Epidemiology of renal cancer in developing countries: Review of the literature

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Abstract

Introduction: Renal cell carcinoma (RCC) is the ninth most common cancer in men, and the 14th most common cancer in women. It has been reported that the incidence of RCC is rising. These changes are more common in developed countries because of better screening programs and disease registry. The aim of this article is to review the epidemiology of RCC around the world.
Methods: A literature review on four databases was performed: PubMed, Embase, Lilacs, and Scielo. Studies of incidence, prevalence, mortality, and survival of RCC were taken from different countries. Studies included were published in the last 10 years. Two reviewers independently selected the studies**.**
Results: A total of 5275 references were reviewed by title and abstract. In the end, 42 references were selected for full-text review. The global incidence and prevalence of cancer vary. The highest incidence was described in North America and Northern Europe. In Canada, by 2007 the incidence was 17.9/100 000 and 10.3/100 000 in males and females, respectively. Developing countries like Colombia have fewer incidence rates, finding less information in poor-income areas.
Conclusions: We have seen a rise in the incidence and mortality of RCC globally. There is an association between RCC and smoking, obesity, hypertension, and socioeconomic status. Seeing the epidemiological data from some regions in developing countries and the lack of specialists in those places, it can be deduced the existence of an underreporting of

the disease that reveals the need to improve both surveillance and disease registration programs, especially in these countries.

Introduction

Renal cell carcinoma (RCC) is the 9th most common cancer in men and 14th in women. In 2012, 143 000 deaths by RCC were estimated making it the 16th most common cause of cancer death globally.[1] In recent decades there has been an increased incidence which has been associated with a better diagnosis of the disease, and a major exposure to different risk factors. [2] The highest incidence rates could be found in developed countries mainly North and East Europe, and North America.[3]

Unlike other cancers, the incidence and mortality of RCC has had a significant rise globally, being more stable in developed countries like the United States. This associated with better screening programs and disease registration which also has reduced mortality in other countries like France, Germany and Italy.[4]

Some risk factors for the RCC that have been reported are: sex and age, being more prevalent in men and older adults.[4] However, because of the increased incidence, some studies have identified other associated factors such as: hypertension by chronic use of diuretics, diabetes, urinary tract infections; exposure factors such as smoking, asbestos, radiation and lifestyle factors such as diet and obesity.[5]

In Canada, according to statistics from GLOBOCAN 2012 the number of cases estimated to 2020 for RCC was 4 139 in men and 2 565 in women with more than 1000 new cases since 2012. Moreover it is reported 1 373 deaths in men and 792 in women for 2020, with 400 more deaths since 2012. [6]

While Canada counts with the Canadian Cancer registry, other countries get their epidemiological data from local population bases of cancer. Colombia for example has the oldest database in Latin America with the population registry of cancer in Cali (RPCC), which contains information since 1962.[7] However, because of the geographic and socio-cultural difference in this country, RPCC information is insufficient to calculate the national epidemiological behavior[8], situation that also can be seen in other countries.

Given the lack of accurate and recent epidemiological data about RCC, it is necessary to perform a literature search to determine the incidence, prevalence and mortality of this disease around the globe, and see if there is a lack of information in their registries and if possible, identify the aspects in which they fail.

Methods

A review of the literature was performed in 4 different databases (PubMed, Embase, Lilacs and Scielo), on any information concerning the field of epidemiology in Renal Cancer.

The search criteria were established in the form of free text and indexed terms. To characterize the renal cell carcinoma we use the free terms: "Kidney cancer", "Renal Cancer", "kidney Neoplas *", "Renal Neoplas*". For epidemiological studies the terms

included in free text were: "incidence" "prevalence", "epidemiology", "mortality", "burden of disease", "cost of illness" and indexed terms: "Incidence" and "prevalence". As restriction, the search was limited to publications in the last 10 years. A gray literature search was also made on the pages of: The National Technical Information Service (NTIS), and the European Association for Grey Literature Exploitation (EAGLE), in which could not be found any relevant information.

The articles should be original studies, which provide epidemiological information on incidence, prevalence, mortality, survival and disease burden for RCC. Studies that describe their information in specific subgroups (Specific histological type, or specific ethnic group) were excluded. References were reviewed by title and abstract, by two reviewers independently. From the first selection of articles references were reviewed in full text ensuring that they give some information of interest mentioned previously about RCC. Duplicate studies were removed, and studies written in any language different from English or Spanish were ignored. Subsequently, the information obtained was analyzed.

