Journal of Cystic Fibrosis 15 (2016) 791 – 793

www.elsevier.com/locate/jcf

Short Communication

# Cystic fibrosis in Latin America—Improving the awareness

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Received 31 March 2016; revised 15 May 2016; accepted 18 May 2016
Available online 1 June 2016

**Abstract**

The burden of cystic fibrosis (CF) in Latin America is being increasingly recognized and is significant compared with other regions of the world. In this short communication, we assess the current situation in some Latin American countries and make suggestions for possible directions for future focus. We discuss the work that remains in deciphering how the various genetic, environmental and medical factors interact and influence outcomes in different ethnic groups. We also consider the need for consistency in both research and access to services across Latin America, including CF registries, neonatal screening programs, access to specialized CF healthcare practitioners, transition to adult clinics and treatment regimens. Progress in these areas is likely to build on the advances to date, and improve the lives of patients in Latin America who are affected by this debilitating and life-limiting disorder.


*Keywords:* Cystic fibrosis; Latin America; Awareness; Diagnosis; Management; Progress

## 1. Introduction

Once considered a disease of the Caucasian populations of Europe, it is now recognized that no ethnic group can be considered exempt from cystic fibrosis (CF); populations in Latin America are no exception to this [1]. There has been an heightened awareness of CF and an increased number of CF diagnoses in Latin America over recent decades [1]. Further increases in estimates of prevalence are likely over the coming years, reflecting an increased use of neonatal screening and increasing recognition of individuals with milder disease presentation [1].

We conducted a literature search to assess what is currently known about CF in Latin America and used the findings to highlight possible directions for future focus.

## 2. CF in Latin America: current perspectives

### 2.1. Incidence of CF in Latin America

Estimates suggest that CF affects between 1 in 1600–14,000 live births in Latin America [1–3]. This incidence is substantial relative to other parts of the world (Table 1), but is thought to represent only a fraction of the real number of patients with CF in Latin America. Under-diagnosis remains a significant challenge, despite improvements over recent years, highlighting the need for more widespread understanding and greater disease awareness within this region [1–3]. A historical perception that CF occurs infrequently in Latin America may lower the detection rate, due to a lower index of suspicion, and must be addressed.

The consistent development and maintenance of CF registries is vital for monitoring CF incidence and outcomes in patients with CF. A number of countries in Latin America, including Brazil, Argentina, Mexico and Chile have established registries in place; however, various countries remain without

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http://dx.doi.org/10.1016/j.jcf.2016.05.007

Table 1
Live birth incidence of cystic fibrosis [2,3].

| Location | Live birth incidence |
|---|---|
| **Asia** (likely to be underdiagnosed) | |
| India | 1/40,000–100,000 |
| Japan | 1/100,000–350,000 |
| **Australia** | 1/2500 |
| **European Union** | ~1/2000–3000 (Range: Finland 1/25,000; Ireland 1/1800) |
| **Latin America** | |
| Mexico | 1/8500 |
| Argentina | 1/6000–7000 (data from the two biggest CF screening programmes in Argentina; Dr. Claudio Castaños, personal communication) |
| Brazil (Euro-Brazilians) | ~1/1600 |
| Brazil (Afro-Brazilians) | ~1/14,000 |
| Chile | 1/4000 |
| Cuba | 1/3900 |
| **Middle East** | |
| United Arab Emirates | 1/15,876 |
| Bahrain | 1/5800 |
| **South Africa** (African population) | 1/7056 |
| **USA** | 1/3500 |

CF registries. This needs to be prioritized to facilitate the identification of regions in which there is a need for change.

### 2.2. CFTR gene mutations in Latin America

The pattern of cystic fibrosis transmembrane conductance regulator (CFTR) mutations in Latin America is complex, with each country displaying a range of mutations, some of which are unique to the country and some of which mimic the ethnic origin of the population [1,4]. Mexico has one of the widest known spectra of CFTR mutations worldwide [5]. The treatment of CFTR dysfunction is now a very close or established reality in several countries and will be soon available for Latin American patients. Extensive genetic characterization by region is essential to maximize new opportunities.

### 2.3. Diagnosis and screening

In many parts of Latin America, significant progress has been made over recent years in the timely diagnosis of CF. This progress has been achieved through the implementation of pioneering neonatal screening programs (such as those in Brazil, Argentina and Mexico), dedicated CF awareness and training initiatives and increased access and use of molecular and other diagnostic tests [2,6–9].

Despite the aforementioned progress, the diagnostic picture across Latin America is mixed. Neonatal screening is not implemented everywhere and implementation is complex. Further work is needed to ensure universal access to neonatal screening, including the development of appropriate health policies. In addition, access to the most up-to-date diagnostic tools varies between and within countries in Latin America. For example, the equipment and expertise for the sweat chloride test are not universally available and the sweat conductivity test is frequently used instead. Although it is recognized that molecular testing is becoming increasingly useful, access to the necessary expertise and facilities for data interpretation using bioinformatics represents a significant obstacle in the near future [6,10]. Greater uniformity in the availability of diagnostic tests would be likely to further improve CF diagnosis rates across Latin America.

It is widely accepted that in Latin America, as in other parts of the world, there is considerable variation in the phenotypes and disease course of CF, which complicates the diagnosis, prognosis and treatment. Variation occurs as a result of genetic factors, environmental factors, medical treatment and interactions between them [11]. Characterizing and understanding how these factors influence outcomes in different ethnic groups in Latin America are important for both diagnosis and optimization of patient care.

