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Prescription patterns and costs of antidiabetic medications in a large group of patients

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ABSTRACT

Aims: To determine the prescription patterns of antidiabetic medications and the variables associated with their use in a Colombian population.

Methods: A cross-sectional study using a systematized database of approximately 3.5 million affiliates of the Colombian Health System. Patients of both genders and all ages treated uninterruptedly with antidiabetic medications for three months (June–August 2015) were included. A database was designed that included sociodemographic, pharmacological, comedication, and cost variables.

Results: A total of 47,532 patients were identified; the mean age was 65.5 years, and 56.3% were women. Among the patients, 56.2% (n = 26,691) received medication as monotherapy. The most prescribed medications were metformin, 81.3% (n = 38,664), insulins, 33.3% (n = 15,848), and sulfonylureas, 21.8% (n = 10,370). Among the patients, 92.8% received comedications, including antihypertensives (79.7%), hypolipemiants (65.5%), antiplatelet drugs (56.3%), analgesics (33.9%), antiulcerants (33.1%), and thyroid hormone (17.3%). The cost per 1000 inhabitants/day was $1.21 USD for metformin, $3.89 USD for insulins, and $0.02 USD for glibenclamide.

Conclusions: Generally, rational prescription habits predominated, however in some cases an overuse of comedications (such as antiulcer drugs) and a large group of patients with high cost formulations were observed. Subsequent effectiveness and cost-benefit analyzes are required.

1.   Introduction

Diabetes mellitus (DM) is a public health problem that affects approximately 8% of the global population. In 2013, there were an estimated 381 million people with DM worldwide. The majority resided in middle and low income countries. However, by the year 2035, this figure may reach 592 million patients, corresponding to an increase of 55% [1,2]. According

to data from the World Health Organization, type 2 diabetes mellitus corresponds to 90–95% of the cases of the disease. In Latin America, the prevalence varies considerably between countries, from 4.3% in Peru to 15.4% in Puerto Rico. In Argentina, Chile, and Mexico, the percentages are 6.0%, 10.3%, and 11.7%, respectively [3].

After Brazil and Mexico, Colombia has the third largest population in Latin America, with approximately 48 million inhabitants. The prevalence of type 2 diabetes mellitus in the country is between 1.2% and 11.2%, whereas type 1 diabetes mellitus is present in 0.07% of the population [1,4–6].

Currently, the pharmacotherapeutic options have significantly expanded due to the large number of medications. Human insulin is the medication of choice for type 1 diabetes mellitus and advanced stages of type 2 diabetes mellitus, whereas in other patients, metformin is the most highly valued medication because of its ability to control glycemic levels and to offer additional effects with significant clinical improvement [7,8]. Other drugs used for the management of DM are the sulfonylureas, thiazolidinediones, glucagon-like peptide-1 (GLP-1) analogs, dipeptidyl peptidase-4 (DPP-4) inhibitors, sodium-glucose co-transporter 2 (SGLT-2) inhibitors, meglitinides, and alpha-glucosidase inhibitors [9,10].

The Health System of Colombia provides universal coverage through two regimes: the first is paid by the user, and the second is subsidized by the state. However, both have a benefits plan known as the Mandatory Health Plan (Plan Obligatorio de Salud, POS, in Spanish), which covers most drugs for the treatment of DM, including all insulins and some formulations of metformin and sulfonylureas, but does not yet include the other molecules or combination drugs. To access the latter, the treating health professional can request the medication through a mechanism called the Scientific Technical Committee (Comité Técnico Científico, in Spanish) or through a legal guardianship tool ("tutela").

In Colombia, all patients with diabetes are treated routinely by general practitioners, but are seen by internal medicine and endocrinology depending on the clinical scenario (such as major diabetes complications or those patients in whom the goal is difficult to achieve). There is not legal restriction for physicians to prescribe any of the antidiabetic medications, but higher cost insulins or dosage forms are commonly started by the specialist. General practitioners usually continue prescribing the medications started by specialists.

The objective of this study was to determine the antidiabetic medication prescription patterns in a population of people affiliated with the Colombian Health System.

2. Materials and methods

2.1. Study design and participants

A descriptive cross-sectional study of antidiabetic medication prescription behavior was conducted in a population of approximately 3.5 million people affiliated with the contributory regime of the Colombian Health System in five Health Promotion Entities (Insurance companies), which corresponds to approximately 17.5% of the population actively affiliated

with this regime in the country and 7.3% of the Colombian population.

Data from patients with dispensation of antidiabetic medications between June 1 and August 31, 2015, of all ages and either gender whose treatment was maintained continuously for at least 3 months were included. This requirement was set to ensure the inclusion of patients with stable and continuous treatment adherence because these are chronic use medications.

From the information on the consumption of medications systematically obtained by the dispensing company (Audifarma S.A.), a database was designed and collected the following groups of variables:

1. Sociodemographic variables: age, gender, and city.
2. Antidiabetic medications available: biguanides (metformin), sulfonylureas (glibenclamide, gliclazide, and glimepiride), thiazolidinediones (pioglitazone), GLP-1 analogs (exenatide and liraglutide), DDP-4 inhibitors (sitagliptin, vildagliptin, saxagliptin, and linagliptin), insulins (ultrashort action: lispro, aspartat, and glulisine; short: regular; intermediate: NPH; long: glargine, detemir, and degludec), meglitinides (nateglinide and repaglinide), alpha-glucosidase inhibitors (acarbose), and SGLT-2 inhibitors (dapagliflozin and empagliflozin). Information on the dose used was analyzed; the unit considered was the defined daily dose (DDD) and its estimation per 1000 inhabitants/day (DID).

To establish comorbidity, comedication was accepted as a surrogate indicator of chronic disease as follows: (a) analgesics/pain management; (b) psychoneural drugs (anxiolytics and hypnotics, antidepressants, antipsychotics, and antiepileptics)/neurological and psychiatric disorders; (c) antiplatelet drugs/cardiovascular prevention; (d) antiarrhythmics/cardiac arrhythmia; (e) anticoagulants/atrial fibrillation and venous thrombosis; (f) anti-hypertensives and diuretics/arterial hypertension; (g) antiulcerants/acid-peptic disease; (h) bisphosphonates/osteoporosis; (i) inhaled bronchodilators/chronic obstructive pulmonary disease or asthma; (j) estrogens and progestogens/contraception or hormone replacement therapy; (k) gabapentin and pregabalin/neuropathic pain; (l) hypolipemiants/dyslipidemia; (m) thyroid hormone and antithyroids/thyroid disorders; (n) inotropes/cardiac failure; and (o) nitrovasodilators/ischemic heart disease.

For the evaluation of the economic impact of the use of antidiabetic drugs in the Colombian Health System, the reference prices of the formulations most commonly used by the different insurance companies were used. Then, the cost per 1000 inhabitants/day (CID) was evaluated (cost/[365 × number of inhabitants] × 1000). Additionally, the monthly and annual costs were estimated (reference value according to the Bank of the Republic of Colombia, $1 USD = 3101 COP [August 31, 2015]).

The protocol received the approval of the Bioethics Committee of the Universidad Tecnológica de Pereira in the category of "research without risk". The protocol safeguarded