6	14	0.7	0.4	0.6
C18	2.9	25.2	71.9	3.2	35.6	61.2	3.1	30.7	66.2	274	312	586	25.7	22.7	24.0
C19	4.3	25.5	70.2	1.6	24.6	72.1	2.8	25.0	71.3	47	61	108	4.4	4.4	4.4
C20	5.0	27.2	67.8	4.7	38.0	57.3	4.8	33.3	61.9	202	255	457	18.9	18.5	18.7
C21	–	33.3	66.7	–	100.0	–	–	42.9	57.1	6	1	7	0.6	0.1	0.3
C22	1.0	25.8	73.2	5.7	30.9	63.4	3.6	28.6	67.7	97	123	220	9.1	8.9	9.0
C23	–	15.3	84.7	–	34.8	65.2	–	20.7	79.3	59	23	82	5.5	1.7	3.4
C24	5.0	5.0	90.0	–	35.3	64.7	2.7	18.9	78.4	20	17	37	1.9	1.2	1.5
C25	1.7	23.3	75.0	4.4	36.0	59.6	3.1	30.1	66.8	120	136	256	11.2	9.9	10.5
C26	–	13.6	86.4	9.1	9.1	81.8	3.0	12.1	84.8	22	11	33	2.1	0.8	1.4
C18–C21	3.8	26.1	70.1	3.7	35.6	60.6	3.7	31.3	64.9	529	629	1158	49.5	45.7	47.4
C23–C24	1.3	12.7	86.1	–	35.0	65.0	0.8	20.2	79.0	79	40	119	7.4	2.9	4.9
C15–C26	3.6	23.7	72.8	3.4	35.9	60.6	3.5	30.6	65.9	1,068	1,376	2,444	43.7	56.3	

ICD-10	Age distribution (%) at deaths									Frequency (number of cases)			Frequency (%)		
	Females			Males			Both genders								
	0–44	45–64	65+	0–44	45–64	65+	0–44	45–64	65+	F	M	T	F	M	T
C15	–	26.7	73.3	2.1	58.5	39.4	1.8	54.1	44.0	15	94	109	1.8	8.5	5.5
C16	3.6	21.0	75.4	2.3	28.7	69.0	2.8	26.0	71.3	167	303	470	19.5	27.3	23.9
C17	16.7	–	83.3	25.0	25.0	50.0	20.0	10.0	70.0	6	4	10	0.7	0.4	0.5
C18	1.0	19.9	79.1	1.4	26.6	72.0	1.3	23.4	75.4	191	207	398	22.3	18.7	20.3
C19	–	11.1	88.9	3.0	21.2	75.8	1.7	16.7	81.7	27	33	60	3.2	3.0	3.1
C20	2.1	21.8	76.1	3.3	31.1	65.6	2.8	27.1	70.2	142	183	325	16.6	16.5	16.5
C21	–	33.3	66.7	–	–	–	–	33.3	66.7	6	–	6	0.7	0.0	0.3
C22	1.1	23.7	75.3	5.2	29.6	65.2	3.4	26.9	69.7	93	115	208	10.9	10.4	10.6
C23	–	15.3	84.7	–	31.8	68.2	–	19.8	80.2	59	22	81	6.9	2.0	4.1
C24	–	–	100.0	–	31.3	68.8	–	15.2	84.8	17	16	33	2.0	1.4	1.7
C25	0.9	22.6	76.5	4.1	32.0	63.9	2.5	27.4	70.0	115	122	237	13.4	11.0	12.1
C26	–	5.6	94.4	10.0	10.0	80.0	3.6	7.1	89.3	18	10	28	2.1	0.9	1.4
C18–C21	1.4	20.2	78.4	2.4	28.1	69.5	1.9	24.5	73.6	366	423	789	42.8	38.1	40.2
C23–C24	–	11.8	88.2	–	31.6	68.4	–	18.4	81.6	76	38	114	8.9	3.4	5.8
C15–C26	1.6	20.0	78.4	2.9	31.4	65.7	2.3	26.4	71.2	856	1,109	1,965	43.6	56.4	

survival rate was twice as low, only 5.3%. Comprising both genders, cancer group C15–C26 was featured by the range of survival rates from 3.3% to 50.6%.

