

Therapeutic Profile of Patients with Diabetes Treated at the First Level of Health Care

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ABSTRACT

Introduction: Diabetes mellitus type 2 (DM2) is a chronic metabolic disease frequently associated with late complications derived from progressive damage several tissues. When patients with DM2 do not respond adequately to non-pharmacological measures, anti-diabetic agents should be indicated to avoid the long-term risk of macro and microvascular complications. **Objective:** The aim of this study is to evaluate the therapeutic profile for DM2 in the first level of care in the health system in two different countries (Argentina and Paraguay). **Methods:** This study was an observational descriptive cross-section study. Variables considered were age, sex, date of disease debut, clinical signs of diabetes complications, blood pressure, abdominal circumference, anti-diabetic and anti-hypertensive drugs, and laboratory data. **Results:** Regarding medication, 30.6% of the patients were treated with biguanides (metformin) and 23.5% with oral hypoglycemic agents; 21.7% with a combination of both anti-diabetic groups; and 3.5% with other therapeutically options (glitazones, meglitinides, SGLT2 inhibitors, and GLP-1 agonist). All the cases of new drug indications were register in Argentina while in Paraguay; all drugs prescribed were considered essential medicines. **Conclusion:** Diabetes is a frequent disease that causes severe disabilities and death in the affected population. Although it exists several drugs for DM2 treatment, only a few of them follow the rational use of medicines guidelines, while other drugs might be unsafe and certainly more expensive than essential options. Since first level health-care therapeutic strategy plays a major role in avoiding complications from diabetes, countries with low or middle income such as Paraguay or Argentina should do efforts to provide to all patients a rational treatment. This work shows that not in all scenarios, this pattern is true.

Key words: Diabetes, first level, health care, treatment

INTRODUCTION

Diabetes mellitus type 2 (DM2) is a chronic metabolic disease frequently associated with late complications derived from progressive damage to the kidney, retina, blood vessels, heart, and nervous system.^[1] DM2 has a significant growth in its prevalence in recent years due to the process of industrialization and urbanization of the population, reaching today values of a global epidemic health problem.^[2,3] According to the World Health Organization (WHO), there are more than 347 million people with diabetes in the world.^[4]

DM2 is currently one of the leading causes of death,^[4] increasing that risk of decease at least twice when compared with the population without diabetes.^[4]

The research carried out by the National Diabetes Program of the Ministry of Public Health and Social Welfare in Paraguay,^[5] established that 9.7% of the population 700,000 people suffer from diabetes while 1,125,000 are in the pre-diabetic stage. In Argentina, prevalence is more than 10% for the adult population (4 million inhabitants).^[6]

Diabetes is a silent disease that can emerge at any age for two reasons: (1) Due to a lack of insulin secretion, which causes

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Type 1 diabetes or (2) due to inadequate secretion of it, which leads to the appearance of Type 2 diabetes (DM2). This disease is not curable, but it can be controlled with adequate treatment. To accomplish this objective, it is necessary to maintain optimal blood glucose levels.^[7]

Diabetes treatment is based on three principles: Education, lifestyle changes, and, if necessary, and pharmacological options. When the patient with DM2 does not respond adequately to diet or fails to comply with non-drug measures, antidiabetic agents should be indicated to promote glycemic control and lead to decreased levels of glycated hemoglobin (HbA1c).^[8] The level of DM2 control, assessed by HbA1c, influences the long-term risk of macro and microvascular complications.^[9]

Given the frequent association of diabetes with hypertension/dyslipidemia/excess weight, the control of these risk factors is an integral and main part of the control of diabetes itself.^[9]

The pharmacist, through its pharmaceutical interventions, has demonstrated over the past years, a role in improving health outcomes for patients, especially those with chronic diseases.^[10]

According to the WHO, pharmaceutical care is “a concept of health professional practice in which the patient is the main beneficiary of the pharmacist’s actions. Pharmaceutical care is the compendium of attitudes, behaviors, commitments, concerns, values ethics, roles, knowledge, responsibilities, and skills of pharmacists in the provision of pharmacotherapy with the aim of obtaining defined therapeutic results in the health and quality of life of the patient.”^[11]

Therapeutic efficacy can be increased through pharmaceutical care actions that may warrant the proper dosage, absorption, drug compliance, and treatment adherence.^[12]

The objective of this study was to evaluate the therapeutic profile of diabetic patients cared by the first level of the health system in two different scenarios and countries (Argentina and Paraguay).

