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## Original Article

### Prevalence of osteoporosis in Colombia: Data from the National Health Registry from 2012 to 2018<sup>☆</sup>



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#### ABSTRACT

**Introduction:** Osteoporosis is considered a healthcare problem due to the increased risk of fractures and high cost of care. In Colombia, the Ministry of Health introduced SISPRO, a tool to collect nationwide information from the health system. The information collected from SISPRO is available for scientific analysis. This article presents an analysis of the prevalence and characteristics of patients with osteoporosis using data from 2012 to 2018.

**Aim:** To estimate prevalence of osteoporosis between January 2012 to December 2018 and describe the patients' demographic characteristics.

**Methods:** This is a descriptive epidemiological study using the International Statistical Classification of Diseases and Related Health Problems related to osteoporosis as search terms using the SISPRO database. **Results:** National records report 249,803 patients over 50 years old diagnosed with osteoporosis. The estimated prevalence is 2440 cases per 100,000 inhabitants over 50 years old (based on a total population of 10,236,132), being more frequent in women (92% of cases), with a female/male ratio of 12.3:1.

**Conclusion:** This study shows a lower prevalence than previous estimates or projections. Given these findings we think it is necessary to act to promote health policies for patients with osteoporosis.

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### Prevalencia de osteoporosis en Colombia: datos del registro nacional de salud del 2012 al 2018

#### RESUMEN

**Introducción:** La osteoporosis es considerada un problema de salud pública, ya que, al aumentar el riesgo de fracturas, genera un alto coste para el sistema de salud. En Colombia, el Ministerio de Salud utiliza la herramienta SISPRO para recolectar información del sistema de salud. La información almacenada en SISPRO es pública y disponible para la investigación. Este artículo presenta un análisis de la prevalencia y características de los pacientes con osteoporosis a partir de los datos del 2012 al 2018.

**Objetivos:** Estimar la prevalencia de osteoporosis entre enero de 2012 a diciembre de 2018 y describir las características demográficas de los pacientes.

**Métodos:** Estudio descriptivo de corte transversal en el que se tomaron los datos de SISPRO, utilizando como palabras clave los diagnósticos del manual internacional de enfermedades relacionados con el diagnóstico de osteoporosis.

##### Palabras clave:

Osteoporosis

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**Resultados:** Se documentaron 249.803 individuos mayores de 50 años con diagnóstico de osteoporosis, estimando una prevalencia de 2.440 casos por 100.000 habitantes mayores de 50 años (basado en una población total de 10.236.132), siendo más frecuente en mujeres (92%), con una relación mujer a hombre de 12,3:1.

**Conclusión:** Este estudio muestra una baja prevalencia respecto a las estimaciones y proyecciones. Dados estos resultados es necesario trabajar en promover políticas en salud para los pacientes con osteoporosis.

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## Introduction

Osteoporosis (OP) and fragility fractures are a public health problem due to the increase in morbidity and mortality that they generate. Because prevalence of the disease is directly proportional to age, OP is becoming increasingly frequent in a population that tends to live longer.<sup>1</sup> However, OP is not on the agenda of public health priorities in Colombia, where other chronic diseases such as cancer, HIV infection, chronic kidney disease, cardiovascular disease, diabetes mellitus, among others, are the focus of the state budget and the interventions of health decision-makers.<sup>2</sup> This paper aims to establish the prevalence of OP in Colombia, describe the basic demographic characteristics of patients with this disease and give visibility to a problem that is silent but with multiple repercussions on our country's health system.

## Material and method

A cross-sectional study was conducted based on official data from the Colombian Ministry of Health. The official data from the Colombian Ministry of Health come from an information collection and storage tool called the Integral Social Protection Information System (SISPRO), which has four components: health, pensions, occupational risks, and social promotion. The first component stores and processes the basic and minimum data required by the General System of Social Security in Health for management, regulation, and control processes. This data is entered from the Individual Registry of Health Service Delivery. The information contained in these databases is for public use. The dynamic tables that the Ministry of Health has online were consulted and the data were obtained to conduct this study. Information was obtained for Colombia for the period from 1 January 2012 to 31 December 2018, for which an analysis of the Individual Registry of Health Service Delivery databases was undertaken, using the international codes of diseases (ICD-10) for osteoporosis (M800, M801, M802, M803, M804, M805, M808, M809, M810, M811, M812, M813, M814, M815, M818, M819), and we analysed variables such as sex, type of insurance and distribution in five-year age groups, according to the official projections of the National Administrative Department of Statistics, based on the projections of the 2005 national census.<sup>3</sup> The data collected were analysed with descriptive statistics, using means and measures of central tendency for quantitative variables and proportions for qualitative variables. Prevalence was adjusted by sex and age group to the 2015 population over 50 years of age, projected for each of the 32 departments during the period analysed. The diagnostic criteria for OP in the SISPRO database are not standardised; they depend on the clinical and diagnostic judgement of each physician when registering a patient with an ICD-10 code related to OP. Patients who were registered with a diagnosis of OP as the "principal diagnosis" were included. It is important to highlight that the coverage of the Colombian health system is one of the highest in Latin America (95.1%),<sup>4</sup> which allows for a significant amount of data from the entire population of the coun-