### 2.4. Treatment and patient support

Over recent years, increasing numbers of patients with CF in Latin America have been treated and obtained access to specialized treatment centers. There has also been a drive to introduce programs and guidelines to improve awareness amongst physicians. Various CF associations have been established throughout Latin America (Table 2), which offer a variety of support and advice for patients, carers and healthcare professionals.

Despite these improvements, in many areas of Latin America there is still suboptimal access to various CF interventions. For example, a number of new medications have become available over the last 20 years, which have resulted in significant benefits in terms of patient outcomes. Examples include: dornase alfa (DNase; to hydrolyze the DNA present in sputum and reduce viscosity in the lungs); tobramycin solution and chronic oral azithromycin (for the treatment of bacterial infection); and hypertonic saline therapy (used for the hydration of mucus) [12]. Each of these therapies has a proven efficacy profile in randomized placebo-controlled trials [12]. Unfortunately, not all

Table 2
Examples of cystic fibrosis associations in Latin America.

| Country | Association |
|---|---|
| **Argentina** | Liga Argentina de FQ (association for parents)<br>Asociación Civil de profesionales de la fibrosis quística (newly created) |
| **Brazil** | Associação Brasileira de Assistência à Mucoviscidose (ABRAM)—a non-medical patients' association (www.abram.org.br)<br>Brazilian Cystic Fibrosis Study Group—GBEFC (www.gbefc.org.br) |
| **Chile** | Corporación para la Fibrosis Quística del Pancreas (http://www.fibrosisquisticadelpancreas.cl/) |
| **Colombia** | Fundación Colombiana para Fibrosis Quistica |
| **Costa Rica** | Asociación Costarricense Fibrosis Quistica (http://www.acofiqui.org/) |
| **Cuba** | Comision Cubana de F.Q. |
| **Mexico** | Asociación Mexicana de Fibrosis Quística (http://fq.org.mx/sitio/)<br>Asociación México–Italiana contra la Fibrosis Quística |
| **Uruguay** | Asociación de Fibrosis Quistica del Uruguay (http://www.fqdeluruguay.org/) |
| **Worldwide** | Cystic Fibrosis Worldwide (http://www.cfww.org/) |

patients in Latin America have access to these treatments due to high cost and low rates of reimbursement. Furthermore, lung transplantation treatment for the most advanced CF cases is limited in Latin America by the low number of specialized lung transplantation sites.

Optimal treatment is likely to involve a multidisciplinary team; however, although progress has been made, there is often inadequate provision of facilities and a lack of specialists and multidisciplinary representation in the treatment of CF in Latin America. As such, there is a pressing need for greater multidisciplinary awareness and training for healthcare professionals specializing in both pediatric and adult disciplines.

### *2.5. Adults with CF*

Advances in the quality and implementation of medical care for patients have led to more patients with CF in Latin America surviving to adulthood. Generally, increases in the average survival of patients with CF over recent years have been largely attributed to early diagnosis and specialized treatment in the early stages of the disease [7]. This has resulted in the need for multidisciplinary, adult-focused healthcare teams who specialize in the treatment of CF [11,13]. Such facilities are severely limited or do not exist in many regions of Latin America; better provisions are required.

## 3. Summary and future focus

Little over two decades ago, CF was a disease that was under-recognized, under-diagnosed and under-treated in Latin America. Since that time, considerable efforts have been made to educate healthcare professionals and patients about this life-limiting disorder, which has led to improved outcomes for patients.

Although progress has undoubtedly been made, this review has outlined several areas where considerable work is still needed, including the development and maintenance of CF patient registries; universal access to neonatal screening and up-to-date diagnostic tools; more uniform input from multidisciplinary and specialized teams; improvements in the provisions for adults with CF; and better access to treatment. Such advancements are likely to further improve awareness and outcomes. In the meantime, management and treatment strategies for CF should be adapted to improve survival and quality of life for patients living in low resources countries like Latin America. These improvements should include simple actions such as sweat chloride testing availability, and optimization of treatments, infection control, and lower cost drug delivery systems, emphasizing the importance on adherence and compliance [14].

## Conflicts of interest

Luiz Vicente Ribeiro F. da Silva Filho has received grants from AbbVie, Roche and Novartis to act as speaker in medical events and also to participate in technical board meetings.

Claudio Castaños has received financial support and travel reimbursement from Novartis for participation at medical events. He was also member of the Novartis Argentina Cystic Fibrosis Advisory Board and has received honoraria as a speaker and investigator in Novartis-sponsored trials.

Héctor Hernán Ruiz Gutiérrez has received grants from AbbVie, Novartis and Roche for speaking in medical events and also for participation in technical board meetings.

## Acknowledgments

The study was funded by Novartis Pharma AG (Basel, Switzerland). Sebastian Fucile (Novartis Pharmaceuticals Corporation; East Hanover, NJ, USA) provided critical review of the manuscript. Lietta Nicolaides (CircleScience, an Ashfield Company, part of UDG Healthcare plc) and Rebecca Douglas (contracted to CircleScience, an Ashfield Company, part of UDG Healthcare plc), provided medical writing assistance, funded by Novartis Pharma AG.

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