



Prevalence and Demographic Characteristics of Prostate Cancer Patients in Colombia: data from the National Health Registry from 2015 to 2019

Prevalencia y características demográficas de pacientes con cáncer de próstata en Colombia: datos del Registro de Salud Nacional de 2015 a 2019

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Abstract

Background and Objective Prostate cancer is a multifactorial disease and is among the top five causes of death in men worldwide. The Colombian Ministry of Health has adopted the Integrated Information System on Social Protection (Sistema Integrado de Información de la Protección Social, SISPRO, by its Spanish acronym) registry to collect comprehensive information from the Colombian health system. The system provides close to universal coverage (around 95%). We aimed to establish the prevalence of prostate cancer in Colombia and to describe its demographics, based on data provided by SISPRO, openly available for scientific analysis.

Methods Using the SISPRO data from 2015 through 2019, we analyzed the prevalence and demographic characteristics of patients diagnosed with prostate cancer.

Results We identified a total of 43,862 patients with prostate cancer in the 5-year period and estimated a prevalence of 4.54 cases per 1,000 habitants, using as denominator males over 35 years old. We calculated a prevalence of early-onset prostate cancer (i.e., 35–54 years) of 0.14 per 1,000 habitants (791 cases in 5 years). The highest prevalence was observed in patients > 80 years (33.45 per 1,000 habitants). The departments with the highest prevalence were Bogotá, Valle del Cauca, Risaralda, and Boyacá, and the region with the lowest prevalence was Amazonas.

Keywords

- ▶ prostate cancer
- ▶ prevalence
- ▶ Colombia
- ▶ Latin America
- ▶ early-onset

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Conclusion We describe the prevalence and demographics of prostate cancer in Colombia using the national healthcare system database. We observed that the prevalence has been increasing over time, and the distribution is variable according to regions, which may be related to racial or environmental causes, or access to the urologist. These factors should be addressed in further studies.

Resumen

Antecedentes y Objetivo El cáncer de próstata es una enfermedad multifactorial, y se encuentra entre las cinco principales causas de muerte en hombres a nivel mundial. El Ministerio de Salud de Colombia ha adoptado el Sistema Integrado de Información de la Protección Social (SISPRO) para la recopilación de la información integral del sistema de salud colombiano. El sistema proporciona una cobertura casi universal (alrededor del 95%). El objetivo de este estudio fue establecer la prevalencia del cáncer de próstata en Colombia y describir su demografía, con base en los datos proporcionados por el SISPRO, disponibles de forma abierta para el análisis científico.

Métodos Utilizando los datos del SISPRO de 2015 a 2019, se analizaron la prevalencia y las características demográficas de los pacientes diagnosticados con cáncer de próstata.

Resultados Se identificó un total de 43,862 pacientes con cáncer de próstata en el período de 5 años, con una prevalencia de 4,54 casos por cada mil habitantes, utilizando como denominador hombres mayores de 35 años. La prevalencia de cáncer de próstata de inicio temprano (es decir, paciente de 35 a 54 años) fue de 0.14 por mil habitantes (791 casos en 5 años). La mayor prevalencia se observó en pacientes > 80 años (33,45 por mil habitantes). Los departamentos con mayor prevalencia fueron Bogotá, Valle del Cauca, Risaralda, y Boyacá. Y la región con menor prevalencia fue Amazonas.

Conclusión Describimos la prevalencia y la demografía del cáncer de próstata y el cáncer de próstata de inicio temprano en Colombia utilizando la base de datos del sistema nacional de salud. Observamos una distribución desigual de la prevalencia entre las regiones, que puede estar relacionada con factores raciales, ambientales, o de acceso, que justifican más estudios.

Palabras clave

- ▶ cáncer de próstata
- ▶ prevalencia
- ▶ Colombia
- ▶ América Latina
- ▶ inicio temprano

Introduction

Prostate cancer (PCa) is a multifactorial disease that is considered a public health issue. According to the Global Cancer Observatory (GLOBOCAN), 1,276,106 new cases of PCa were registered worldwide, representing 7.1% of all cancers in men.^{1,2} Age is a major risk factor and a median age of diagnosis of 66 years has been reported. Other well-established non-modifiable risk factors are genetic susceptibility, black ethnicity, and family history. Its association with other modifiable factors, such as chemical contaminants, diet, and medications, among others, is not yet clear.³

The annual incidence of PCa has been increasing worldwide thanks to better cancer surveillance programs. The screening for and management of early PCa are some of the most challenging and controversial issues in medicine.⁴ In the last years, several countries in Latin America, including Brazil, Chile, Costa Rica, Mexico, Peru and Colombia, made PCa a public health priority in their national cancer plans; guidelines for early detection, diagnosis, treatment and

follow-up have been developed.^{5,6} In Colombia, PCa is the most frequent cancer in men and the second cause of mortality in the male population, with a mortality rate of 12 per 100,000 people.¹

The present study aimed to establish the prevalence of PCa in Colombia and to describe its demographics, based on data provided by the Integrated Information System on Social Protection (Sistema Integrado de Información de la Protección Social, SISPRO, by its Spanish acronym). This system is the official administrative registry of the Colombian Ministry of Health.

