

Prevalence of pulmonary arterial hypertension in the Colombian Caribbean

Pablo Miranda-Machado¹ , Ivan Baños-Alvarez² and Alvaro Alvarez-Barrios³

¹ALZAK Foundation, Cartagena, Colombia; ²Universidad Nacional de Colombia, Bogotá, Colombia; ³Universidad de Cartagena, Cartagena, Colombia

Abstract

In Latin America, there are no specific data on the prevalence of pulmonary arterial hypertension (PAH). For this reason, the Registro Latinoamericano de Hipertensión Pulmonar (RELAHP) is under development. The aim of this study is to estimate the prevalence of PAH in the Colombian Caribbean in 2015 based on data from a private health insurance company (PHIC) with coverage in that region. All the Individual Service Delivery Registries (RIPS) of all ambulatory care centers that serve the population of the Colombian Caribbean region affiliated with a PHIC selected for this research were reviewed. All patients who had a diagnosis of pulmonary hypertension (PH) were included (International Classification Diseases 10-Revision [ICD-10 I270, I272, I278, and I279]). Subsequently, the information on electronic medical records was reviewed. To estimate the prevalence of PAH, the total population of the PHIC and population projections of Colombian Caribbean by Departamento Administrativo Nacional de Estadísticas (DANE) was used. We identified 27 patients with a confirmed diagnosis of PH and 18 patients with a confirmed diagnosis of PAH. Taking into account the total population affiliated to the Caribbean Regional of the PHIC selected for the study in September 2015, a PAH prevalence of approximately 28 cases per million inhabitants is estimated. The mean of age was 22 ± 21.4 years (14.8% children) and 17 (62.9%) were girls/women. The majority of patients presented with PAH (Group 1) (66.6%). The estimated number of cases of PH in Colombian Caribbean in 2015 is approximately 292 cases or 1 in 35,760. Epidemiological estimates of PAH in the Colombian Caribbean are compatible with the definition of orphan or rare diseases. The majority of patients are female.

Keywords

pulmonary hypertension, prevalence, orphan, rare diseases, Colombian Caribbean

Date received: 23 January 2019; accepted: 29 March 2019

Pulmonary Circulation 2019; 9(2) 1–4

DOI: 10.1177/2045894019847643

Introduction

Pulmonary hypertension (PH) is defined as an increase in mean pulmonary artery pressure (mPAP) > 25 mmHg at rest determined by right heart catheterization (RHC) that may be present in multiple clinical conditions.¹ Pulmonary arterial hypertension (PAH) (Group 1) describes a group of PH patients characterized hemodynamically by the presence of pre-capillary PH and increased pulmonary vascular resistance (PVR) in the absence of other causes of pre-capillary PH such as PH due to lung diseases, chronic thromboembolic pulmonary hypertension (CTEPH), or other rare diseases.^{2,3} The estimated prevalence of PAH and idiopathic PAH worldwide is 15 cases and 5.9 cases per million adult population.⁴ In Latin America, there are no specific data on

prevalence. For this reason, the Registro Latinoamericano de Hipertensión Pulmonar (RELAHP), an observational and multicenter project belonging to the Department of Pulmonary Circulation of the Latin American Association of Thorax (ALAT) has been under development since April 2014 and will end in March 2019.⁵ The female:male ratio is 4:1, with an average age of 50 years, although it can occur at any age. Women and young patients have greater survival.⁶ This study aims to estimate the prevalence of PAH in the population of the Colombian Caribbean based on data from

Corresponding author:

Pablo Miranda-Machado, Crespo 70 #6-99, Cartagena, Colombia 130002.

Email: mmpa9@hotmail.com



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a population affiliated with a private health insurance company (PHIC) with coverage in that region, in order to contribute to national epidemiological estimates of this rare disease.

Methods

Study design

A cross-sectional study was carried out using the Individual Service Delivery Registries (RIPS) and the electronic medical records of the ambulatory care centers that serve the population of the Colombian Caribbean region affiliated with a PHIC selected for this research. The data collection was carried out during the month of October 2015.

The data collection of this research was approved by the ethics committee of a Private Health Insurance Company in Colombia and was carried out in accordance with Resolution No. 8430 of 1993 by the Ministry of Health and Social Protection of Colombia. This study was classified as a No Risk investigation, according to the categories established in the aforementioned resolution and the ethics committees dispensed to the authors of the written consent of the informed consent of the participants.

Study population

In 2015, 10,442,134 people lived in the Colombian Caribbean and 51.3% were women. According to the age groups, 36.8% were aged <15 years, 63.7% were aged 15–64 years, and 6.8% were aged >65 years. The population affiliated with the PHIC selected for this study had a population structure relatively similar to the population of the Colombian Caribbean in 2015. It had 624,199 affiliated patients in the Colombian Caribbean, 55.1% were women and according to age groups, 21.2% were aged <15 years, 69.1% were aged 15–64 years, and 9.4% were aged >65 years.