Over the 6-year study period, the number of C15–C26 cases decreased (Table 1 and 2). The age distribution at diagnosis and at death for each age group is showed in the Table 6. The proportion of females under 45 years of age in this cancer group was slightly higher (3.6%) than that of males (3.4%). *Vice versa*, the mortality rate in the same cancer group was almost twice higher in males (2.9%) than in females (1.6%). One can say that cancer group C15–C26 is the cancer of the 65+ age group. At that age, females developed cancer and died of it (72.8% and 78.4%, respectively) more often than males (60.6% and 65.7%, respectively).

In the 2001–2006 period, a total of 2,444 people were diagnosed with C15–C26 cancers. In this period, the hospital admissions in the OBC hospitals counted 4,642 and the total days of hospital care numbered 73,671. On average, one patient was hospitalized 1.9 times during this reference period with the average length of stay of 15.9 days (Table 7, Figure 5). The number of hospitalizations

TABLE 7
THE NUMBER OF CANCER HOSPITALIZATIONS AND THE AVERAGE LENGTH OF STAY IN HOSPITAL FOR C15–C26 CANCERS, PERIOD 2001–2006

	Females – number of hospital admissions					Females – average length of stay				
	0–19	20–44	45–64	65+	All ages	0–19	20–44	45–64	65+	All ages
C15	–	1	16	19	36	–	25.0	23.3	18.3	20.7
C16	1	36	85	203	325	14.0	12.3	15.4	16.3	15.6
C17	–	1	–	13	14	–	39.0	–	14.7	16.4
C18	–	22	172	355	549	–	14.1	13.3	14.8	14.3
C19	–	2	24	50	76	–	13.5	17.3	15.6	16.1
C20	–	18	165	307	490	–	16.9	13.4	15.7	15.0
C21	–	–	1	4	5	–	–	8.0	14.8	13.4
C22	–	4	46	104	154	–	14.3	17.1	17.4	17.2
C23	–	1	14	52	67	–	9.0	11.1	19.6	17.7
C24	–	1	2	23	26	–	31.0	34.0	19.7	21.2
C25	–	7	52	108	167	–	13.9	17.3	20.6	19.3
C26	–	2	7	22	31	–	29.5	16.0	17.6	18.0
C15–C26	1	95	584	1,260	1,940	14.0	14.7	14.8	16.4	15.8
	Males – number of hospital admissions					Males – average length of stay				
	0–19	20–44	45–64	65+	All ages	0–19	20–44	45–64	65+	All ages
C15	–	3	147	81	231	–	10.7	16.8	21.3	18.3
C16	–	29	213	381	623	–	11.6	14.4	15.6	15.0
C17	–	1	5	5	11	–	77.0	22.8	18.6	25.8
C18	–	29	216	384	629	–	10.8	15.0	13.6	14.0
C19	1	3	38	81	123	12.0	16.3	14.0	16.5	15.7
C20	–	24	274	336	634	–	15.5	16.2	16.5	16.3
C21	–	–	1	2	3	–	–	12.0	28.5	23.0
C22	–	5	63	109	177	–	24.8	19.6	14.7	16.7
C23	–	–	14	14	28	–	–	16.8	18.2	17.5
C24	–	–	12	15	27	–	–	21.3	24.9	23.3
C25	–	8	85	112	205	–	31.6	16.3	18.0	17.8
C26	–	1	2	8	11	–	57.0	3.5	18.8	19.5
C15–C26	1	103	1,070	1,528	2,702	12.0	15.7	15.9	15.9	15.9
	Both genders – number of hospital admissions					Both genders – average length of stay				
	0–19	20–44	45–64	65+	All ages	0–19	20–44	45–64	65+	All ages
C15	–	4	163	100	267	–	14.3	17.4	20.7	18.6
C16	1	65	298	584	948	14.0	12.0	14.7	15.9	15.2
C17	–	2	5	18	25	–	58.0	22.8	15.8	20.6
C18	–	51	388	739	1178	–	12.3	14.3	14.2	14.1
C19	1	5	62	131	199	12.0	15.2	15.3	16.2	15.8
C20	–	42	439	643	1124	–	16.1	15.2	16.1	15.8
C21	–	–	2	6	8	–	–	10.0	19.3	17.0
C22	–	9	109	213	331	–	20.1	18.5	16.0	17.0
C23	–	1	28	66	95	–	9.0	14.0	19.3	17.6
C24	–	1	14	38	53	–	31.0	23.1	21.7	22.3
C25	–	15	137	220	372	–	23.3	16.7	19.2	18.5
C26	–	3	9	30	42	–	38.7	13.2	17.9	18.4
C15–C26	2	198	1,654	2,788	4,642	13.0	15.2	15.5	16.1	15.9