METHODS

Database Search

Colombia has one of the widest health coverages in Latin America: 95.97% of the 50.5 million inhabitants as of April 2020, according to official data from the Colombian Ministry of Health.⁷ The Ministry developed an information database called SISPRO, which stores and processes the basic

data that the system requires for its regulation and control processes. Demographics and clinical data are grouped in the Individual Health Services Delivery Registry (Registro Individual de Prestación de Servicios de Salud, RIPS, by its Spanish acronym), which are collected by medical staff during each outpatient or inpatient medical contact. This consolidated registry receives input from different sources: both private and public health providers, insurers, and other sources, such as RIPS, the Unified Affiliate Registry (Registro Único de Afiliados, RUAF, by its Spanish acronym), the System of Public Health Surveillance (Sistema de Vigilancia en Salud Pública, SIVIGILA, by its Spanish acronym), high-cost account, among others. These databases are publicly available for scientific analysis (<http://www.sispro.gov.co/>); the information to carry out this study was retrieved from the online dynamic tables. We have described searching methods previously.^{8–11} Due to recent updates on the database, the currently available information comprises only the period between 2015 and 2019. Briefly, we obtained the information for the whole country, for the period between January 1st 2015 and December 31th 2019. We analyzed the RIPS database using the International Classification of Diseases code for PCa (ICD-10 code: C61). ICD-10 codes: D075 (In situ carcinoma of the prostate) and D400 (tumor of uncertain or unknown behavior of the prostate) were not included to avoid bias. Following the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines, we analyzed the distribution in 5-year age groups, according to the data from the most recent census, which was performed in 2018 with results published in the second semester of 2019.¹²

Prevalence per 1,000 inhabitants was calculated using as numerator the number of males diagnosed with PCa (counted once). The denominator was the number of inhabitants reported by the National Administrative Department of Statistics (Departamento Administrativo Nacional de Estadística, DANE, by its Spanish acronym) in each age group or geographical area. To calculate the prevalence, we included

only men older than 35 years. We selected 35 years as the age threshold, as PCa diagnosis below this age is extremely rare; thus, the recorded cases under this age are probably due to codification errors, and their inclusion would imply that the prevalence calculation would be based on a larger denominator that could underestimate the real prevalence. Besides, we determined the prevalence of early-onset PCa (EO-PCa), defined as PCa diagnosis in patients < 55 years (but older than 34 years), as mounting evidence supports differential pathophysiology that warrants further research.¹³ Data were recorded and analyzed using Microsoft Excel (Microsoft Corp., Redmond, WA, USA).

RESULTS

After removing cases under 35 years of age ($n = 51$), a total of 43,862 cases of patients with a primary diagnosis of PCa (both from outpatient and hospital services) were attended at some point during the 5 years (2015–2019). ► **Table 1** shows the number of cases per year divided by age group. The unadjusted prevalence in the 5-year period was 4.54 cases per 1,000 inhabitants. The highest prevalence was observed in patients > 80 years (33.45 per 1,000 inhabitants). The prevalence of EO-PCa was 0.14 cases per 1,000 inhabitants. ► **Fig. 1** shows the number of cases by age group and by year, with the highest being in 2019.

Regarding the distribution of PCa by departments, the prevalence ranged from 0.42 to 6.45 per 1,000 inhabitants. The departments with the highest prevalence were Bogotá (capital city of Colombia), Valle del Cauca, the Colombian coffee trail (Risaralda) and Boyacá. The lowest prevalence was observed in the region of Amazonas (Amazonas, Vaupés, Guaviare, and Vichada) (► **Table 2** and ► **Fig. 2**).

DISCUSSION

Colombia has a national health system that serves 63,000 new cases of cancer annually.¹⁴ The most prevalent malignancies in

Table 1 Patients with a main diagnosis of prostate cancer according to age between 2015 and 2019

Age group (years)	2015	2016	2017	2018	2019	5-year total cases	x1,000
35–39		4	5	7	9	22	0.01
40–44	2	6	11	9	17	37	0.03
45–49	17	20	21	47	63	123	0.09
50–54	65	84	146	278	384	609	0.47
55–59	250	278	492	805	1,079	1,759	1.55
60–64	719	796	1,090	1,805	2,349	4,002	4.42
65–69	1,321	1,381	1,835	3,044	3,751	6,612	9.61
70–74	1,832	1,900	2,430	3,974	4,674	8,495	17.25
75–79	2,092	2,119	2,404	3,825	4,426	8,506	26.18
80–older	4,205	3,890	3,765	5,371	5,700	13,697	33.45
Total	10,503	10,478	12,199	19,165	22,452	43,862	4.54

Note: Numbers do not add up since patients might be included in more than one cell.