History of PH

All the RIPS of all ambulatory care centers that serve the population of the Colombian Caribbean region affiliated with a PHIC selected for this research were reviewed. All patients who had a PH diagnosis were included (International Classification Diseases 10-Revision [ICD-10 I270, I272, I278, and I279]). Subsequently, the information on the electronic medical records was reviewed in order to verify the diagnostic confirmation by the specialists in clinical pneumology. We excluded patients with Group 2 PH (PH due to left heart disease), Group 3 PH (PH due to lung diseases and/or hypoxemia), Group 4 PH (CTEPH and other pulmonary artery obstructions), and to whom information was obtained that allowed us to rule out the diagnosis of PAH as missing or incomplete information on the results of confirmatory analysis. To estimate the prevalence

of PAH in the population affiliated with the PHIC with coverage in the Colombian Caribbean, the total affiliated population in September 2015 ($n = 624,199$) was used. To estimate the prevalence of PH in the Colombian Caribbean, the total population projected by Departamento Administrativo Nacional de Estadísticas (DANE) for 2015 ($n = 10,442,134$) was used.

Classification of PH

For the definition of PAH (Group 1), the classification proposed in the 2015 Guidelines for the diagnosis and treatment of PH: The Joint Task Force for the Diagnosis and Treatment of PH of the European Society of Cardiology (ESC) and The European Respiratory Society (ERS) was used.

Statistical analysis

The quantitative variables were expressed in means \pm standard deviation and the qualitative variables were expressed in percentages. The quantitative variables were compared with the Student's t-test and the qualitative variables by the Chi-squared test. All statistical analyses were conducted using the Stata version 14.2 software (StataCorp, College Station, TX, USA) and R version 3.4.3 (R Core Team, R Foundation for Statistical Computing). $P < 0.05$ was considered statistically significant for all tests.

Results

In 2015, a total of 592,223 patients attended and a total of 5,999,432 medical attentions were reported in the PHIC. All the attentions were reviewed and it was identified that of the 592,223 patients who attended, 110 had a PH diagnosis. In addition, of the approximately 6 million attentions reviewed, a total of 3035 attentions were evidenced with the diagnosis of interest.

Thirty-six patients with a confirmed PH diagnosis were identified. After reviewing the information recorded in the medical records, 18 patients with Group 2 PH, Group 3 PH, Group 4 PH, or in whom the diagnosis was not confirmed were excluded. Finally, 27 patients were identified with the confirmed diagnosis of PH and 18 patients were identified with the confirmed diagnosis of PAH (Fig. 1). The mean age was 22 ± 21.4 years (14.8% children) and 7 (62.9%) were girls/women.

The majority of patients presented Group 1 PAH (66.6%), mainly associated with connective tissue diseases, portal hypertension, and congenital heart diseases. All patients with Group 3 PH are associated with apnea syndrome during sleep and patients with this PH group are associated with sickle cell anemia (Table 1). There were no significant differences between the PH groups and the age and sex groups. With regard to the management of these patients, most receive inhibitors of phosphodiesterase-5

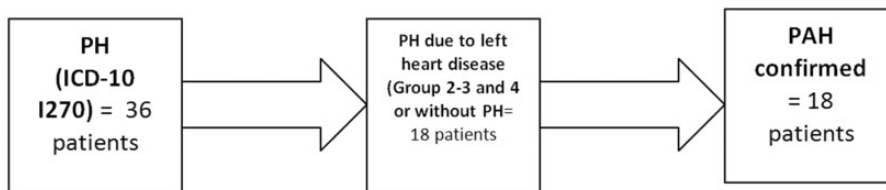


Fig. 1. PAH confirmed.

Table 1. PH classification.

PH classification	n (%)
1. Group 1 – pulmonary arterial hypertension (PAH)	18 (66.6)
1.1 Idiopathic (PHI)	5 (27.77)
1.2 Heritable	1 (5.51)
1.2.1 Unknow	1 (100)
1.3 Associated with PH	12 (66.6)
1.3.1 Connective tissue diseases	3 (25)
1.3.2 Portal hypertension	2 (16.6)
1.3.3 Congenital heart diseases	7 (58.3)
3. Group 3 – PH due to lung diseases and/or hypoxia	4 (14.8)
3.4 Sleep disordered breathing	4 (100)
4. Group 4 – CTEPH and other pulmonary artery obstructions	3 (11.1)
4.1 CTEPH	3 (11.1)
5. Group 5 – PH with unclear and/or multifactorial mechanisms	2 (7.4)
5.1 Hematological disorders: chronic hemolytic anemia, myeloproliferative disorders, splenectomy	2 (100)

Table 2. Treatment of PH.