TABLE 8
YEARS AND AGES DISTRIBUTION AT DIAGNOSIS OF C15–C26 CANCERS AND THE AVERAGE LENGTH OF STAY IN HOSPITAL, PERIOD 2001–2006

Year of data collection	Females – number of hospital admissions					Females – average length of stay				
	0–19	20–44	45–64	65+	All ages	0–19	20–44	45–64	65+	All ages
2001	–	17	134	216	367	–	16.8	14.7	16.7	16.0
2002	1	15	89	228	333	14.0	13.4	14.6	15.0	14.8
2003	–	19	90	198	307	–	15.1	16.0	18.0	17.2
2004	–	20	98	219	337	–	13.2	15.0	15.9	15.5
2005	–	10	85	183	278	–	21.2	15.7	16.9	16.7
2006	–	14	88	216	318	–	10.9	12.8	16.2	15.0
C15–C26	1	95	584	1,260	1,940	14.0	14.7	14.8	16.4	15.8
Year of data collection	Males – number of hospital admissions					Males – average length of stay				
	0–19	20–44	45–64	65+	All ages	0–19	20–44	45–64	65+	All ages
2001	–	23	153	205	381	–	11.8	15.0	16.4	15.6
2002	–	20	211	259	490	–	14.1	14.0	15.2	14.6
2003	–	15	185	279	479	–	21.7	17.6	17.2	17.5
2004	–	13	169	272	454	–	12.1	17.8	14.6	15.7
2005	1	16	160	233	410	12.0	20.1	16.7	18.3	17.7
2006	–	16	192	280	488	–	16.2	14.6	14.4	14.5
C15–C26	1	103	1,070	1,528	2,702	12.0	15.7	15.9	15.9	15.9
Year of data collection	Both genders – number of hospital admissions					Both genders – average length of stay				
	0–19	20–44	45–64	65+	All ages	0–19	20–44	45–64	65+	All ages
2001	–	40	287	421	748	–	13.9	14.9	16.6	15.8
2002	1	35	300	487	823	14.0	13.8	14.2	15.1	14.7
2003	–	34	275	477	786	–	18.0	17.0	17.5	17.4
2004	–	33	267	491	791	–	12.8	16.7	15.1	15.6
2005	1	26	245	416	688	12.0	20.5	16.3	17.7	17.3
2006	–	30	280	496	806	–	13.7	14.1	15.2	14.7
C15–C26	2	198	1,654	2,788	4,642	13.0	15.2	15.5	16.1	15.9

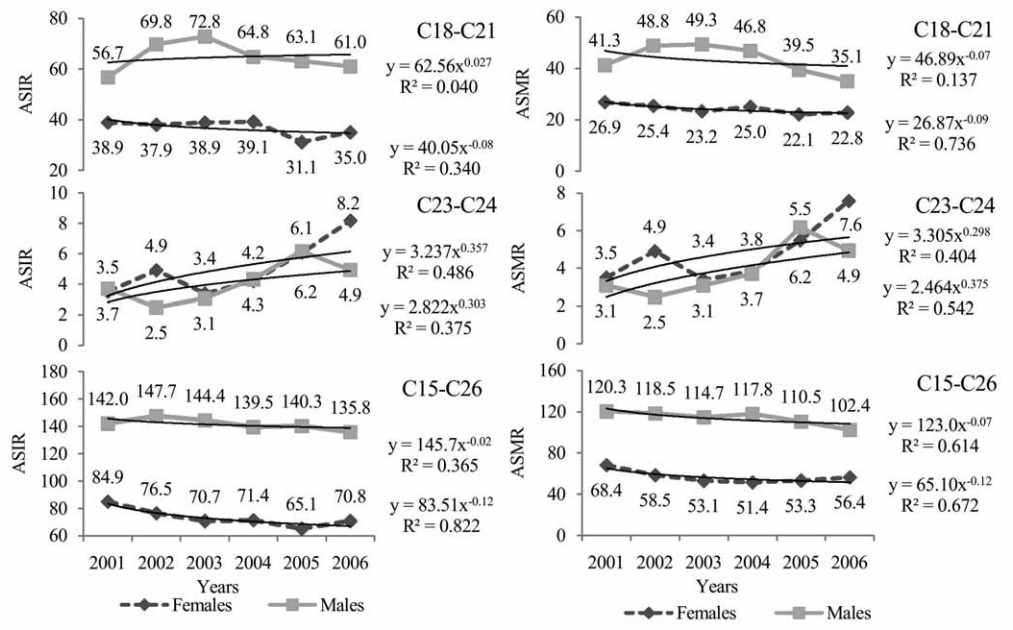

Fig. 3. The cancer age-standardized mortality rate (ASMR) for cancer group C15–C26 in the period 2001–2006 in the OBC per 100,000 inhabitants using the EU standard population. The downward trendlines in females and males suggest that a strong relationship exists between ASMR and years, R^2=0.672 and R^2=0.614, respectively (R^2>0.48<0.81).

