



Rapid changes in the incidence of urinary system cancers in Turkey

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ABSTRACT

Estimation of national cancer incidence for major cancer sites in Turkey has been carried out by analyzing the data obtained from active cancer registry, and published regularly by Institute of Public Health of Ministry of Health. In the light of these statistics, the incidence of urinary cancers in both sexes and their age related distributions have been discussed, paying special attention to prostate, kidney and bladder cancers. The annual incidence of all cancer cases increased gradually, reaching to 221.5 per 100,000 population in 2009, the latest confirmed figure available at present. Among males the most frequent cancers were those of the lung, prostate and bladder. The incidence rates of urinary cancers among males were 36.1, 21.4 and 6.3 per 100,000 for prostate, bladder and kidney respectively. The reliability of current data concerning the incidence of cancer has been discussed by comparing them with the previously reported national cancer data.

Keywords: Cancer registry; incidence; urinary system cancer

Introduction

History of cancer registry dates back to a century ago. In our country, fight against cancer dates back to 1940s, studies on cancer registry have started from the year 1983 with inclusion of cancers in reportable diseases mandated by law.^[1] Ministry of Health, General Directorate of Basic Health Services established a Branch Office for Fight Against Cancer during sixties, and then fight against cancer has become a government policy. Ten years later Directorate of Fight Against Cancer was established within the body of General Directorate of Basic Health Services. Ten years after, in 1982, cancer was included within the context of reportable diseases mandated by law, and then Department of Fight Against Cancer was founded.^[1-3] Up to the first years of 2000s, cancer data which were collected within the context of reportable diseases mandated by law, have been started to be actively collected with the establishment of Cancer Registry Centers. In our country due to widespread use of this method, it is possible to access into data with increasing reliability every year.

In the year 1989, Turkey has become a member of International Agency for Research on Cancer (IARC) of The World Health Organization (WHO). In all the world for cancer statistics, Globocan data released by IARC are used. According to Globocan data, globally, in the year 2008, 12.7 million newly developed cases with cancer, and 7.6 million cancer-related deaths were detected. In the year 2012, 14.1 million *de novo* cases with cancer, and 8.2 million cancer-related deaths were recorded. Within the last 5 years 32.6 million people with established diagnosis of cancer have maintained their lives. Age-standardized total mortality rates are 25% higher among men (men, 205, and women 165/100,000). In women mortality rates do not differ widely among regions. However mortality rates differ widely among regions. Its incidence rates in West Africa, and New Zealand are 79 and 365/100,000, respectively.^[4] Strikingly, such an increase in its incidence is related to prostate cancer. According to 2012 estimates, 307,000 men died from prostate cancer in the whole world. Prostate cancer ranks fifth among causes of death in men

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(6.6% of all-cause deaths in men). Its mortality rates are very high in blacks, moderately high in America, and Oceania, while it is very low in Asia.^[4]

Herein, we examined incidence rates of urogenital cancers in Turkey, differences in cancer rates between men, and women, and their distribution among different age groups. We especially concentrated on prostate, bladder, and kidney cancers which have an important place in our urooncology practice.

As is known, the probability of contracting a certain disease by healthy individuals within a determined unit of time (for cancer cases usually within a year) is prevalently called incidence. In other words, incidence is the number of newly developed cases within a year among people under risk of cancer which is expressed as per 100,000 people.^[5]

Sources of data

Based on cancer data released, and analyzed by Ministry of Health Department of Fight Against Cancer, we performed a study describing incidence rates of urogenital cancers.^[1] Data analyzed in this article belonged to the year before 2003. As is already known, collection of these data from many centers, their confirmation, and analysis so as to be able to be shared by colleagues take up much time. Most currently accessible data records retrieved from databases of international organizations as OECD, and WHO, and data dating back to 3-5 years were included in our analysis. Possibly because of retrieval of more reliable data or methodological changes, sometimes data of past years published later may contradict previously released data. At this moment, the latest data we could access were retrieved from Health Statistics Yearbook 2013 released by Ministry of Health, General Directorate of Health Research, and Globocan 2012 data published by International Agency of Cancer.^[6,7]