Treatment of PH	n (%)
Sildenafil	4 (14.8)
Sildenafil and warfarin	2 (7.4)
Sildenafil and bosentan	2 (7.4)
Sildenafil, bosentan, and warfarin	1 (3.7)
Sildenafil, bosentan, iloprost, and warfarin	2 (7.4)
Sildenafil, bosentan, surgery, and pulmonary rehabilitation	1 (3.7)
Bosentan	3 (11.1)
Bosentan and continuous positive pressure in airway (CPAP)	1 (3.7)
CPAP	1 (3.7)
Riociguat and warfarin	1 (3.7)
Apixaban	1 (3.7)
Surgery correction of congenital heart diseases	2 (7.4)
Oxygen	1 (3.7)
No treatment is registered	5 (18.5)
Total	27 (100)

(sildenafil), inhibitors of endothelin receptors (bosentan) and anticoagulation (warfarin), monotherapy, or a combination. There was no evidence of treatment in five (18.5%) of the patients (Table 2).

Taking into account the total affiliated population of the Caribbean region in the PHIC selected for the study in September 2015 (18/624,199 patients), a prevalence of PAH of 0.0028% is estimated (approximately 28 cases per million inhabitants). Taking into account the population of the Colombian Caribbean in 2015 (n = 10,442,134), the estimated number of PAH cases in the Colombian Caribbean in 2015 is approximately 292 cases or 1 in 35,760.

Discussion

The Government of the Republic of Colombia, through the Ministry of Health and Social Protection (MSPS), recognized “orphan diseases as of special interest and adopts norms designed to guarantee social protection by the Colombian State to the population that suffers from orphan diseases and their caregivers” and ordered the

updating and the mandatory use of the list of orphan diseases by all members of the General System of Social Security in Health (SGSSS). PH is part of the updated list of orphan diseases.⁷

The PH records have been fundamental for the characterization of the presentation, natural history, and clinical course of the disease and provide a basis for the prognosis. In the United States, there have been records since the mid-1980s by the National Institute of Health (NIH).^{8,9} In Latin America, there are individual registries in Mexico, Brazil, and Chile and a Latin American registry is in design.^{5,10} Studies in Colombia on PH are scarce and recently a Colombian Registry (RECOLHAP) has been launched. A series of 30 patients was identified in Bogotá (2640 m a.s.l.) where 80% were women and 83% presented with Group 1 PAH (idiopathic = 13%, collagen-vascular = 30%, shunt = 27%, toxic = 3%, hereditary = 3%, and portopulmonary = 7%), and 17% with Group 4 PH (PHTEC).¹¹ In a 2019 study by Miranda et al., with data from the Sistema Integral de Información (SISPRO) of MSPS from 2010 to 2014, a prevalence and incidence of

PAH in Colombia were estimated at approximately 52 and 20 cases per million inhabitants, respectively. It was predominant in women and in the age groups > 60 years.¹²

This study has several limitations. The total population of the PHIC selected for this study represents about 6% of the total population of the Colombian Caribbean in 2015. However, the distribution of the population by age and sex was very similar. However, most of the population of the selected PHIC belongs to one of the existing health regimes in Colombia, specifically to the population with payment capacity or contributory regime. The lack of data on the differences in the prevalence of risk factors for PAH among the population of the contributory and subsidized regime of the health system in Colombia and the Colombian Caribbean can be an important limitation when extrapolating PHIC data to the entire Colombian Caribbean.

On the other hand, it can be evidenced that about 67% of the patients with PH diagnosis corresponded to a Group 1 PAH. The lower prevalence of Group 3 PH can constitute a limitation related to the methodological strategy or lack of screening of PH in groups with active search indication. In the study of the prevalence of PH evaluated by echocardiogram in patients with and without indication of active search for PH of Londoño et al., 39.5% of patients with risk factors for PH had an echocardiogram at the time of the study and were reported differences in the prevalence of PH between specific groups. A prevalence of PH of 25% was identified in patients with systemic sclerosis and 27.9% in patients with cirrhosis and indication for liver transplantation. In the group of patients without active search indication, the prevalence of PH was 51% in patients with end-stage renal disease and 35.71% in patients with cirrhosis and portal hypertension without indication for liver transplantation.¹³ In our study, 25% was associated with connective tissue diseases and 16.6% was related to portal hypertension. The estimation of the PH prevalence of Groups 2, 3, and 4 was not the objective of our study and further studies with other methodologies are needed to improve estimates of the prevalence of all PH groups.

Availability of data and material

The data that support the findings of this study are from a Private Health Insurance Company in Colombia; this information could be obtained making a formal solicitude to them and may have restrictions of sharing.

Conflict of interest

The author(s) declare that there is no conflict of interest.

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

ORCID iD

Pablo Miranda-Machado  <https://orcid.org/0000-0002-6790-7112>

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