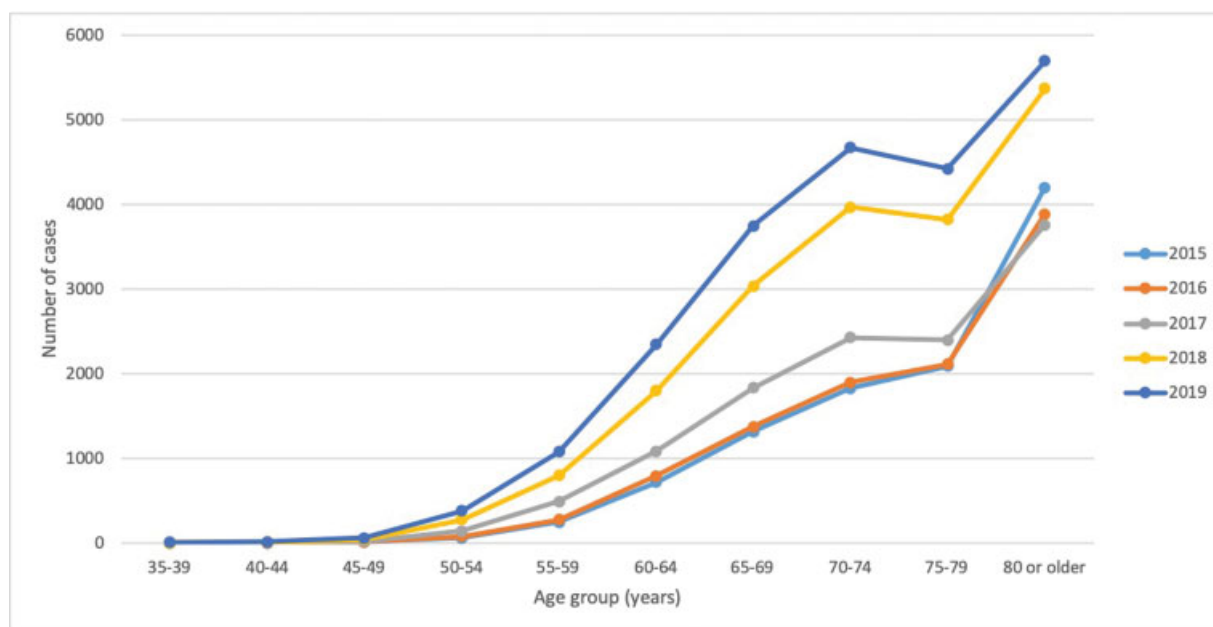


Fig. 1 Number of cases per age group (x 1,000 inhabitants).

men are prostate, stomach, colon, and lung.^{1,15} Based on the present study, the prevalence of PCa in 5 years was 4.54 cases per 1,000 inhabitants, and it has been increasing over time (► **Fig. 1**). The incidence rate reported in 2013 varies between 40.5 to 45.9 per 100,000 inhabitants.⁶ Data from Cali (southwest, capital city of Valle del Cauca) described that the age-standardized rate (ASR) changed from 22.3 per 100,000 males (1962–1966) to 64.8 per 100,000 males (2001–2005).¹⁶ Between 2003 and 2007, the ASR in Colombia was 54.4 per 100,000 males.⁵ According to data from high cost account (data present in SISPRO), in 2019, 37.7% of the PCa patients had a Gleason score (GS) of 6 (3 + 3), 20.5% GS 7 (3 + 4); 15.8% had a GS of 8, 15.2% GS 7 (4 + 3), and 10.8% had a GS of 9 or 10. And the most frequent clinical stage was II (40.6%) followed by stages I (27%) and IV (20.1%).¹⁷

The population in Latin America is heterogeneous regarding race, life expectancy, diet, and socioeconomic and cultural

levels.³ These factors may explain the differences in PCa epidemiology among countries. For instance, Brazil has the highest reported ASR (91.4 per 100,000 inhabitants) in the region,⁵ probably due to its high proportion of black race population, which stands out as a non-modifiable risk factor.¹⁸ In contrast, Peru has the lowest rate (34.6 per 100,000 inhabitants),⁵ probably due to the small proportion of people over 50 years old (12%).³