try. This project was approved by our institution's Central Research Committee.

## Results

We identified 249,803 cases ("persons attended") with a principal diagnosis of OP, which allowed us to calculate an unadjusted prevalence of 2440 cases per 100,000 inhabitants over 50 years of age, and to establish that the condition is more frequent in women (92% of cases), with a female: male ratio of 12.3:1. An analysis of the prevalence of OP by five-year age groups shows an increase in prevalence as the population ages (Table 1 and Fig. 1). The number of patients according to sex and age group is presented in Table 2. It can be observed that the prevalence of OP is higher in women (4210 per 100,000 inhabitants) compared to men (395 per 100,000 inhabitants), and that prevalence increases as the population ages.

We also analysed the presence of OP with fractures, which corresponded to 18% of the total cases of osteoporosis. Due to the characteristics of the Registry, it was not possible to establish the fracture site. In the analysis by sex, we observed that 22% of men with OP have fractures compared to 18% of women. Given these results, we undertook an analysis of the prevalence of OP with fracture adjusted for sex and age, which showed that the prevalence of OP with fracture is 1% in women and .1% in men.

Regarding the distribution of OP by department, we found that the national population-adjusted prevalence in men ranged between 2.3 and 206.2 per 100,000 inhabitants, while the adjusted prevalence in women was between 12 and 2190 per 100,000 inhabitants (Fig. 2). The areas with the highest adjusted prevalence in both men and women are three departments of the coffee-growing region: Risaralda (6.8 per 100,000 inhabitants), Antioquia (6.2 per 100,000 inhabitants) and Caldas (5.8 per 100,000 inhabitants).

## Discussion

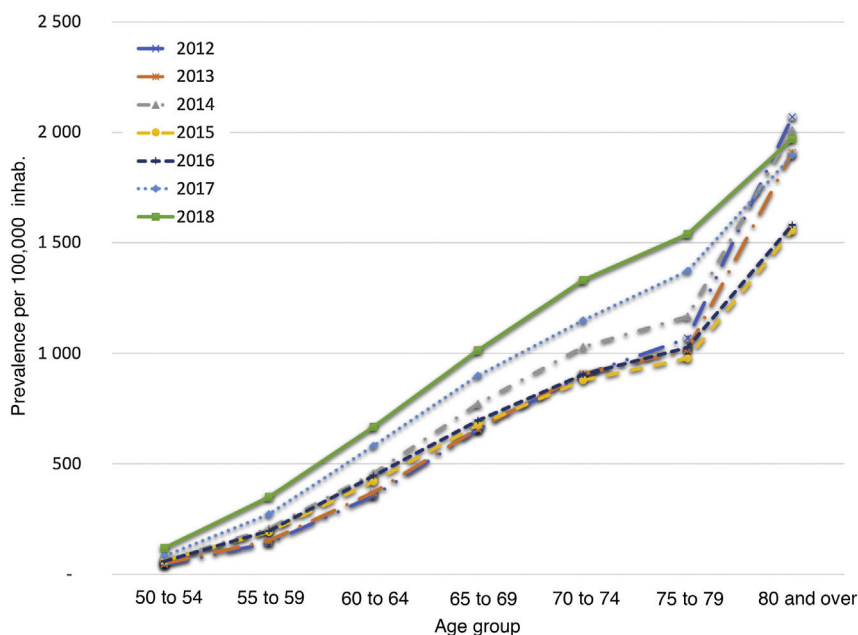
Colombia is in a process of demographic transition, as are other countries in the region, due to increased longevity of the population. Life expectancy according to the WHO for Colombia is 77 years, and when differentiated by sex, it is 80 years for women and 74 years for men.<sup>5,6</sup> One of the notable consequences of this demographic phenomenon is an increase in the prevalence of chronic non-communicable diseases. This phenomenon has been documented worldwide in the case of OP, which is a disease considered a public health problem because it affects postmenopausal women and the elderly population, increasing the risk and incidence of fractures, with significant social and economic costs for health systems.<sup>7,8</sup> It is estimated that approximately 200 million people suffer from OP worldwide, with a progressive increase associated with the global ageing of the population, although the prevalence of OP is difficult to establish, given its asymptomatic course until the onset of fractures.<sup>7-9</sup>