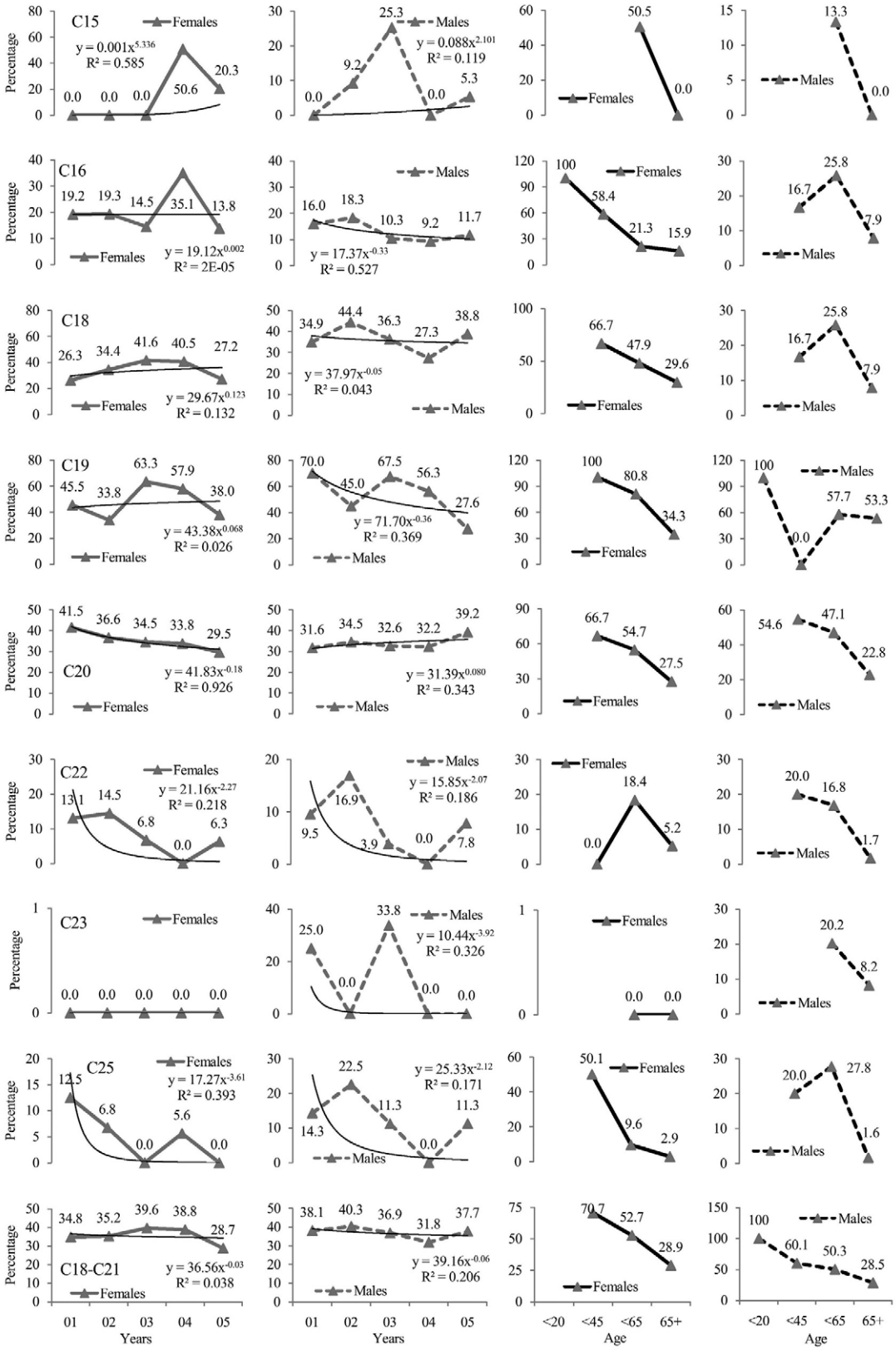

Fig. 4. The age-standardized 5-year relative survival rate for cancer group C15–C26 (both genders) in the OBC in the 2001–2005 period. The downward trendlines in females and males suggest that no relationship exists between 5-years relative survival rates and years, R^2=0.033 and R^2=0.195, respectively.