Cancer-related data declared by The Ministry of Health are compiled from the data of the provinces which retrieved data using Active Cancer Registry System. Patient files, and electronic databases were individually investigated, and entered in a central computer program by Data Registry personnel. Data were analyzed after checking for duplication, and other quality control studies.^[8] Vital statistics of Turkish Statistical Institute (TUİK) is used for analysis. Published cancer data generally reflect the situation before the year 2009. Regarding evaluation of incidence rates of cancer, this date can be accepted to reflect updated information.

Globocan is a project sponsored by WHO in 184 countries aiming to determine incidence, prevalence, and mortality rates in various cancer types at a national level. It is conducted among population aged ≥ 15 years. Data source of the project is generally IARC, current data can be retrieved directly from IARC.^[7] In the year 2013,

Cancer Registry Centers in İzmir, Antalya, Trabzon, and Edirne were included in the limited number of centers where IARC estimates cancer data in the whole world.^[8] When evaluating Globocan data, special care should be exerted in comparisons because of differences of quality of data, sample collection times, and methodologies between countries.

Besides, we also made use of causes of death statistics released by TUİK.^[9]

Results

According to 2013 data released by TUİK 2013, distribution of causes of death among male, and female patients is seen in Table 1. As is seen in the whole world, and in our country, cancer is climbing to upper rows among all-cause mortalities. Based on TUİK 2013 Statistics of Causes of Death, diseases of cardiovascular system lead the way with an incidence rate of 40%, followed by neoplasms (21%). Neoplasms retain their second rank in both men (25%), and women (16%) (Table 1). Based on these statistics 50% of the cancer-related deaths occur in the age group of 55-74 years.^[9]

Distribution of incidence rates of all types of cancers in our country between the years 2002, and 2009 is seen in Figure 1. As seen in Figure 1, in our country the incidence rate of cancer increases steadily every year. It was 133.5/100,000 in 2002, and increased up to 220/100,000 in 2009. In Turkey age-standardized incidence of cancer is 269.7/100,000 in men, and 173.3/100,000 in women. Median incidence of cancer in both genders is 221.5/100,000.^[8]

The most frequently seen 10 cancer types in men in Turkey are seen in Figure 2. Accordingly, lung cancer is on top of the list (66/100,000) followed by prostate cancer (36.1/100,000), and bladder cancer (21.4/100,000), while kidney cancer takes the eight place (6.3/100,000).

Based on Globocan 2012 data released by IARC the top five cancer types most frequently seen in men in different group of countries are presented in Table 2. The most frequently seen five cancer types in men in IARC member countries including Turkey, European Union (EU), WHO European Region, United States of America, and the whole World are tabulated. Lung cancer ranks first in Turkey, and in the World followed by prostate cancer. In IARC member countries, EU, and WHO European Region, and USA, prostate cancer established its firm place on top of the list. Bladder cancer also took its place among the top five cancer types in almost all groups. Interestingly, in the WHO European Region kidney cancer is listed among five most frequently seen cancer types.

Table 1. Distribution of causes of death between genders, 2013 statistics^[6,8]

	Female		Male		Total	
	n	%	n	%	n	%
Cardiovascular system diseases	71 750	45	70 477	36	142 228	40
Neoplasm (malignant, and benign)	26 523	16	49 700	25	76 223	21
Respiratory system diseases	14 073	9	21 077	11	35 150	10
Endocrinologic, and metabolic diseases	11 501	7	8 529	4	20 030	6
Wounds, and intoxications	5 316	3	14 292	7	19 609	5
Nervous system, and sense organs	7 896	5	6 757	3	14 653	4
Other	23 765	15	25 877	13	49 688	14
Total	160 824	100	196 709	100	357 581	100

Table 2. The most frequently seen cancer types in men based on the data released by International Agency for Research on Cancer (IARC) Globocan 2012^[4]