Results

The search yielded a total of 5 275 references that were reviewed by title and abstract. In seeking local references 4 studies from non-indexed journals were included. 338 references were selected for full text review, of which 300 were excluded because they did not express epidemiological data of interest (reported data for specific age group or specific ethnicity). References of which full text were not available (poster format or abstract) were excluded as well as those who were in other language different of English or Spanish. 42 articles were finally analyzed for data extraction, of which 8 belong to Latin American literature (Figure 1).

All studies were observational; most of them were cross-sectional studies that drew their information from databases of each country. A limitation of the review lies in the methodology of most of the studies, since disease registration programs have a different quality and coverage in each country, preventing a proper comparison of the results.[9] *Yang et al* for example refers to a possible underreporting of disease.[10] Also, *Villanueva et al* in his study discusses the need to improve epidemiological surveillance programs, and the creation of better prevention and treatment programs.[11]

Among the included studies, 14 assessed populations from Europe, 14 from America of which 8 correspond to Latin American literature, 2 global studies, 8 from Asia and Oceania, and 4 from Africa and the Middle East.

Global data

Patel et al. found the highest incidence in North America of 11,8/100 000 population.[3] *Znaor et al.* describes the incidence and mortality rates between 2003 and 2007, the highest was found in Europe, specifically in Czech Republic; the lowest were located in Asia, mainly Thailand and Korea.[1] *Patel et al.* refers to the characteristics of each population

(genetics and exposure to risk factors), as well as socioeconomic level as possible explanation for the epidemiological differences between countries, finding higher incidences in developed countries and an increased mortality in development countries.[3] *Znaor et al.* also concludes an overall increase in the incidence of RCC due to the development of better diagnostic techniques.[1] (See **Table 1.)**

Europe studies

Four studies evaluated multiple countries. The study by *Ljungberg et al.* found a gender difference being 15,8/100 000 in men and 7,1/100 000 in women; it also concludes that both incidence and mortality have been declining due to the reduced cigarette consumption in these population and better occupational hygiene.[4] The remaining studies were conducted in Germany, Holland, Italy, England, Scotland, Ireland, Denmark and Spain for a total of 10 studies. The highest incidence was found in Germany and Holland being in the last one 16,9/100 000 in men, and 9,2/100 000 in women. [12,13] The lowest was found in Spain with 8,2/100 000 in men and 3,7/100 000 in women between 2003-2007; [14] with a tendency to increase.[15] Ireland also has an increase tendency, *Falebita et al.* associates this findings with better diagnosis and registration.[16] *Wihlborg et al.* study made in Denmark describes a change over time, rising from 3,95/100.000 between 1944-1948 to 7,30/100 000 between 1969-1973, and decreases to 7,01/100 000 between 1999-2003; taking as an explanation the improvements in diagnosis for the ascent time lapse and the decrease in cigarette consumption for the descent one.[17] Also the study by *Maruthappu et al.* in England found differences by ethnicity, being the largest one in white population, regarding: Pakistani, Asian, African and Indian.[18]

Mortality was assessed in 8 articles, three with information from multiple countries. The highest mortality was found in Czech Republic of 9/100 000 in men and 3,7/100 000 in women, the lowest was found in Greece, Portugal, and Luxembourg.[19] Most studies agree that mortality is decreasing, associated with more timely diagnosis, better treatments and less tabaco consumption.[2,4,19] The other 5 studies were conducted in Holland, Ireland, Italy and 2 in Spain. The highest mortality was found in Holland of 7,3/100 000 in men and 3,8/100.000 in women.[13] The lowest was found in Italy of 2,39/100 000 in men and 1,61/100.000 in women. [20] Although some studies describe a decrease in mortality, other studies like *Opeyemi et al.* in Ireland shows an increase in mortality in recent decades from 3,6/100.000 in 1994 to 4,7/100.000 2004 for both sexes.[16]