According to the projections of the International Osteoporosis Foundation's report presented in 2012, it was evident that the data in Latin America were insufficient, but the estimates

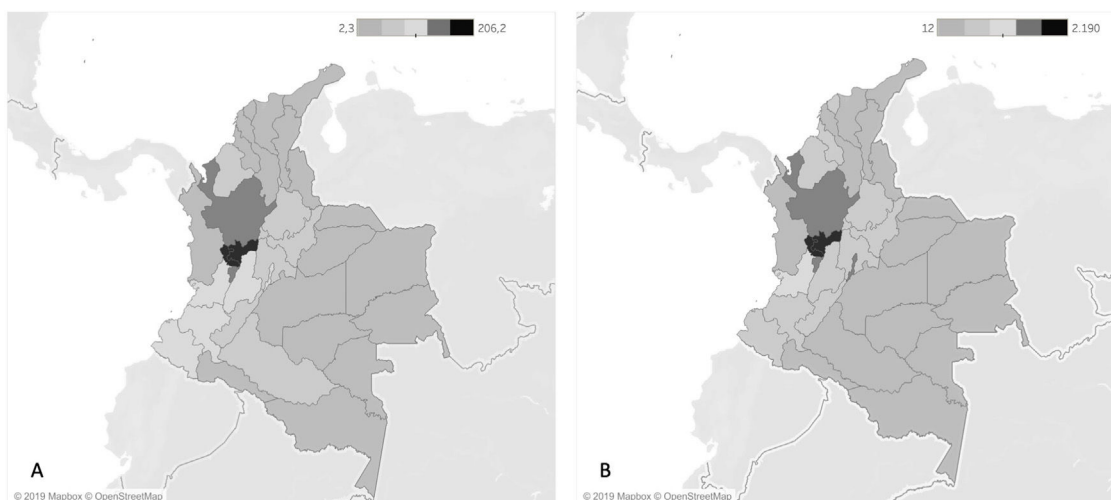
**Table 1**  
Patients seen with a primary diagnosis of osteoporosis by age group between 2012 and 2018.

Age group	2012	2013	2014	2015	2016	2017	2018	Total patients	Prevalence
50–54	1,050	1,208	1,623	1,638	1,608	2,275	3,313	10,217	381
55–59	2,786	3,135	4,404	4,234	4,545	6,481	8,638	24,571	1,107
60–64	5,453	5,894	7,573	7,267	8,025	10,916	13,059	37,910	2,193
65–69	7,471	7,895	9,665	8,820	9,485	12,779	14,973	43,954	3,362
70–74	7,660	7,853	9,172	8,150	8,748	11,638	13,546	40,570	4,377
75–79	6,854	6,716	7,879	6,701	7,194	9,769	11,130	35,206	5,142
80 or more	13,067	12,417	13,479	10,735	11,230	13,869	14,859	57,375	8,320
Total	45,542	46,471	55,818	49,232	52,373	69,705	81,860	249,803	2,440

The total patients' column corresponds to the number of people seen at some point during the five-year period. Prevalence is calculated using the mean population of the period as the denominator  $\times 100,000$  inhabitants.



**Fig. 1.** Non-age adjusted prevalence of patients with osteoporosis during the years 2012–2018. Prevalence is calculated with the mean population of the period as the denominator per 100,000 inhabitants.



