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Out-of-pocket Expenditure of Patients with Type 2 Diabetes in a Disease Management Program in Medellín, Colombia, 2019: A Descriptive Study

Gasto de bolsillo de pacientes con diabetes tipo 2 en un programa de manejo de la enfermedad en Medellín, Colombia, 2019: Un estudio descriptivo

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ABSTRACT

Objective: To measure out-of-pocket expenditures of patients with type 2 diabetes who attended an outpatient disease management program.

Methodology: A descriptive study was conducted among outpatients with type 2 diabetes who attended a disease management program between June 18 and July 18, 2019. We used a self-administered questionnaire on out-of-pocket expenses in the last three months, including calculating expenses dedicated to food for diabetics, laboratory tests, supplies, radiology, medical appointments, and transportation. Out-of-pocket expenses are measured as the sum of the money spent in each category. Data were analyzed using absolute and relative frequencies, means, and standard deviations. The values are shown in US dollars for 2019.

Results: The average expenditure was \$60.76 (SD: 154.1, minimum: \$2.93; maximum: \$1,500.26). Medication accounted for 38.29% of total expenses (mean: \$23.11, SD: \$47.95), followed by transportation at 21.27% (mean = 12.83, SD = 21.75).

Conclusion: Despite the broad coverage of Colombian healthcare for chronic diseases, this expenditure could indicate problems with adequate access to the healthcare system, causing personal spending to improve the patient's health conditions.

Keywords: Diabetes mellitus type 2, delivery of health care, health expenditure, out-of-pocket payments, Colombia.

RESUMEN

Objetivo: Medir los gastos de bolsillo de pacientes con diabetes tipo 2 que asistieron a un programa ambulatorio de gestión de la enfermedad.

Metodología: Se realizó un estudio descriptivo entre pacientes ambulatorios con diabetes tipo 2 que participaron en un programa de manejo de enfermedad entre el 18 de junio y el 18 de julio de 2019. Se utilizó un cuestionario autoadministrado para recopilar información sobre los gastos de bolsillo en los últimos tres meses, incluyendo los gastos dedicados a alimentos para diabéticos, pruebas de laboratorio, insumos, radiología, consultas médicas y transporte. Los gastos de bolsillo se midieron como la suma del dinero gastado en cada categoría. Los datos se analizaron mediante frecuencias absolutas y relativas, medias y desviaciones estándar. Los valores se presentan en dólares estadounidenses de 2019.

Resultados: El gasto promedio fue de \$60.76 (DE= 154.1). Los medicamentos representaron el 38.29 % del gasto total (media = \$23.11; DE = \$47.95), seguidos por el transporte, con un 21.27 % (media =\$12.83; DE: \$21.75).

Conclusión: A pesar de la amplia cobertura del sistema de salud colombiano para enfermedades crónicas, este gasto podría indicar problemas en el acceso adecuado al sistema de salud, lo que genera gastos de bolsillo para mejorar las condiciones de salud del paciente.

Palabras clave: Diabetes mellitus tipo 2, prestación de atención en salud, gasto en salud, pagos de bolsillo, Colombia.

INTRODUCTION

In 2021, 537 million people aged 20–79 worldwide were living with diabetes mellitus (DM), according to the International Diabetes Federation (IDF) (1); this figure is projected to rise to 9.9% by 2045, affecting over 693 million individuals worldwide (2). In Colombia, the prevalence of type 2 diabetes in Bogotá is estimated at 11.0% (3) overweight/obesity, and metabolic syndrome in individuals aged >18 years in Bogotá, Colombia and the variables associated with diabetes prevalence.

Research Design and Methods: This was a cross-sectional population survey with a representative, probabilistic sample of Bogotá, Colombia collected between 2022 and 2023. The final sample size included 2,860 households, distributed among 19 localities of Bogotá. Clinical laboratory samples were taken from randomly selected individuals ($n = 1,070$). According to data from the High-Cost Account (Cuenta de Alto Costo, CAC) for 2023, the incidence of diabetes reached 2.48 cases per 1,000 inhabitants, while the prevalence stood at 3.82 cases per 100 inhabitants, a 22.44% increase compared to the previous period (4).