The 5-year survival was evaluated in four articles; one was conducted in multiple countries. The study made by *Mark-Gragera et al*. found differences by region being the largest in Central Europe of 64,6 % and lowest in Northern Europe of 55,8 %; this contrast because of the difference in diagnosis and intervention programs in each country.[9] The other 4 studies were conducted in Ireland, Denmark and Scotland, the last one having the lowest survival between 39% and 42 %.[21] Among the related factors a better diagnosis and intervention, as well as socioeconomic and educational level were found.[22]

Asia and Oceania

Eight studies were found from: Japan, China, Korea and Australia. Japan had the highest incidence rates for RCC, *Marugame et al.* showed an incidence of 11,6/100 000 in men and 5,6/100 000 in women.[23] Also *Marumo et al.* shows an increased incidence in this country and the need to study its relationship with known risk factors.[24] Similarly, *Yang et al.* mentions an increase in the incidence of renal cancer.[10] *Zheng et al.* discusses how the prevalence of cancer is higher in urban areas compared to rural ones and how this is associated with increased life expectancy.[25] In Korea the incidence was slightly lower than in Japan, furthermore *Jung et al.* describes mortality in men of 2,3/100 000 and 0,9/100 000 in women, with a 5-year survival of 77,7 %.[26,27] Articles of Australia respectively show an increase in both the incidence and survival in the last 5 years.[28,29]

Africa and Middle East

Four studies were found from: Saudi Arabia, Pakistan, Morocco and Iran. The lowest incidence was found in Pakistan of 1,4/100 000 in 2012.[30] The other studies make mention of the impact on their countries, three of which agree that the rate has been increased in recent years;[31–33] The study of *Mirzaei et al.* associates it with a better record of the disease and an increased exposure to risk factors.[32]

America

In America 14 articles were found, six from North America and 8 from Latin America. The study of *Pinheiro et al.* conducted in the US found similar incidence rates among different ethnic groups, being slightly higher in white people (18/100 000 in men, 8,7/100 000 in women), followed by hispanics (17,3/100 000 in men, 7,7/100 000 in women) and finally black people (14,7/100 000 in men, 7,2/100 000 in women).[34] Some studies showed an increase incidence rate over the years; *Gandaglia et al.* for example, describes an incidence of 2,99/100 000 in 1975 compared to 12,16/100 000 in 2009. This increase was associated with improvements in diagnostic techniques and aging population. However, they suggest the needs to investigate a possible increase in risk factors.[35] *Otterstatter et al*. in Canada showed similar results, finding an increased incidence rate and risk factors like obesity and hypertension.[36] In terms of mortality, the study of *Gandaglia et al.* made in the US, found an increase tendency in recent years of 2,24/100 000 in 1975 to 5/100 000 in 2009.[35] On the other hand, a study made in Canada estimates to 2025 a mortality for kidney cancer of 17,9/100 000 in men and 8,7/100 0 00 in women.[36]

As the burden of disease, a study made in the United States found a cost of disease of 4,4 billion dollars for 2005, which meant an average 40.176 dollars per patient.[37] Also, *Chunyo et al*. showed the potential years of life loss (PYLL) for Caucasian American population being 129 216 to 2004.[38] *Mohamed et al.* found that the PYLL has been increasing in recent decades, which has made RCC a disease that should be worrisome for

urologists and the health system.[39] Finally it was found that 5-year survival of patients in the US to 2005 was 64,9 %, similar in Canada of 68 %.[35,36]

Eight studies were found in Latin American literature the one written by *Chatenoud. L et al* evaluated multiple countries in which it is possible to observe the highest mortality found in Uruguay in men and women of 5,97/100 000 and 2,32/100 000 respectively; and the lowest one in Ecuador of 1,17/100000 in men and 0,76/100 000 in women.[40] The other studies were made mainly from: Colombia, Mexico and Chile. The highest incidence rate was found in Chile being 6,95/100.000 in general population.[41] *Villanueva et al.* study found an overall incidence for Mexico of 2,5/100 000.[11] Mortality showed a stability with 2,3/100 000 in men and 1,34/100.000 in women to 1999 and 2,35/100 000 in men and 1,34/100. 000 in women to 2007.[42]