**Fig. 2.** Geographical distribution of the prevalence of osteoporosis for the period 2012–2018, adjusting for sex and age group of the Colombian population. Prevalence is calculated with the mean population of the period as the denominator per 100,000 inhabitants. (A) Males. (B) Females.

indicated that there were 1,423,559 women with OP in Colombia and 8000–10,000 hip fractures per year.<sup>2</sup> However, the data obtained from the Ministry of Health registry reports only 249,803 people with OP, which is one-fifth of the estimate of the Inter-

national Osteoporosis Foundation. Other work such as that by Morales-Torres et al. collected data from Latin America, where the range of vertebral OP was 7.6%–12.1% and of femoral neck OP was 7.9%–22%,<sup>8</sup> which again is higher than that found in our study,

**Table 2**  
Patients diagnosed with osteoporosis by sex and age group between 2012 and 2018.

Age group	Males				Females					
	Males with OP	Prevalence of OP ( $\times 100,000$ inhab)	Males with fractures and OP	OP with fractures (%)	Prevalence of OP with fractures in COL ( $\times 100,000$ inhab)	Females with OP	Prevalence of OP ( $\times 100,000$ inhab)	Females with fractures and OP	OP with fractures (%)	Prevalence of OP with fractures in COL ( $\times 100,000$ inhab)
50–54	1033	81	192	19	15	9,184	654	1032	11	73
55–59	1643	157	293	18	28	22,928	1957	2421	11	207
60–64	2189	269	409	19	50	35,721	3904	4295	12	469
65–69	2733	449	522	19	86	41,221	5901	5733	14	821
70–74	2891	685	570	20	135	37,679	7463	6244	17	1237
75–79	2826	950	619	22	208	32,380	8365	6666	21	1722
80 or more	5445	1917	1493	27	526	51,930	12804	15490	30	3819
Total	18760	395	4098	22	86	23,1043	4210	41881	18	763

COL: Colombia; OP: osteoporosis.

where the overall prevalence is 2.4% in those over 50 years of age. A report from Bogota in 1999 reported a prevalence of OP of 32% in a group of patients who underwent bone scans,<sup>10</sup> which again contrasts with the findings of the national registry.

The results of this study show that OP occurs more frequently in women of all age ranges and its prevalence increases in a directly proportional manner, which is in line with that reported in other studies in Latin America (LAVOS, Brazil)<sup>11,12</sup> and in other regions (Spain, China, Canada).<sup>13–15</sup> However, the lower prevalence than that reported in other studies may be due to under-diagnosis and under-recording in the SISPRO information system, as well as the difference in the methodology of the studies, since the methodology used to measure prevalence in the studies that we took as the reference for this article's discussion was taking densitometry measurements of specific population groups using the active search mode, or by analysing hospital records in at-risk populations.

In terms of the prevalence of OP fractures, these are two to three times more common in women.<sup>16</sup> Worldwide, about 8.9 million fractures per year are attributable to OP.<sup>16</sup> However, there is likely to be under-reporting, because some fragility fractures are under-diagnosed and under-treated,<sup>17,18</sup> leading to the functional impairment of sufferers, decreased quality of life and high mortality rates.<sup>11,16</sup> In 2010, around 3.5 million fractures in Europe were attributed to OP, hip fracture being the most frequent.<sup>19</sup> The LAVOS study, conducted in 5 Latin American countries (Argentina, Brazil, Colombia, Mexico and Puerto Rico) showed a standardised prevalence of vertebral fractures in women over 50 years of age of 11.18% (95% CI 9.23–13.4), which increases from 6.9% in women aged 50–59 years to 27.8% in women over 80 years.<sup>12</sup> This direct relationship between ageing and increased prevalence of fractures is also determined by the findings of our study, as is the higher prevalence of OP among women.

The Colombian health system is based on single-payer public financing and mixed public and private provision, with almost universal coverage (95.1% according to the latest official measurement in June 2019).<sup>4</sup> However, the main limitation of this study is under-reporting, due to the characteristics of the Registry, which only records the main diagnoses, not comorbidities, which in the case of OP, as it is often a comorbidity, is not adequately recorded. Neither is it possible to calculate the incidence because there is no criterion to determine the “main diagnosis” from one year to another. As there can be variations in recording, it is not possible to calculate the incidence or duration of the disease.<sup>20</sup> Also, due to the nature of the data, it is not possible to establish the course of the disease, the patients' specific clinical characteristics, fracture sites, or response to treatment.

Our study shows information taken from the Colombian Ministry of Health database. From this information we made demographic and epidemiological analyses of the population and projections for the care of patients with OP in our country. These results alert us to the importance of improving the characteristics of the Registry, and of designing public health policies for a disease which is possibly being under-diagnosed and therefore, with a lower rate of treatment for patients.

### Conflict of interests

The authors have no conflict of interests to declare.

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