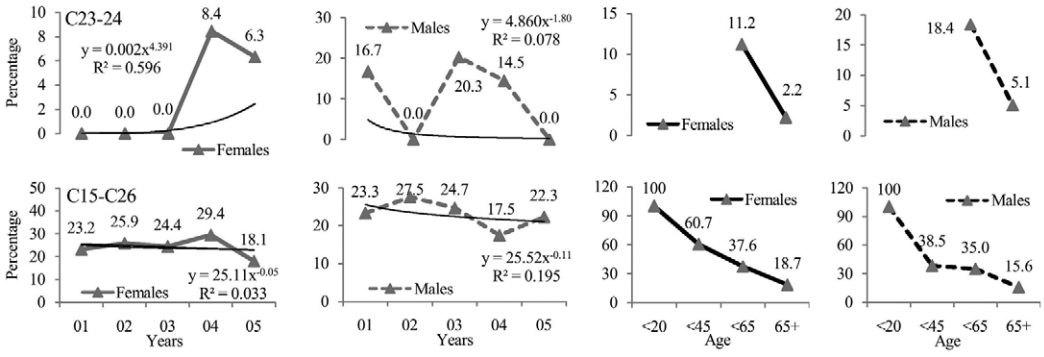

Fig. 4. continued.

was nearly twice bigger in the 65+ age group than in the 45–64 group (2,788 comparing to 1,654). Also, the length of stay progressed linearly from the youngest to the oldest category, precisely from 13 days in the youngest category to 16.1 days in the 65+ age group. Considering both genders, cancer of other and unspecified parts of biliary tract (C24) lead to the highest average length of stay (22.3 days). Males with this cancer spent on average 21.2 days in hospital and females 23.3 days. With respect to all patients together and only male population, the shortest length of stay on average was found with cancer C18 lasting 14.1 and 14 days, respectively. Females with cancer of anus and anal canal (C21) stayed in hospital on average longer than females with other cancer sites did, precisely 13.4 days. On average, males stayed in hospital 0.1 days longer than females did.

The total number of hospitalizations rose from 748 in 2001 to 806 in 2006) (Table 8, Figure 5). The same tendency applies when males are analyzed separately. Females were characterized by a downward tendency, except in the year 2005 when the number of females' hospitalizations went up substantially. The next year though experienced the old downward tendency. The length of stay in hospitals was also featured by a drop in females, the biggest one occurred in 2002. Males made up 58.2% of all hospitalizations.

Discussion

This is the first paper that elaborates the issue of cancer group C15–C26 at a county level in Croatia. The study conducted in the OBC suggests that the incidence rate of C15–C26 cancers declined in all age groups comparing the first with the second period. It is notable that the incidence rate was twice higher among males than among females. The decline in the C15–C26 cancers mortality rate and particularly in the rates of colorectal cancer within the OBC population could not be explained by introduction of the colorectal cancer screening program since this programme was introduced in 2007.

There were available epidemiological studies which could show the correlation of the intake of dietary fat and meat with the risk of colorectal cancer[7,23,24].

The changes in incidence rate of cancer group C15–C26 in the OBC may result from changes in detection practices which appeared after the introduction or increased use of novel screening, diagnostic or treatment techniques. It seems that the declines in the incidence rates of rectum cancer (C20) and stomach cancer (C16) and the increase in incidence rate of colon cancer (C18) in females in the second period can be explained by omissions in the coding of diagnoses in hospital facilities and by manners of its performance and the performance of the mandatory procedure for filling out cancer application forms in hospitals. Apart from the aforementioned types of cancer, all other data suggest a downward trend in the incidence and mortality rate. During the 1988–2008 period, the overall gastric cancer incidence and mortality rate in Croatia decreased steadily[25]. This study reveals an increase in the incidence rate in males comparing to the Croatian average but also a decrease in the mortality rate among males. The situation with females was opposite. The incidence rate was slightly below the Croatian average but the mortality rate was twice as high. A quite similar data relation can be found with colorectal cancer.