In Colombia, *Pardo C et al.* found an incidence of 2,7/100 000 in men and 1,9/100 000 in women. The highest rates were found in Risaralda and Quindío and the lowest in Chocó and Amazonas. Mortality was found to be 1,1/100 000 in men and 0,7/100 000 in women and a survival at 5 years of 51,9%.[43] For 2003 and 2007 Manizales was the city with the highest incidence (3,4/100 000 in men and 2,4/100 000 in women), followed by Bucaramanga (2,4/100 000 in men, 1,3/100 000 in women), and finally the city of Pasto (1,7/100 000 in men and 1,4/100 000 in women).[44–46]

Discussion

A global difference in RCC incidence, mortality, and survival rates could be observed. The highest incidence was found in Europe, mainly in the Czech Republic and Denmark; followed by North America, Australia, South America and Asia. At the same time, higher mortality was found in Europe, and the lowest one in Asia. The study carried out by *Patel A et al.* and *Znaor et al*, are two examples in which we can see the epidemiological difference of each country. However they are also an example of the limited information about epidemiology rates that could be found in development countries like Colombia.[1,2]

In every country the incidence rates seems to have a tendency to rise. However, studies like the ones made by *Ljungberg et al* and *Clèries et al* mentioned a stabilization of incidence rate in recent years. This result, being the product of good disease registration programs as well as better control of risk factors.[4,14] The study that measure mortality made by *Levi et al* and *Bosetti et al*, show a decrease of this rate over the years.[2,19] Despite the findings we can't ensure that these trends are shared in other regions given the different opportunities of each country have because of their diagnostic technologies and reliability in disease registration programs. The study carried out by *Yang et al* or *Wojcieszak et al* mention the existence of an underreporting.[10,47], this can make it difficult to compare the data between countries.

The comparison problem can be observed in the data from the IC5 (Incidence of cancer in 5 continents), in which can be seen the number of cases in each country, but more important can be assessed the quality of the records by values such as: the MV%

corresponding to those cancers recorded with microscopic verification, the DCO% that are obtained from death certificates and the MI% that is the ratio between mortality and incidence of a cancer in a given period. Having an estimate for each value in kidney cancer it can be perceived a higher number of cases reported by death certificates in Latin America. On the other hand there is an underreporting in death certificates reports in Africa, observing a higher quality in the registries of European countries and North America [48].

It is of interest to us studies such as *Patel A et al* or *Eriksen T et al*, who found a relationship between incidence and socioeconomic status, seeing a lower incidence in countries with fewer resources.[3,22] This can be seen in Latin America and Africa. These findings may be seen in other aspects such as survival at 5 years, *Danzig M et al* for example describes a lower survival in these countries [49].

Although several studies identified as potential elements associated with epidemiological differences greater exposure to risk factors such as smoke, diet, obesity and hypertension, it requires deeper research about these factors and their role in the development of RCC. Another interesting fact is the difference by sex and race taking in all studies comparing these populations, finding a higher incidence and mortality rate in men compared to women, and white populations compared to Hispanic, black and Asian people. Finally, given the increasing incidence rate of RCC it is clear the necessity to study a way to facilitate the implementation of prevention, risk factors control, screening programs, and early intervention to enable timely intervention of the RCC.

Knowing that most small renal masses are discovered incidentally it is important that sub-registration can also be found in mortality rates given that there are deaths that may end up associated with causes other than cancer itself [48].

The overall incidence of RCC in developed countries like Canada appears to be higher than other countries with an increase in the last two decades. On the other hand development countries like Colombia appears to be lower compared to Europe and North America. However being an example of a country with registration difficulties because of the epidemiological differences throughout the country, being the areas with lower rates, the departments characterized for their poor incomes such as Chocó and Colombian Amazonas. This finding may be associated with greater difficulties in access to health care services, and medical specialists making Urology a specialty virtually nonexistent in such places [50], which contributes with lesser diagnosis and disease registry.

Conclusion

Our study identifies some of the risk factors that deserve attention for future research such as: obesity, smoke and hypertension. It was found as a point of interest the association between socioeconomic status differences and the epidemiological rates in the different countries, and programs detection and registration of disease programs. This review allowed an approach to the epidemiology of RCC in America and the rest of the world.

Finally, it was shown that the incidence of RCC has been increasing in recent years globally, showing the need to create and / or improve the public health policies aimed at improving the diagnosis and treatment of patients with RCC.

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Figures and Tables

Fig. 1. Flow chart of the search.