In low and middle-income countries, such as Colombia, diabetes mellitus (DM) poses a growing challenge due to rising incidence and prevalence, as well as disease-related complications (PMCID: PMC11388581, DOI: 10.2337/dc21-2151). Not only does it affect patients' health, but it also represents a significant economic burden for healthcare systems, given that the direct costs of medical care primarily arise from complications (5), while indirect costs include out-of-pocket expenditures and lost productivity (6). In this context, González et al. (7) from 2007 estimated a total societal cost of diabetes in Colombia of US\$2.7 billion, and US\$921 million from the perspective of the Ministry of Health. The annual direct cost per patient was US\$288, whereas the indirect cost was US\$559 for a total of US\$847. Similarly, in 2019, the annual cost per patient was estimated to range between one and two million Colombian pesos (US\$305–US\$610) (8).

The economic impact of diabetes significantly affects both health care systems and patients and their families, who face a substantial financial burden that can jeopardize their economic security (9). Direct payments made by patients to healthcare providers can delay access to medical services, particularly for those unable to meet these costs promptly (10). Out-of-pocket (OOP) expenses —defined as the direct payments individuals make at the point of service use (11)— can lead to inequalities in access to and financing of healthcare, as lower-income households have reduced capacity to cover such costs (12,13).

In this context, the most vulnerable households may incur catastrophic health expenditures (CHE) when high OOP levels exceed a significant share of their ability to pay (14). Factors such as patterns of healthcare utilization (15,16), medication costs (17–19), insurance coverage (20), and healthcare system financing all contribute to elevated OOP among patients with type 2 diabetes. Moreover, the presence of complications, comorbidities (21), and low socioeconomic status worsens this situation, as individuals with lower income and educational levels typically face greater financial challenges in managing diabetes (22).

In Colombia, household out-of-pocket spending accounts for 20.6% of total health expenditure, which is below the Latin American average of 39.5% (23). Nevertheless, 23% of patients with diabetes incur significant out-of-pocket costs, particularly those with type 2 diabetes, who often require more prescribed medications and develop multiple comorbidities (24,25). Therefore, this study aimed to describe the out-of-pocket expenditures of individuals with type 2 diabetes in the context of outpatient care within a disease management program.

METHODS

This descriptive study was conducted on outpatients attending a diabetes management program between June 18 and July 18, 2019, at the Integral Diabetes Clinic (CLID) in Medellín, Colombia. The CLID program operates as an ambulatory care service with a multidisciplinary team that includes endocrinologists, general practitioners, nutritionists, pharmaceutical chemists, professional nurses, and psychologists. The program provided comprehensive care to patients with diabetes referred by primary care providers. Upon referral, an endocrinologist or internal medicine doctor conducted an initial assessment, following the clinical practice guidelines of Colombia and the American Diabetes Association (ADA). This assessment included physical and laboratory

examinations and referrals to specialists when necessary. Key activities of the program involved monitoring hemoglobin A1C (A1C), lipids, urine microalbumin, thyroid-stimulating hormone (TSH), and performing retinal examinations annually or as required.

Patients with type 2 diabetes were identified from the CLID database and invited to participate in the waiting room. After reading, approving, and signing the informed consent form, each patient completed the out-of-pocket expense questionnaire. Only patients with type 2 diabetes who signed an informed consent form were included in the study. The convenience sample consisted of all the patients who volunteered during the study period. Of the 120 invited patients, ten declined to participate and were excluded from the study.

The questionnaire, developed by the researchers, collected information on out-of-pocket expenses, defined as payments made directly by the patient when insurance did not cover the full cost. Participants were asked to report expenses incurred over the last three months in categories such as medications, supplies, medical appointments, diagnostic aids, transportation, and food recommended for diabetes management. All expenses were reported in Colombian pesos (COP). To minimize the risk of underreporting, the participants were encouraged to ask questions about any unclear items on the questionnaire. Additionally, the research team reviewed the completed questionnaires to ensure that all sections were properly filled out and addressed any missing or unclear responses (Supplementary Material).

To ensure data protection and confidentiality, the questionnaires were tabulated in Excel, and the resulting database was anonymized by removing all personally identifiable information (PII) before analysis. The anonymized data were used exclusively for research purposes, while the original database was securely stored in the institutional repository with restricted access in compliance with institutional data protection policies and national regulations.

Out-of-pocket spending for medications, food, medical appointments, radiology, laboratory tests, and transportation was calculated for each patient in Colombian pesos (COP) and converted to US dollars (USD) using the November 2019 exchange rate (USD 1 = COP 3,492.42). Prices for supplies were obtained from wholesale stores, and medical appointment rates were based on the 2019 SOAT rate manual. The mandatory traffic accident insurance (SOAT) rate manual is a standardized tariff system in Colombia that is updated annually based on the consumer price index. It provides

a classification and cost framework for various medical procedures and services commonly used for billing and reimbursement purposes in the healthcare sector.