The median age at diagnosis of C15–C26 cancer in the OBC was 67.8 years with a shift of 0.91 years up in the second period (the first period 67.3 years, the second period 68.2 years). The median age at diagnosis of cancer in females was 69.7 years and in males 66.3 years, which implies the difference of 2.9 years between genders. The median age at death from C15–C26 cancers in the OBC was 70.2 years with a shift of 0.44 years up in the second period (the first period 70 years, the second one 70.4 years). The median age at death from C15–C26 cancers in female patients over 65 years of age was 72.5 years while the respective median age in males was 68.5, implying the difference of 4 years.

The age distribution of cancer patients pursuant to the gender in the OBC does not differentiate much from the appertaining age distribution in the USA[26,27]. Patients under 45 years of age constituted 3.5% of total cancer patients and 2.3% of all deaths from cancer. The difference between the incidence rate and the mortality rate in this age was four times bigger than the difference between the incidence and the mortality rate in total

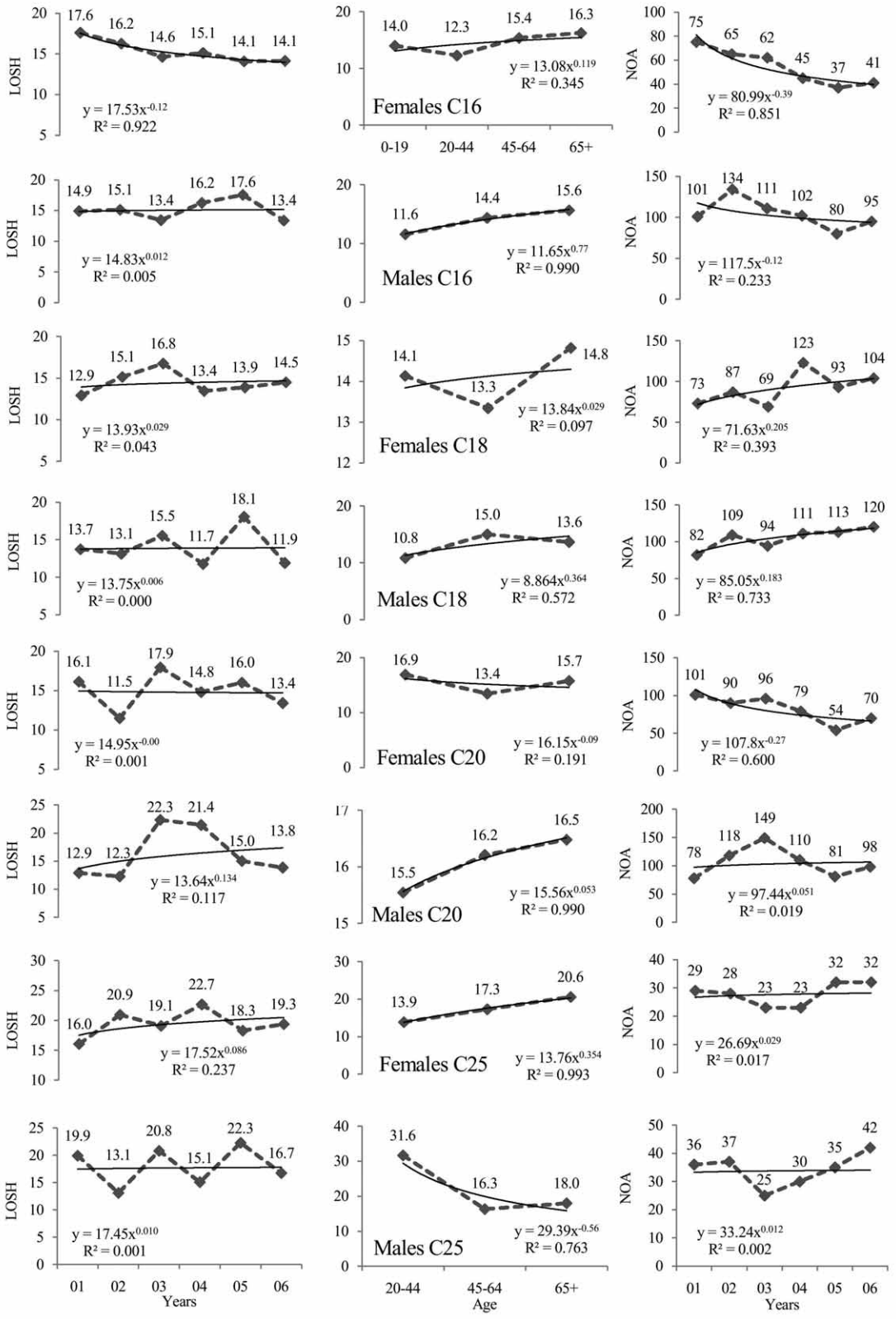

Fig. 5. Length of stay in hospital (LOSH) (in days) for cancer group C15–C26 (both genders, selected sites) in the OBC in the 2001–2006 period (NOA – number of hospital admissions). There is no relationship between length of stay in hospital and years (females and males), but strong and very strong relationship between length of stay in hospital and age for females (R^2=0.770) and males (R^2=0.815), respectively.