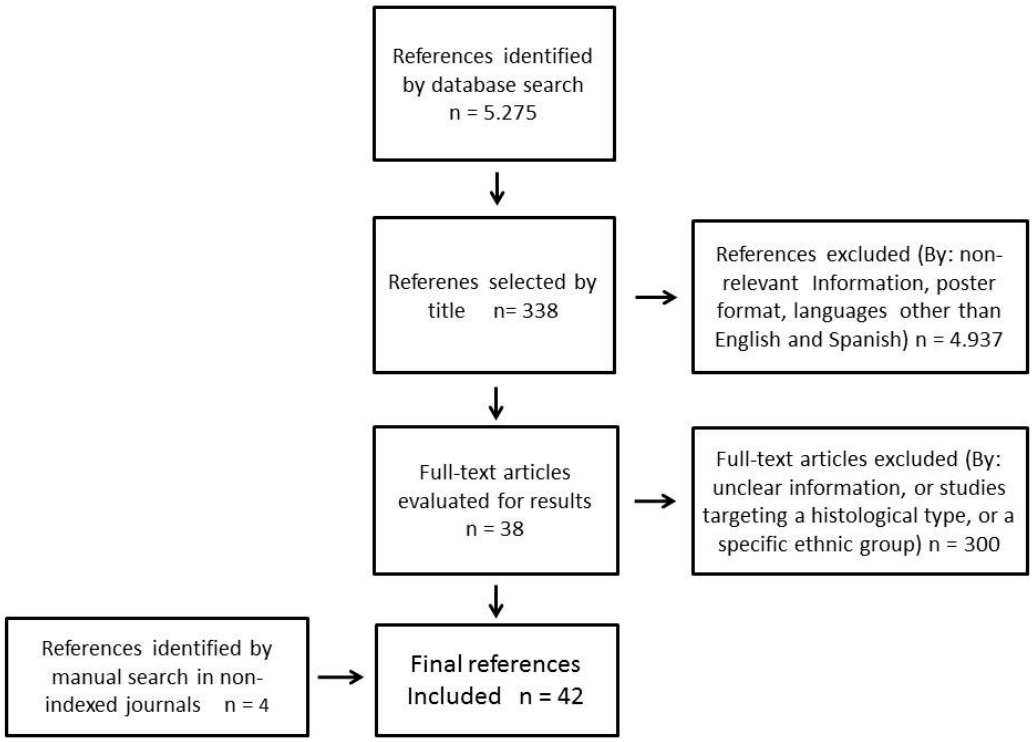

Table 1. Main outcomes of the search

Author	Year	Journal	Outcome measure	Results	Geographic zone
Global					
Patel et al[3]	2012	*J Urol*	Incidence	North America 11,8/100.000 Australia 8,3/100.000 ; Europe 8,1/100.000 Africa 1,2/100.000 ; Asia 1/100.000	Global
Znaor et al[1]	2015	*Eur Urol*	Incidence	Highest incidence was found in Czech Republic of 9,9/100.000. Lowest in Thailand of 0,8/100.000	Global
			Mortality	Highest mortality was found in Czech Republic of 3,6/100.000. Lowest in Korea of 0,6/100.000	
Europe					
Marcos-Gragera et al[9]	2015	*Eur J Cancer*	Survival	North Europe 55,8 % to 5 years Central Europe 64,6 % to 5 years South Europe 64,4 % to 5 years East Europe 57,5 % to 5 years	Europe
Levi et al[2]	2008	*BJU Int*	Mortality	1990-1994 Males of 4,75/100.000 1990-1994 Females of 2,12/100.000 2000-2004 Males of 4,13/100.000 2000-2004 Females of 1,76/100.000	Europe
Bosetti et al[19]	2011	*Eur Assoc Urol*	Mortality	1994 - 4,9/100.000 ; 2006 - 4,3/100.000 Highest incidence in Czech Republic males 9/100.000; females 3,7/100.000 Lowest were found in Greece and Portugal	Europe
Ljungberg et al[4]	2011	*Eur Urol*	Incidence	Males of 15,8/100.000 Females of 7,1/100.000	Europe
			Mortality	Males of 6,5/100.000 Females of 2,7/100.000	
Stang et al[12]	2014	*Emerg Themes Epidemiol*	Incidence	Males of 15,7/100.000 Females of 7,6/100.000	Germany
Van de Schans et	2012	*Eur J Cancer*	Incidence	Males of 16,9/100.000 Females of 9,2/100.000	Holland