Turkey	World	IARC (24 countries)	EU (28 countries)	WHO (Europe)	USA
Lung	Lung	Prostate	Prostate	Prostate	Prostate
Prostate	Prostate	Lung	Lung	Lung	Lung
Bladder	Colorectal	Colorectal	Colorectal	Colorectal	Colorectal
Colorectal	Stomach	Stomach	Bladder	Bladder	Bladder
Stomach	Liver	Bladder	Kidney	Kidney	Melanoma

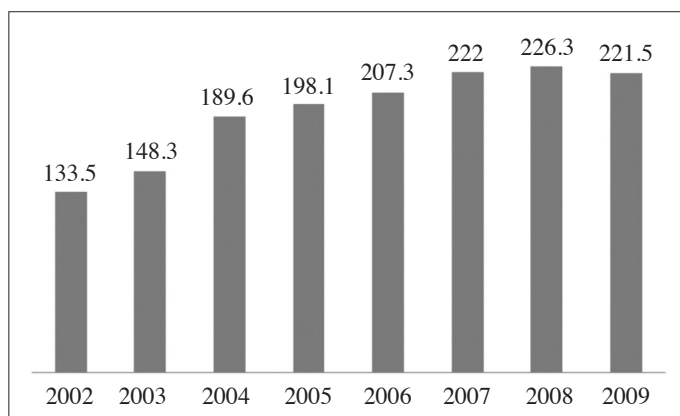


Figure 1. Total annual incidence of cancer in Turkey between the years 2002, and 2009 (1/100,000 standard population)^[2,6]

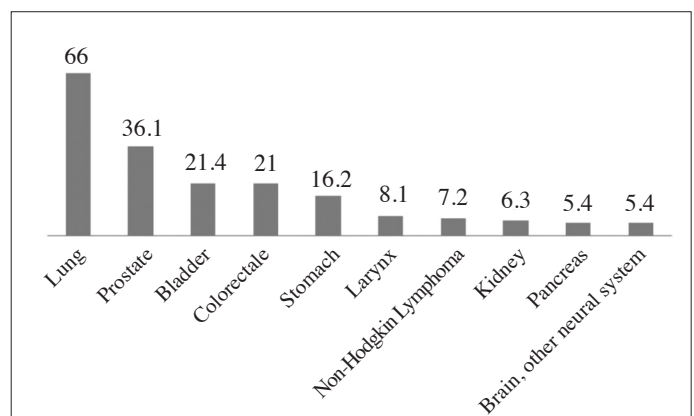


Figure 2. Incidence of the most frequently seen 10 types of cancer in male population in Turkey (2009) (1/100,000 standard population)^[6]

Incidence of cancer varies greatly between men, and women. It has been known that breast cancer is the most frequently seen cancer type in women. Urinary system cancers are not among frequently seen cancers among women. Female genital cancers are not dealt with, and evaluated in this article. Locations of male, and female urinary system cancers, male genital cancers, and their incidence rates are seen in Tables 3, and 4. In men, incidence of urinary system cancers is 283/100,000, while in women it is only 6.5/100,000 in women. In men, the incidence of genital system cancers is 39.2/100,000.

Distribution of male urogenital cancers among years is seen in Table 3. Excluding an exceptional rise in the year 2008, a steady increase between the years 2004, and 2009 (from 27.5/100,000 up to 39.2/100,000) was observed. This steady increase has been seen both in prostate cancer (from 24.9/100,000 up to 36.1/100,000), and testicular cancer (from 2.5/100,000 up to 3.1/100,000). Similarly between these years a steady increase in urinary cancers was also observed. The incidence of kidney cancer in the year 2004 was 4.1/100,000, while it was 6.3/100000 in the year 2009. Incidence of blad-

Table 3. Annual incidence rates of urogenital cancer in men between 2004, and 2009 (Integrated Database, 2004-2009) (Standard Population, per 100,000 people)^[6,8]