METHODS

Study type

This study was an observational descriptive cross-section study.

Study universe

Diabetic patients from the Cordillera District, Republic of Paraguay and La Plata Capital City of Buenos Aires, Argentina.

Analysis unit

Diabetic patients treated at the Family Health Unit (USF) of Cabañas, City of Caacupé, Cordillera, Paraguay, and the

Primary Health Care Center (CAPS) of La Plata, Buenos Aires, Argentina.

Sampling

By convenience, non-probabilistic.

Study period

January 1, 2017, to December 31, 2019.

Information source

Review of medical records.

Study variables

This study was Age, sex, date of onset of the disease, clinical signs of diabetes complications, diastolic and systolic blood pressure, abdominal circumference, and pharmacological treatment for anti-diabetic and anti-hypertensive drugs.

Data collection instrument

Spreadsheet specially designed for the study, in where sociodemographic data, years of evolution of the disease, antidiabetic drugs used, and the comorbidities were recorded.

Data analysis

The data obtained were grouped, processed, and analyzed through descriptive statistics using Microsoft Office Excel® software.

Ethical aspects

The proposal and protocol of this work were evaluated and approved by the Ethics Committee of the Faculty of Chemical Sciences of the National University of Asunción (code CEI-383/17).

RESULTS

Five hundred seventy-six patients were enrolled in the study. Their age was 59.6 ± 10.2 years old, and the distribution of patients by sex was women (398/576) 69.09% and men (178/576) 38%. The time of disease evolution of patients at the moment where they were enrolled was 4.8 ± 3.5 years.

The main risk factors found were hypertension in 63.7% of cases, obesity in 21.9%, and an increase in abdominal circumference 69.1% of men and 63.4% of women [Table 1].

Laboratory data indicated a high presence of dyslipidemia 63.5% (57.4% in Argentina and 66.4% in Paraguay), total cholesterol >200 mg/dL in 31.6% (32.3% and 30.7%, respectively), triglycerides >150 mg/dL in 48.8% (47.9% and 49.7%), and HDL sub-optimal cholesterol in 40.5% of the cases (40.1% and 40.8%, respectively in each country).

Regarding treatment received, 30.6% of the patients were treated with biguanides (metformin), 23.5% with oral hypoglycemic

Table 1: Risk measurement parameters in patients enrolled in the study

Risk	(n=576) (average±SD)	Caacupé	La Plata
Systolic blood pressure (mmHg)	143.44±9.1	136.67±9.93	149.52±9.7
Diastolic blood pressure (mmHg)	87.89±7.2	87.24±6.24	88.49±5.4
Optimal blood pressure	1.8	1.3	2.1
Normal blood pressure	13.9	13.2	14.7
High normal blood pressure	20.6	23.7	18.5
Grade I hypertension	63.7	61.8	64.7
BMI (kg/m ²)	28.6±7.3	27.6±4.3	28,6±6.4
(18.5–24.9) optimal	26.7	24.3	29.2
(25–29.9) overweight	50.3	50.0	50.6
(>30) obesity	21.9	23.7	20.2
Abdominal circumference			
Without risk (cm)			
Male (<94)	M:62.8	M:65.5	M:60.1
Female (<80)	F:26.3	F:23.4	F:29.2
Moderate risk (cm)			
Male (>94 <102)	M:28.2	M:24.2	M:32.2
Female (>80 <88)	F:20.2	F:19.2	F:21.3
High risk (cm)			
Male (≥ 102)	M:9.5	M:10.4	M:8.7
Female (≥ 88)	F:53.35	F:57.4	F:49.5

agents; 21.7% with a combination of both anti-diabetic groups; and 3.5% of other therapeutically options (glitazones, meglitinides, SGLT2 inhibitors, and GLP-1 agonist) [Tables 2-5].