Data analysis included absolute and relative frequencies, means and standard deviations, 95% confidence intervals, and the minimum and maximum values. As this was a descriptive and exploratory study, no confounding variables were adjusted, and the sample size was insufficient for inferential analysis. Data were analyzed using Microsoft Excel and approved by the Human Research Ethics Committee of CES University (Project Code: 734, 2017).

RESULTS

The analysis of out-of-pocket expenditures included 110 patients, with an average age of 63.9 years (SD: 13.5). Of these, 43% were ≤ 64 years old, 57% were women, 96.3% belonged to contributory health care, 59.8% were married, and 40.2% did not have a partner.

The mean expenditure for the last three months was \$60.76 (SD= 154.1, minimum= \$2.93; maximum= \$1500). Medications accounted for 38.29% of total spending (mean = \$23.11, SD = \$47.95), followed by transportation (mean = 12.83, SD = \$21.75) (Table).

Table. Description of out-of-pocket spending in the last three months, 2019

Description	Mean (SD)	Min	Max	Percentage of expenditure (%)
Food	0.532 (5.59)	0.00	58.63	0.88
Laboratories	2.96 (15.47)	0.00	136.31	4.91
Supplies	6.29 (15.77)	0.00	74.75	9.75
Radiology	6.43 (67.44)	0.00	707.33	10.65
Appointments	7.79 (26.61)	0.00	234.51	14.24
Transportation	12.83 (21.75)	2.93	175.88	21.27
Drugs	23.11 (47.95)	0.00	234.51	38.29
Total	60.76 (154.1)	2.93	1,500.26	100

Source: own elaboration.

DISCUSSION

This study aimed to describe the out-of-pocket expenditures of individuals with type 2 diabetes in the context of outpatient care within a disease management program. We found that the average out-of-pocket expenditure per patient in the three months preceding the study was \$60.76 (154.1), equivalent to \$20.03 per month, which is approximately 7.42% of the minimum wage for Colombia in 2019 (\$269.95). In addition, the National Survey of Household Budgets conducted by the National Administrative Department of Statistics (DANE) in 2017 (26) allowed us to establish changes in household consumption habits. The average monthly individual consumption expenditure in Colombia is \$513 (COP 1,792,000), with a health expenditure of \$15 (COP 53,000). At the household level, the average monthly expenditure was \$578 (COP 2,020,000), and the health expenditure was \$17 (COP 58,000). According to these figures, the out-of-pocket expenditures identified in this study were higher than the national and individual average expenditures, adjusted for inflation in 2019 (the individual national average and household expenditure on health were \$16 and \$18, respectively) (27). Defining whether this expenditure is low or high depends on the judgment of the person analyzing the case. For instance, if a person earns a minimum wage, it will be high; however, for people with higher incomes, it may be considered low. There are around 22 million workers in Colombia, and about half of them earn a minimum wage (28).

Various studies, both in developed countries and in those with middle- and low-income, have estimated that out-of-pocket expenses for individuals with diabetes are high. For instance, a study of Medicare patients, which modeled out-of-pocket spending for several chronic diseases, showed that a patient could spend USD 237 per year on diabetes-related expenses (29). Additionally, higher out-of-pocket expenditures are associated with a lower likelihood of utilizing program services (30,31) little is known about the impact of financial barriers on health care utilization. This study investigated the effect of out-of-pocket expenditures on the utilization of recommended diabetes preventive services.

RESEARCH DESIGN AND METHODS—This was a survey-based observational study (2000–2001). Similarly, in India, nearly 38% of households with diabetic members experienced catastrophic health expenditures (at the 10% threshold), and approximately 10% of diabetes-affected households were pushed below the poverty line because of out-of-pocket expenses, irrespective of the type of care sought. Moreover, 48.5% of households resorted to distressed financing sources to cover the inpatient costs of diabetes. Medicines represent one of the largest

components of total health expenditure, regardless of the type of care sought or the healthcare facility visited (15).