ICD 10	Tumour location	2004	2005	2006	2007	2008	2009
C60-63	Male genital organs	27.5	31.2	32	35.8	41.2	39.2
C60	Penis	0.1	0	0	0.1	0.1	0
C61	Prostate	24.9	28.6	28.9	32.3	37.6	36.1
C62	Testis	2.5	2.6	3.1	3.3	3.4	3.1
C63	Other male genital organs	0	0	0	0.1	0.1	0
C64-68	Urinary system organs	24	25.2	27	28.6	28.1	28.3
C64	Kidney	4.1	4.1	5.5	5.2	5.8	6.3
C65	Renal pelvis	0.3	0.2	0.2	0.4	0.3	0.3
C66	Ureter	0.2	0.1	0.1	0.2	0.2	0.2
C67	Bladder	19.3	21	21	22.5	21.7	21.4
C68	Other urinary system organs	0.1	0.2	0.2	0.3	0.1	0.1

Table 4. Annual incidence rates of urogenital cancer in women between 2004, and 2009 (Integrated Database, 2004-2009) (Standard Population, per 100,000 people)^[6,8]

ICD-10	Tumour location	2004	2005	2006	2007	2008	2009
C64-68	Urinary system	4.5	5.5	5.1	6.1	6.2	6.5
C64	Kidney	2.2	2.9	2.4	3.2	3.0	3.5
C65	Renal pelvis	0.0	0.0	0.1	0.1	0.1	0.0
C66	Ureter	0.0	0.0	0.0	0.0	0.0	0.1
C67	Bladder	2.3	2.6	2.6	2.8	3.0	2.9
C68	Other organs	0.0	0.0	0.0	0.0	0.1	0.0

der cancer led a relatively stable course, and ranged between 19.3, and 22.5/100,000.

Detailed profile of age-specific rates of types of cancer is presented in Table 5. In men, incidence rates of prostate, and bladder cancers increase with aging. Especially in advanced ages profound increases in the incidence rates of prostate cancer in advanced ages are remarkable. Kidney cancers in men are at their highest level in the age bracket of 60-79 years of age. In advanced age, its incidence rate decreases. Despite lower incidence rates in women age-specific disposition of renal, and bladder cancers resembles that of male cancers.

Discussion

In our country, together with establishment of Department of Fight Against Cancer, cancer disease has been included in the list of reportable diseases mandated by government. However WHO indicates that instead of passively retrieving cancer data from all populations, using an active system collecting specific, and more qualified data from selected regions would be

a more proper approach of deducing country-wide estimates. In compliance with this approach, in the year 1992, within the context of “Cancer Registry, and Incidence Project”, and by means of Cancer Registry Centers founded in priorly in İzmir, and then Diyarbakır provinces, cancer data have been started to be actively registered. Within the frame of Health Transformation Program, the relevant investigations gained momentum, and countrywide sampling percentage approached to 23% thanks to collaborative efforts of 9 Cancer Registry Centers in the year 2007.^[2,3] Therefore, adequately qualified data related to the incidence of cancer in Turkey could only be gathered for 2004-2006 cancer statistics. Ministry of Health continued to generalize Cancer Registry Centers, and percentage of the sampled population reached to 27% in the year 2010, and 50% in 2012.^[2] If we think that only 8% of the world population have been actively registered, the importance of our national data is readily understood.

Recent data obtained have demonstrated marked increases in the incidence of cancer. Within years, cancer incidence rates have increased predominantly from 133.5/100,000 in 2002 up

Table 5. Distribution of incidence rates of urogenital cancers in various age groups (Integrated Database, 2009) (Unadjusted rate per 100,000 persons)^[6]