DISCUSSION

Once changes in lifestyle, diet, and exercise have not been able to obtain the therapeutic goals, pharmacological treatment is a valid option to achieve metabolic control not only guaranteeing HbA1c levels <6.5% but also avoiding cardiovascular complications such as myocardial infarction, stroke, blindness, or kidney failure.

The treatment of Type 2 diabetes is divided into three therapeutic steps. In the first step, metformin should be considered since it was shown to reduce complications and mortality associated with this disease.^[13] Only in some cases, oral hypoglycemic agents such as sulfonylureas can be indicated as initial monotherapy, but the association with other drugs is still controversial in this step.^[14] The second step is the addition of a second synergistic drug in combination with metformin. Finally, the third step involves the introduction of insulin as a preferred option over oral options.

Other therapeutical alternatives are glitazones, meglitinides, SGLT2 inhibitors, and GLP-1 agonist that may collaborate

in controlling surrogate variables such as blood glucose or HbA1c levels, were not able yet to demonstrate a significant reduction of complications or mortality from diabetes, hence are not a valid option for the first level of health care in term of their benefit/risk ratio.

The study shows that in the first level of health care in La Plata (Argentina), 7% of the patients with diabetes were prescribed with non-classical treatment such as glitazones, meglitinides GLP-1 agonist, or SGLT2 inhibitors, while in Paraguay nobody received that type of drugs.

On the other hand, regarding insulin therapy, no clear benefits on the efficacy of short-acting or long-acting insulin analogs over regular human insulin in people with Type 2 diabetes have been demonstrated^[15] and those new options insulin alternatives are much more expensive. For this reason, in the first level health system, regular insulin should be the choice, concept that is respected in Paraguay but not in Argentina.

About Glitazones, DPP-4 inhibitors, or GLP-1 analogs, these options did not demonstrate the influence the risk of DM2 evolution or tissue injury reduction due to DM2 complications when compared with placebo.^[16,17]

The rational use of medicine (RUM) rules indicates that medicines should demonstrate efficacy to change the natural

Table 2: Therapeutic options

Background	n=576 Average (%)	Caacupé %	La Plata %
Diabetes mellitus type 2 (only)	76	75.9	71.5
Hypertension+DM2	68	24.1	28.5
Therapy	n=576 (%)	Caacupé	La Plata
Monotherapy	26.7	27.1	26.2
Complex (2–4 drugs)	66.2	68.3	64.1
Polymedication (5 or more drugs)	7.1	4.6	9.7

Table 3: Antihypertensive drugs

Antihypertensive drug type	n: 568 (%)	Caacupé	La Plata
Betablockers	2.8	4.3	2.4
IECA	64.7	64.7	58.7
CA	5.9	5.9	5.9
Diuretics	0	2.3	1.3
Ara II	3.5	4.3	17.9
Combinations	20.7	18.5	23.8

history of a disease, safety, and access to the lowest price for the patient and the health system. That features are all guarantee by metformin, sulfonylurea, or insulin (regular and NPH), so these medicines must be part of the list of essential medicines for diabetes treatment at the first level of health-care system.

CONCLUSION

This work demonstrates a still great variability in the RUM profile, associate with diabetes treatment in the first level of health-care system of middle-low income countries such as Argentina or Paraguay. Efforts should be done to guarantee access to a therapeutic option that demonstrated the best cost/effectiveness ratio, to provide drugs with proven efficacy, safety, and reasonable cost to this population.

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Table 4: Anti-diabetic drugs

Type of oral anti-diabetics	n: 576 (%)	Caacupé	La Plata
Metformin	30.6	11.8	49.4
Glimepiride	17.4	23.7	11.2
Glipizide	5.2	0	10.4
Chlorpropamide	0.9	0	1.9
Combinations	21.7	23.7	19.7
Other options (glitazones, aGLP1, iSGLT2)	3.5	0	7.0
Diet (exclusively)	29.4	38.8	20.1

Table 5: Insulin type

Insulin type	n: 76 (%)	Caacupé	La Plata
NPH	7.2	6.6	7.8
Lispro	4.7	3.9	5.6
Crystalline	5.0	7.9	4.4
Without Insulin	82.1	81.6	82.6

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