al[13]			Mortality	Males of 7,3/100.000 Females of 3,8/100.000	
Eriksen et al[22]	2008	*Eur J Cancer*	Incidence	Males of 15/100.000 Females of 8/100.000	Denmark
			Survival	Males of 39 % to 5 years Females of 44 % to 5 years	
Wihlborg et al[17]	2009	*Urology*	Incidence	1944-1948 - Males 3,95/100.000 1944-1948 - Females 2,72/100.000 1969-1973 - Males 7,30/100.000 1969-1973 - Females 4,77/100.000 1999-2003 - Males 7,01/100.000 1999-2003 - Females 3,6/100.000	Denmark
Maruthappu et al[18]	2015	*BMC Cancer*	Incidence	White people 5.9/100.000 ; Black people 5.5/100.000	England
Falebita et al[16]	2009	*Int Urol Nephrol*	Incidence	1994 – Males 7,1/100.000 1994 – Females 3,3/100.000 2005 - Males 8,0/100.000 2005 - Females 5,7/100.000	Ireland
			Mortality	1994 - 3,6/100.000 2004 - 4,7/100.000	
			Survival	1994-1996 - 69,4 % to 5 years 2000-2002 - 69,5 % to 5 years	
Westlake et al[21]	2008	*Br J Cancer*	Survival	Between 39 % and 42 % to 5 years	Scotland
Souza et al[15]	2011	*Actas Urológicas Españolas*	Prevalence	2002 - Males 53,65/100.000 2002 - Females 23,04/100.000 2012 - Males 57,1/100.000 2012 - Females 44,08/100.000 2022 - Males 59,57/100.000 2022 - Females 81,37/100.000	Spain
			Incidence	2002 - Males 8,79/100.000 2002 - Females 4,92/100.000 2012 - Males 9,17/100.000 2012 - Females 8,97/100.000 2022 - Males 9,55/100.000 2022 - Females 16,4/100.000	

			Mortality	2002 - Males 4,19/100.000 2002 - Females 1,97/100.000 2012 - Males 4,38/100.000 2012 - Females 3,59/100.000 2022 - Males 4,56/100.000 2022 - Females 6,56/100.000	
Clèries et al[14]	2013	*Clin Transl Oncol*	Mortality	Males of 2,3/100.000 Females of 0,8/100.000	Spain
			Incidence	Males of 8,2/100,000 Females of 3,7/100,000	
Arfè et al[20]	2011	*Eur J Cancer Prevent*	Mortality	Males of 2,39/100.000 Females of 1,61/100.000	Italy
Asia & Oceania					
Marumo et al[24]	2007	*Int J Urol*	Incidence	Males of 8,2/100.000 Females of 3,6/100.000	Japan
Marugame et al[23]	2006	*Jap J Clin Oncol*	Incidence	Males of 11,6/100.000 Females of 5,6/100.000	Japan
Yang et al[10]	2013	*PLOS ONE*	Incidence	Males of 5,64/100.000 Females of 3,33/100.000	China
Zheng et al[25]	2015	*Cancer Letters*	Prevalence	Prevalence to 5 years for 2011: Males of 17,9/100,000 Females of 10,4/100,000	China
Jung et al[26]	2013	*Kor Cancer Assoc*	Incidence	Males of 10,1/100.000 Females of 4,3/100.000	Korea
			Mortality	Males of 2,3/100.000 Females of 0,9/100.000	
			Survival	77,7 % to 5 years	
Yi et al[27]	2013	*J Prevent Medicine Public Health*	Incidence	9,7/100.000	Korea
Luke et al[28]	2011	*Asian Pacific J Cancer*	Incidence	1980-1984 of 6,29/100.000 2005-2008 of 12,46/100.000	Australia
			Mortality	1980-1984 of 3,39/100.000 2005-2008 of 4,24/100.000	