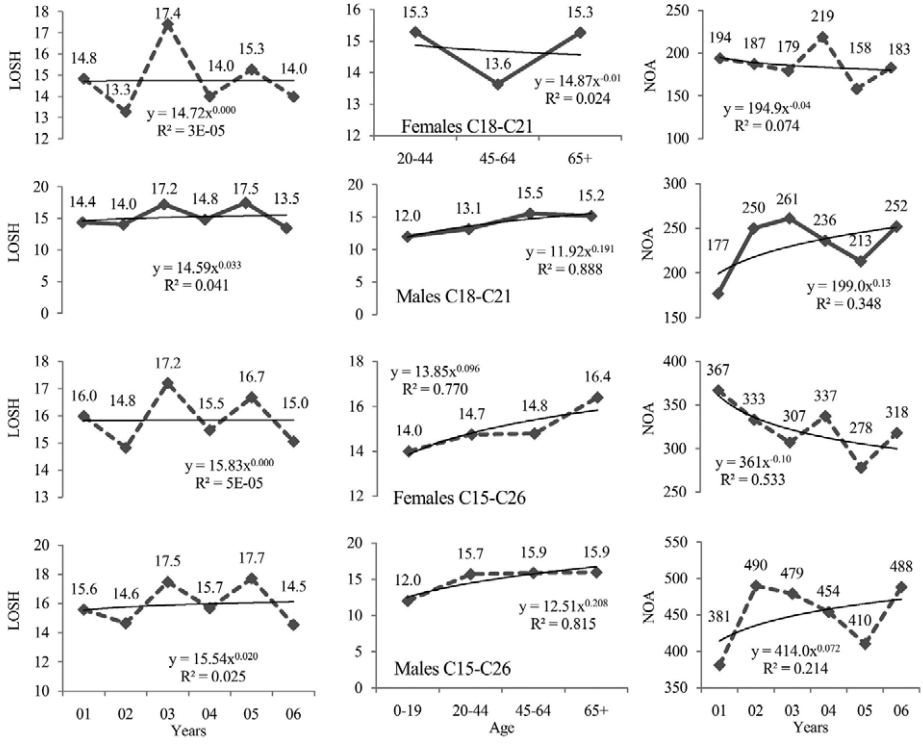

Fig. 5. continued.

cancer (C00–D48) in the OBC. The difference in the age distribution at death was even more evident (2.3% to 0.2%)[3]. As many as 72.8% of female cancer patients and 60.6% of male cancer patients was over 65 years of age at diagnosis with cancer. On average, females got diagnosis from C15–C26 cancers 12.2 years later than males did. A similar difference was determined with the respective mortality (12.7 years). There has not been any study in the OBC, which would be aimed at finding reason for this disproportion.

Cancer survival rates represent a direct consequence of different cancer control activities such as early detection, cancer care delivery and access or appropriate treatment. Very few studies focusing on cancer survival have been conducted in Croatia so far and most estimates are outdated in terms of comparison[28]. The survival from C15–C26 cancers strongly depends on age[29]. The overall 5-year relative survival rate from these cancers in the OBC is still significantly lower than that in European countries, particularly concerning oesophagus cancer (C15) and colorectal cancer C18–C21[30]. In the OBC, the survival rate from C15–C26 cancers was in all ages slightly higher in females than in males, which is opposite from the situation in the USA[9]. In the Primorsko-Goranska County, there are data on estimated 5-year survival rate (observed survival) of patient with colorectal cancer (from 1980 to 1999) accompanied with different cancer stage and various medical treatments[31,32]. Unfortunately, these data cannot be compared with the data on observed survival from colorectal cancer in the OBC (unpublished data on this survival, used as a ground for calculation of the 5-year relative survival rate, suggest the total overall observed survival rate of 23.3%, males 22.8%, females 24%) due to a different methodology of data processing).