	Tumour location	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80+
Male	Male genital organs	0.3	1.8	6.8	7.0	8.5	54.1	221.0	402.7	462.7
	Penis	0.0	0.0	0.0	0.0	0.1	0.0	0.3	0.0	0.0
	Prostate	0.0	0.0	0.0	0.3	4.4	51.6	219.1	401.6	457.1
	Testis	0.3	1.8	6.8	6.7	3.9	2.5	1.6	0.8	5.6
	Urinary system	0.8	0.2	0.9	4.8	18.3	62.3	153.4	226.3	242.0
	Kidney	0.7	0.1	0.3	2.1	6.3	17.8	33.0	33.7	16.0
	Renal pelvis	0.0	0.0	0.0	0.1	0.3	0.7	1.5	1.8	0.9
	Ureter	0.0	0.0	0.0	0.0	0.3	0.4	1.4	1.6	2.7
	Bladder	0.1	0.1	0.7	2.6	24.0	43.5	117.1	187.9	220.7
	Female	Urinary system	1.1	0.3	0.3	1.8	7.4	14.7	27.5	45.6
Kidney		1.0	0.3	0.1	1.2	4.3	8.6	14.9	20.0	13.0
Renal pelvis		0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.9	0.0
Ureter		0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.8	0.5
Bladder		0.1	0.0	0.3	0.6	3.1	5.8	12.4	24.0	37.1

Data compiled from the 2013 Yearbook of Health Statistics of TR Ministry of Health, and Social Welfare

to 221.5/100,000 in 2009 (Figure 1). However, as a remarkable finding, increase in the incidence of prostate cancer is incomparably higher when we consider increases in the incidence rates of all other cancer types. Some inconsistencies strike our attention when we compare incidence rates of cancer reported for these years with those indicated in previous reports. For instance, general incidence rates for cancer were reported as 70.24, and 70.32 /100,000 for the years 2002, and 2003, respectively.^[1] However in current statistics published by the Ministry of Health the incidence rates for the years 2002, and 2003 have been reported as 133.5, and 148.3/100,000 respectively. Probably, in addition to time-consuming data analysis, and confirmation, more sophisticated data registry system, and larger population sample used for cancer registry enable access into more reliable data.

The difference between previously, and currently released data is more prominent as for urogenital cancers. For instance, based on previous data, for the year 2003, incidence rates for prostate, and bladder cancers were 5.97, and 5.83/100,000 in men, respectively.^[1] However, data compiled from limited number of provinces with outstanding cancer registries to which special importance was assigned, have been indicated as the most reliable data at hand. Accordingly, it has been expressed that it would be more accurate to propose incidence rates for prostate, bladder, and renal cancer for the year 2003 as 14.01, 8.0, and 2.76/100,000, respectively.^[1] It has been recognized that standardization of cancer data collection methods, quality of data, and comparability of data are still debatable issues.^[10] Apart

from differences in health-consciousness, diagnostic tools, socioeconomic conditions, inadequacies in standardization of data, and data collection methods hamper our attempts to achieve healthy results.

Active cancer registry popularized by the Ministry of Health from 2006 have enabled us to obtain more reliable data. Cancer incidence rates demonstrate great differences as for its distribution between genders. We think that both genders should be evaluated separately so as to analyze the data more explicitly. From this perspective, if the most current data (2009) are evaluated, incidence rates of prostate cancer (36.1/100,000); bladder cancer (21.4/100,000), and kidney cancer (6.3/100,000) in men are estimated as indicated in parentheses. Incidence of colon cancer (21/100,000) is very close to that of bladder cancer. In women bladder, and kidney cancer are seen at incidence rates of 3.5, and 2.9/100,000, respectively.

In order to explain the reported incidence rates over 100/100,000 in the USA population, it is possible to state our previous justifications including greater capability to diagnose cancer cases, more effective reporting system, and gradual increase in cancer burden incurred on community due to industrial development, and aging which are also valid for our country. Besides, in line with the increase in the incidence rates, prostate cancer ranked second after lung cancer in men both in our country, and in the world. One must not forget that prostate cancer is the most frequently seen type of male cancer in IARC member countries, EU, WHO European Region, and the US. In the whole world

1.1 million men have been estimatedly diagnosed as prostate cancer. Seventy percent (759,000 men) of these cases are from developed regions.^[4]