Colombia is a country with several ancestry backgrounds. According to the 2005 census (DANE), 49% of the population is mestizo (mixed European and Amerindian ancestry), 37% is of European ancestry (predominantly Spaniard), 10% is of African ancestry, and 3.4% identify themselves as Amerindian.¹⁹ Interestingly, one of the regions with the highest PCa prevalence is Valle del Cauca (southwest). According to the 2018 census (DANE),¹² this region has one of the largest proportions of Afro-Colombian inhabitants. It is noteworthy to point out that prevalence is also influenced by a high population density and a high number of available urologists. According to the Colombian Ministry of Health, the departments with the larger number of urologists are Bogotá (capital city of Colombia), Antioquia, Valle del Cauca, and Santander,⁶ a fact that is consistent with our data. On the other hand, the population density and urban development in the Amazonas regions is low (Amazonas, Vaupés, Guaviare and Vichada), which implies less access to specialists, and, therefore, a lower probability of obtaining an accurate diagnosis; this would explain the lower prevalence in this region. This phenomenon is supported by the fact that the registered cases in SISPRO are dependent on the official report made by the treating physician. Thus, patients from rural and less developed areas usually travel to larger cities to obtain a diagnosis, and, therefore, each case would be registered in that city; this implies that the calculated prevalence in less developed regions is underestimated.

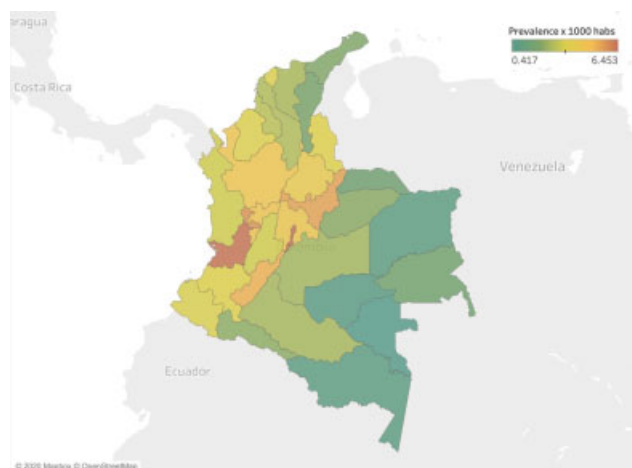


Fig. 2 Prevalence per Colombian department (x 1,000 inhabitants).

Table 2 Prevalence per Colombian department

Department	Prevalence x1,000 habitants
Bogotá, D.C.	6.45
Valle del Cauca	6.34
Risaralda	5.73
Boyacá	5.48
Huila	5.22
Quindío	4.59
Caldas	4.51
Antioquia	4.44
Cundinamarca	4.29
Santander	4.14
Norte de Santander	3.65
Cauca	3.58
Córdoba	3.47
Atlántico	3.47
Nariño	3.39
Chocó	3.26
Tolima	3.24
Sucre	2.91
Bolívar	2.78
Magdalena	2.65
Caquetá	2.58
Meta	2.55
Archipiélago de San Andrés	2.34
Putumayo	2.19
Casanare	2.12
La Guajira	2.03
Cesar	1.88
Guainía	1.60
Arauca	1.51
Vichada	0.76
Amazonas	0.69
Guaviare	0.64
Vaupés	0.42

On the other hand, the prevalence of EO-PCa, defined as PCa under 55 years, was 0.14 cases per 1,000 habitants or (791 cases in 5 years). The incidence of EO-PCa has been increasing over the last years. For example, in the United States, it changed from 5.6 to 32 cases per 100,000 person years (confidence interval [CI] 95% CI 5.0–6.7), making EO-PCa an important emerging issue for public health.^{20,21} In 2012, 10% (241,740 cases) of men \leq 55 years old were diagnosed with PCa.²² Different risk factors have been associated, such as family history, ethnicity, and genetic factors,²³ and different studies have described differences in the molecular characteristics and the clinical behavior when compared with classic PCa.^{24–26}

One of the limitations of our study is the possible under-reporting by physicians in the medical records, especially because there are many occasions in which patients cannot access or continue with the medical assistance, especially in remote regions of the Colombian territory. In addition, the prevalence would be underestimated in underserved areas, as the formal diagnosis would be registered in larger cities.

In conclusion, to the best of our knowledge, this is the first study that describes the prevalence and demographics of PCa and EO-PCa in Colombia using the national healthcare registry. The prevalence has been increasing over time and it varies between the regions; the departments with the highest prevalence were Bogotá, Valle del Cauca, Risaralda, and Boyacá, and the region with the lowest prevalence was the Amazonas. This behavior may be related to racial and environmental causes as well as to access to appointment with the urologist, among others. These factors should be addressed in further studies.

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Conflict of Interests

The authors declare no conflict of interests for this study.

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