The out-of-pocket expenditure measured in this study is considered non-catastrophic (at a 20% threshold), but may still be impoverishing, which highlights the need for additional studies to further explore and confirm this assertion. However, it is noteworthy that medications represent the largest proportion of expenses, despite the extensive coverage provided by the health system. Conversely, the World Health Organization (WHO) highlights that the proportion of households experiencing catastrophic health expenditure increases significantly in countries where health expenditure accounts for less than 5% of the Gross Domestic Product (GDP) or where out-of-pocket expenditure exceeds 20% of the total health expenditure (11). This highlights the importance of understanding the diverse factors contributing to out-of-pocket spending, as these expenses can stem from varying circumstances.

The findings of this study align with the national data reported in the Boletín de Gasto de Bolsillo en Medicamentos by the Ministry of Health of Colombia(32), which highlights the burden of pharmaceutical expenses on households. According to the report, the average pharmaceutical expenditure was COP 73,211 (SD: 388,295), with the highest spending observed in households where the head was permanently disabled (COP 11,760). Affiliates of the contributory regime accounted for 68.1% of pharmaceutical expenditures, while 68% of subsidized regime affiliates reported out-of-pocket expenses despite these medications being covered by the Health Benefits Plan. These figures underscore the financial vulnerability of low-income populations, the need for stronger financial protection mechanisms, and improved access to essential medications.

Furthermore, out-of-pocket expenses may have different origins: the population may be concerned about improving their health condition and incur higher expenses, which is a favorable situation, or the population may lack access to the health system, which is a negative situation. Additionally, although this study did not investigate the determinants of out-of-pocket spending, other studies indicate that in Colombia, the main variables include the characteristics of the household head, such as educational level, type of occupation, type of healthcare affiliation, housing characteristics, household composition (family size, presence of children, and older adults in the family), and an inverted U-shaped relationship, indicating that the two population

groups face the most significant burden of out-of-pocket spending with opposite conditions, the poorest and the richest (33).

The measurement of out-of-pocket spending is an indicator of the performance of the health system. Accordingly, a sound health system should offer financial protection to beneficiaries, considering that in some cases, high or catastrophic spending can put people at risk of poverty. However, studies on out-of-pocket expenses at the individual and household levels for health expenditures have been heterogeneous, partly because of the lack of conceptual consensus on the variables that should be included in the calculation of out-of-pocket expenses (34). This lack of consensus is particularly evident in the context of diabetes, where there is a wide range of reported out-of-pocket expenses. This variation can be attributed to the different definitions of out-of-pocket spending used across studies. To better inform patients and support health policy decision makers in accurately assessing annual out-of-pocket spending for diabetes, it is essential to establish a consistent definition and methodology for measuring out-of-pocket expenses.

Based on the findings of this study, it is crucial for health care professionals and policymakers to focus on strategies aimed at reducing the financial burden of out-of-pocket expenses for individuals with type 2 diabetes. Despite the existing coverage, it is necessary to evaluate effective access to healthcare services, with particular emphasis on implementing measures to ensure the affordability and accessibility of essential medications, as they represent the largest proportion of out-of-pocket costs. Strengthening financial protection mechanisms within the health system is imperative, particularly for low-income populations, in addition to improving the coverage of diabetes management programs. Additionally, policies should promote equitable access to healthcare services by addressing the social determinants of health, such as educational disparities and working conditions, which are closely linked to out-of-pocket spending. Finally, efforts should be directed toward the development of standardized methodologies for measuring out-of-pocket expenses, enabling better monitoring of financial risk, and the design of targeted interventions to prevent impoverishment due to healthcare costs.

Among the limitations of this study, we found that the sample was not representative of patients with type 2 diabetes, and memory bias or underestimation of out-of-pocket expenses was possible. However, in the absence of standardized instruments for measuring out-of-pocket expenses, we proceeded with the development of an instrument that captured the main out-of-pocket ex-

penses of our patients, without validating it during the process. Additionally, the study did not include the socioeconomic condition of participants as a variable, which limits the understanding of how financial capacity influences out-of-pocket spending. Future research should incorporate the socioeconomic status of participants to improve their comprehension of out-of-pocket expenses and their impact on different population groups.

CONCLUSIONS

The out-of-pocket expenditure for the last three months in patients with type 2 diabetes in a private clinic in the city of Medellín represented 7.42% of the minimum wage in 2019. Despite the broad coverage of Colombian healthcare regarding chronic diseases, this expenditure could indicate problems with adequate access to the healthcare system, causing personal spending to improve the patient's health conditions. Therefore, out-of-pocket spending leads to significant losses in individual incomes and financial protection.

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