			Survival	61,7 % to 5 years	
Australian Institute of Health and Welfare[29]	2013	*Asia Pacific J Clin Oncol*	Survival	1982 - 1987 de 47 % to 5 years 2006 - 2010 de 72 % to 5 years	Australia
Africa & Middle East					
Abomelha et al[31]	2011	*Arab J Urol*	Incidence	2,4/100.000	Arabia Saudí
Mirzaei et al[32]	2015	*Asian Pacific J Cancer Prevent*	Incidence	2003 - Males of 1,39/100.000 2003 - Females of 0,96/100.000 2009 - Males of 2,99/100.000 2009 - Females of 2,05/100.000	Iran
Badar et al[30]	2016	*BMJ Open*	Incidence	2010 - 1,5/100.000 2012 – 1,4/100.000	Pakistan
Tazi et al[33]	2013	*E Cancer*	Incidence	Males of 2,3/100.000 Females of 1,7/100.000	Morroco
America					
Chatenoudet al[40]	2014	*Annals Oncol*	Mortality in Males	Uruguay 5,97/100.000 Argentina 4,85/100.000 Chile 4,2/100.000 Brazil 1,71/100.000 Colombia 1,25/100.000 Ecuador 1,17/100.000	Latin America
			Mortality in Females	Uruguay 2,32/100.000 Chile 1,88/100.000 Argentina 1,68/100.000 Colombia 0,79/100.000 Ecuador 0,76/100.000	
Pinherio et al[34]	2009	*Cancer Epidemiol Biomarkers Prev*	Incidence	Males – Hispanic people17,3/100.000 Males – White people 18/100.000 Males – Black people 14,7/100.000.	USA
				Females - Hispanic people 7,7/100.000 Females - White people 8,7/100.000 Females - Black people 7,2/100.000.	
Lang et al[37]	2007	*Urol Oncol*	Burden of disease	Anual cost for RCC up to 2005 was $4,4 billones [US], with a cost per patient of $40.176. 92,4 % costs for medicines and	USA

				procedures ; 7,6 % for disability	
Kamel et al[39]	2012	*J Urol*	Burden of disease	1972-1976 of 343.912 PYLL. 2002-2006 of 479.355 PYLL	USA
Li et al[38]	2010	*Urology*	Burden of disease	YPLL White people 104.126 [50,59 %] YPLL Black people 112.438 [62,10 %] YPLL Hispanic people 10.010 [72,81 %] YPLL General 129.216 [52,94 %]	USA
Gandaglia et al[35]	2014	*Can Urol Assoc J*	Incidence	1975 - 2,99/100.000 2009 - 12,16/100.000	USA
			Mortality	1975 - 2,24/100.000 2009 - 5/100.000	
			Survival	1975 - 47,5 % to 5 years 2005 - 64,9 % to 5 years	
Otterstatter et al[36]	2014	*Cancer Causes Control*	Incidence	1986 – Males of 13,4/100.000 1986 – Females of 7,7/100.000 2007 - Males of 17,9/100.000 2007 - Females of 10,3/100.000	Canada
			Mortality	To 2025 males mortality will be 17,9/100.000. To 2025 females mortality will be 8,7/100.000	
			Survival	68 % to 5 years	
Montes et al[41]	2004	*Revista Chilena de Urología*	Incidence	General of 6,95/100.000 Males of 9,67/100.000 Females of 4,14/100.000	Chile
Villanueva et al[11]	2014	*Gaceta Médica de México*	Incidence	2,5/100.000	Mexico
Bosetti et al[42]	2011	*Eur J Cancer Prevent*	Mortality	1999 - Males of 2,2/100.000 1999 - Females of 2,35/100.000	Mexico
				2007 - Males of 2,35/100.000 2007 - Females of 1,34/100.000	
Guarnizo et al[44]	2012	*Colombia Médica*	Incidence	Males of 3,4/100.000 Females of 2,4/100.000	Colombia
Uribe et al[45]	2012	*Colombia Médica*	Incidence	Males of 2,4/100.00 Females of 1,3/100.000	Colombia

Yépez et al[46]	2012	*Colombia Médica*	Incidence	1998-2002 Males of 2,1/100.000 1998-2002 Females of 1,1/100.000 2003-2007 Males of 1,7/100.000 2003-2007 Females of 1,4/100.000	Colombia
Pardo et al[43]	2015	*Instituto Nacional de Cancerología*	Incidence	Males of 2,7/100.000 Females of 1,9/100.000	Colombia
			Mortality	Males of 1,1/100.000 Females of 0,7/100.000	
			Survival	Absolute survival of 51,9 % to 5 years	