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COVID-19 Pandemic Impact on the Efficacy and Direct Medical Cost of Metformin plus Glibenclamide in Ecuadorian Outpatients with Type II Diabetes Mellitus

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INTRODUCTION

Type II Diabetes Mellitus (T2DM) is one of the most prevalent endocrinological diseases with a high economic impact worldwide. The International Diabetes Federation (IDF) reported 537 million people with T2DM and an approximate cost of 966 billion USD worldwide in 2021 (1). Meanwhile, an Ecuadorian national survey reported a T2DM prevalence of 2.7% in the population between 10 and 59 years old and according to the IDF, Ecuador has a mean spending of 1,957.1 USD per person (1, 2).

COVID-19 pandemic was reported by the World Health Organization (WHO) in March 2020 with lockdowns representing an important change in the assessment of T2DM patients (3). People living with T2DM were associated with a higher risk of adverse outcomes following initial infection (4).

OBJECTIVE

The study aim was to analyze the economic impact of direct medical costs (DMC) and efficacy of T2DM outpatient population management using metformin plus glibenclamide (M+G) during COVID-19 pandemic in Ecuador.

METHODS

This study was a retrospective and economic impact analysis of the efficacy and direct costs of T2DM in ambulatory patients treated with M+G during the COVID-19 pandemic in an Ecuadorian second level hospital. Data collected included demographic characteristics, drug regimen, laboratory tests, diabetes complications, comorbidities, and hospitalization stay. Estimates of cost were based on National Public Procurement Service and the Rate of Benefits for the National Health System. The mean difference in glycated hemoglobin (HbA1c), fasting glucose, and weight after 6 and 12 months of treatment was also analyzed.

RESULTS

Thirty-nine patients were enrolled in the study, 53.8% females and 46.2% males. The outpatient treatment of T2DM had a total cost (TC) of 1,817.72 USD (46.61 USD per patient [PP]), of which 1,335.90 USD was spent in metformin 500 mg, 102.20 USD in metformin 850 mg, and 379.62 USD in glibenclamide 5 mg. Medical consultation costs were 8,004.00 USD (205,23 USD PP), including 6,765.25 USD for diabetic monitoring. Emergency care and hospitalizations represented a TC of 3,448.56 USD (88.42 USD PP) and 77,812.73 USD (1,995.20 USD PP), respectively. Additional inpatient T2DM treatment had a TC of 85.18 USD (2.18 USD PP). However, 1,781.86 USD (45.69 USD PP) were spent in other drugs during hospitalization (antibiotics, analgesics/anti-inflammatories, and anticoagulants). The TC of laboratory tests was 10,940.63 USD (280.53 USD PP), including 5,071.09 USD for T2DM monitorization tests. Additionally, imaging tests had a TC of 354.91 USD (9.10 USD PP), special tests 2,516.12 USD (64.52 USD PP) and procedures 3,873.1 USD (99.31 USD PP) (Table 1).

Table 1. Total annual direct cost per patient of T2DM (N=39)

Variable	Total cost (USD)	Cost per patient (USD)
Outpatient treatment of T2DM	1,817.72	46.61
Medical consultations	8,004.00	205,23
Emergency care	3,448.56	88.42
Hospitalization	77,812.73	1,995.20
Additional T2DM treatment during hospitalization	85.18	2.18
Other drugs used during hospitalizations	1,781.86	45.69
Laboratory	10,940.63	280.53
Imaging tests	354.91	9.10
Special tests	2,516.12	64.52
Procedures	3,873.10	99.31
Total Cost	110,634.81	2836.79

Abbreviations: T2DM-Type 2 Diabetes Mellitus, USD – United States Dollar

In the analysis of efficacy, no significant changes in the patient's weight were observed at 6 and 12 months. Fasting glucose levels significantly decreased at 6 and 12 months, with a difference of -84.8 mg/dl (95%CI (-121.5 to -48.1mg/dl; P<0.0001) and -58.8 mg/dl (95%CI -97.9 to -19.7 mg/dl; P=0.004), respectively. In addition, a significant diminution in the HbA1c levels was observed at 6 (difference of -1.34%; 95%CI -2.2 to -0.49%; P=0.002) and 12 months (difference of -1.05%; 95%CI -1.93 to -0.16%; P=0.02) (Table 2).

Table 2. Effect of Metformin plus Glibenclamide treatment in glycemic control and weight (N=39)

Variable	Baseline (±SD)			Difference (95%CI)	P-value
Weight (kg)	72.4 ± 11.7	*6 months*	71.9 ± 10.3	0.57 (-1.29 to 2.45)	P=0.53
		12 months	71.4 ± 12.2	1.08 (-2.03 to 4.19)	P=0.48
Fasting glucose (mg/dl)	282 ± 98.7	*6 months*	197 ± 63.0	-84.8 (-121.5 to -48.1)	P<0.0001
		12 months	233 ± 84.8	-58.81 (-97.9 to -19.7)	P=0.004
HbA1c (%)	11.0 ± 2.59	*6 months*	9.63 ± 2.33	-1.34 (-2.2 to -0.49)	P=0.002
		12 months	9.96 ± 2.55	-1.05 (-1.93 to -0.16)	P=0.02

Abbreviations: HbA1c - glycated hemoglobin; SD - standard deviation; CI – confidence interval

CONCLUSIONS

DMC of T2DM treatment were high, especially those related to complications and long hospitalization stay. Also, M+G significantly reduced fasting glucose and HbA1c levels, but not according to international recommendations. This study highlights the importance of a greater focus on follow-up and adequate treatment of patients.

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