In some countries of the world, prostate cancer, and in others lung cancer take the first row among most frequently seen cancer types. Generally prostate, lung, and colon cancers occupy the top three rows, while in Turkey lung, prostate, and bladder cancer have the highest incidence rates, in that order. In men incidence of lung cancer in Turkey is nearly 69/100,000, however average incidence rates in the world, and USA are 30-35, and 48/100,000, respectively. Lung cancer which is the most important cancer type caused by tobacco, and tobacco products is mostly seen among men in our country. Lung cancer which is seen beginning from the early ages once more demonstrates the importance of conduction, and maintenance of tobacco control programs. For prostate cancer world average is 28/100,000 while in the Europe, it is 36.1/100,000 for our country.^[2,6] However, incidence of prostate cancer in the world varies greatly (\approx 25-fold). Its incidence is at its highest level in Australia/New Zealand (111.6/100,000), while it is 97.2/100,000 in North America. On the other hand, in Asian populations an incidence rate of 10.5/100,000 has been reported. In Eastern, Southern, and Central Asia it drops down to 4.5/100,000.^[4] Average incidence of bladder cancer in men in the whole world is 10/100,000, in Europe, 16-17/100,000, and 21.4/100,000 in our country. In Turkey, in the age group of 15-24 years, prominently testicular, and bone cancers in men, thyroid, Hodgkin cancer in women have been seen.^[2,6]

According to the data of TUİK, when rate of increase in the incidence of cancer disease which ranks second in Turkey among causes of mortality is examined, in near future it will probably climb to the top of the list both in Turkey, and in the World. It will not be wrong to predict that prostate, and bladder cancer with incidence rates exceeding general tendency will take an increasingly important place in our clinical practice in the years to come.

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References

1. Aydın S. Türkiye'de üriner sistem kanserlerin görülme sıklığı. Türk Üroloji Dergisi 2007;33:392-7.
2. Türkiye'de Kanser Kayıtçılığı. Available at: <http://kanser.gov.tr/daire-faaliyetleri/kanser-kayitciligi/108-t%C3%BCrkiyede-kanser-kayitcigi.html>. Accessed February 19, 2015.
3. Türkiye'de Kanser Kayıtçılığı. T.C. Sağlık Bakanlığı Kanserle Savaş Dairesi Başkanlığı. Ankara, 2011.
4. Ferlay J, Soerjomataram I, Ervik M, Dikshit R, Eser S, Mathers C, et al. Lyon, France: International Agency for Research on Cancer; 2013. Available at: <http://globocan.iarc.fr>, Accessed on February 18, 2015.
5. Tezcan S. Epidemiyoloji Tıbbi Araştırmaların Yöntem Bilimi. Hacettepe Halk Sağlığı Vakfı, Ankara, 1992.
6. Sağlık Bakanlığı Sağlık İstatistikleri Yıllığı 2013. Sağlık Araştırmaları Genel Müdürlüğü, Ankara, 2014.
7. GLOBOCAN 2012: Estimated Cancer Incidence, Mortality and Prevalance Worldwide in 2012. Available at: <http://globocan.iarc.fr/Default.aspx>. Accessed on April, 4 2015.
8. Gültekin M, Boztaş G (ed). Türkiye kanser İstatistikleri, Sağlık Bakanlığı Halk Sağlığı Kurumu, Ocak, 2014. Available at: http://kanser.gov.tr/Dosya/ca_istatistik/Turkiye_Kanser_istatistikleri.pdf
9. TUİK Ölüm Nedeni İstatistikleri. Available at: http://www.tuik.gov.tr/PreTablo.do?alt_id=1083. Accessed on February 20, 2015.
10. Parkin DM, Plummer M. Comparability and quality of data. In: Parkin, DM, Muir CS, Whelan SL, Gao YT, Ferlay J, Powell J (eds). Cancer Incidence in Five Continents, Volume VI pp.57-73, IARC Scientific Publications No. 120, Lyon, 1992.