The reference period was characterized by a rise in the number of hospitalizations of males (all age categories) diagnosed from cancers of digestive organs while the appertaining figure went down in females. The average length of stay in hospital changed (increases significantly) with the age of patients (Figure 5). The largest number of hospitalization was a result of colorectal cancer which was followed by the stomach cancer. Unfortunately, the data on cancer patients does not include (although they ought to) information on the performed treatment during hospital care such as the type of surgical treatment, chemotherapy, radiation etc. Therefore, the hospitalizations and the length of stay in hospital can only be commented generally and not individually on a single patient basis. What cannot be derived from these data is what exercise direct influence on the length of stay in hospital, its connection with the outcome of the treatment, dynamics of the change of treatment costs and the answer to the question if one should strive for a shorter length of stay in hospital or not[33,34]. The difference in the length of stay in hospital between the youngest and oldest age category amounted to 2.9 days in the OBC (13 and 15.9 days, respectively, Table 8) and it re-

sembled the respective difference in the USA, bearing in mind the fact that the length of stay in hospital due to this type of cancer is in the USA 3–4 shorter than in the OBC[35].

Incidence and mortality rates of the cancers of the digestive system in the OBC do not differ significantly from the data for the Croatia as a whole, but are well above the EU average. On the other hand, the survival rate is much lower than the EU average which is a direct indicator of the health service functioning and requires urgent and quality response. At the level of Croatia as a whole, including the OBC there are preventive programs that focus on education of citizens about measures and actions that could be taken in the prevention and early detection of cancers of the digestive system.

Limitations

Patients who were treated outside the hospital in the OBC are not registered in IPHO. Despite the efforts to get this information (they exist at the national level) in their original form, the authors were unable to obtain that data for unknown reasons. Therefore, the data of cancer in the OBC may differ from data of cancer for the OBC at the state level.

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RAK PROBAVNIH ORGANA (C15–C26) U OSJEČKO-BARANJSKOJ ŽUPANIJI, HRVATSKA

S A Ž E T A K

Zavod za javno zdravstvo Osječko-baranjske županije je u suradnji s različitim tijelima državne uprave i Maticom umrlih na razini županije prikupljao i obradio podatke o osobama oboljelih od raka za područje Osječko-baranjske županije (OBC) koristeći se obvezatnim bolničkim prijavama oboljelih. Za šifriranje raka probavnog sustava korištena je Međunarodna klasifikacija bolesti, 10-ta revizija, C15–C26. Cilj rada je prikazati veličinu problema i opterećenost zdravstvenog sustava karcinomima probavnog sustava C15–C26 u OBC u razdoblju od 2001–2006. Članak obrađuje incidenciju i smrtnost, dobnu raspodjelu, prosječnu dob oboljelih i umrlih, 5-godišnje relativno preživljavanje te broj i dužinu hospitalizacija u bolnicama OBC. Koristeći EU standardnu populaciju prosječna stopa incidencije i smrtnosti u promatranom razdoblju je 101,1 odnosno 80/100.000. Prosječna stope incidencije u promatranom šestogodišnjem razdoblju za grupu raka C15–C26 (101,1 i 80/100.000, EU standardne populacije) pada u drugom trogodišnjem razdoblju (prvo razdoblje 2001–2003, 104,9/100.000 i drugo razdoblje 2004–2006, 97,2/100.000). Stopa smrtnosti također pada od 83.4 u I razdoblju na 76,6/100.000 u II razdoblju. U trenutku postavljanja dijagnoze raka prosječna dob je bila 67,8 godina s pomakom od 0,91 godina u stariju dob u drugom razdoblju (67,3 na 68,2 godine). Prosječna dob prilikom dijagnoze raka je 69,7 godina u žena i 66.3 godine u muškaraca s razlikom do 3,4 godina za žene. Relativno 5-godišnje preživljavanje za sve dobi i oba spola je 23,6%, neznatno više u žena (24,3%) nego u muškarca (23,1%). U promatranom razdoblju porastao je broj hospitalizacija uzrokovanih karcinomima probavnog sustava u muškaraca vidljiv u svim dobnim skupinama, dok se smanjuje broj hospitalizacija u žena. Prosječna duljina ležanja se s godinama ne mijenja. Sijela raka C15–C26 su najučestalija skupina raka u oba spola. 5-godišnje preživljavanje kao jedan od pokazatelja kvalitete rada zdravstvene službe ostavlja prostor za bitno unapređenje kako bi se u što kraćem razdoblju približio EU prosjeku.