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Research Article

Impact of COVID-19 Pandemic Isolation on Glycemic Control and Treatment Adherence in Patients with Type 2 Diabetes Mellitus

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Abstract

Background: The COVID-19 disease was the leading cause of death internationally in 2020 and 2021. To reduce the risk of contagion, contingency measures such as isolation were implemented. However, some of these measures led to an increase in poor glucose level control and adherence to treatment in patients with diabetes.

Aim: To analyze the impact of isolation due to the COVID-19 pandemic on glycemic control and adherence to treatment in patients with type 2 Diabetes Mellitus.

Design: Analytic cross-sectional study.

Methods: An observational, cross-sectional, analytical study was carried out in patients from 30 to 50 years with type 2 diabetes, in the Family Medicine Unit 46 of Ciudad Juarez, Mexico. The following variables were collected: age, sex, therapeutic adherence, glycemic control, and use of refillable prescription. The statistical analysis was performed using the measures of central tendency, dispersion and percentages. The analysis of the variables was performed with chi-Square and V of Cramer test.

Results: A value of 0.034 was obtained from the chi-square test, proving the association between the use of refillable prescriptions and poor glycemic control, and a weak strength of association was obtained by obtaining a value of 0.1363 from Cramer's V test.

Conclusion: It was shown that there is a statistically significant association between the use of refillable medical prescriptions and poor glycemic control during COVID-19 isolation. Although this relationship is significant, it is considered weak according to Cramer's V value.

Keywords: Diabetes Mellitus type 2; Adherence to treatment; COVID-19; Glycemic control

Introduction

Diabetes is a condition that requires a significant transformation in the lives of those who suffer from it, requiring adaptation to new eating and exercise habits, as well as perseverance and self-care, essential to achieve optimal control and prevent future complications. The COVID-19 pandemic highlighted the vulnerability of people with chronic diseases and older adults, showing that comorbidities increase the risk of serious effects and increased mortality, especially among diabetic patients with poor management of their condition [1-2]. The influence of confinement on diabetes control is an underexplored area. However, studies around the world have suggested that social isolation may exacerbate risk factors such as weight gain and consumption of processed foods, decreasing physical activity and worsening glycemic control. In addition, the pandemic has impacted family support, crucial for adherence to treatment of chronic conditions, since distancing measures have limited social and family interaction and have required a restructuring of health services to minimize the risk of contagion [3-4]. In Mexico, the Instituto Mexicano del Seguro Social (IMSS) implemented refillable prescriptions for patients with well-controlled chronic diseases and older adults as a strategy to reduce visits to medical centers and the risk of infection. This situation raises

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questions about the interaction between isolation and diabetes management during the pandemic, and whether these preventive measures could have had an impact on the glycemic control of diabetic patients. This research seeks to explore these relationships and contribute to the understanding of how the pandemic has affected diabetes management [5-6]. The main objective of this study was To analyze the impact of isolation due to the COVID-19 pandemic on glycemic control and adherence to treatment in patients with type 2 Diabetes Mellitus.

Material and Methods

Study Design and Population

An analytical cross-sectional study was conducted in Ciudad Juarez, Mexico, during 2021. The research was carried out at FMU 46, of the Instituto Mexicano del Seguro Social; main health care center in the region. The inclusion criteria were the following: patients aged between 30 and 50 years, with diabetes mellitus, who received a refillable prescription during the COVID-19 pandemic. The exclusion criteria were patients with other comorbidities, and no report of serum glucose. Incomplete surveys were eliminated.

Variables

Information was collected in a data collection form in the SPSS version 25 program in Spanish, of the following variables: age, defined as years since birth; sex, according to phenotypic characteristics; therapeutic adherence according to Morisky-Green test; and glycemic control according to American Diabetes Association criteria [7].

Statistical Analysis

The data were analyzed using descriptive statistics with measures of central tendency and dispersion for quantitative variables; frequencies and percentages for qualitative. In the inferential analysis we used the chi-square test and Cramer's V test. A $p<0.05$ was considered statistically significant.

Ethics

The study was approved by the Local Committee for Ethics and Health Research number 805; with registration number R-2022-805-041. The research was carried out under the General Health Law on Health Research, the Declaration of Helsinki and the Bioethical Principles. Due to the type of study, no informed consent was required from the participants.

Table 1: General characteristics of the participants.

Variables	Value
Age, *years*	43 +- 5
Sex, woman, *N (%)*	125 (51)
Sex man, *N (%)*	117 (48)

n= frequency; %= percentage

Table 2: Glycemic control and refillable prescription preCOVID isolation.

	Controlled	Uncontrolled	Total	%
Refillable prescription	150	4	154	63.63
No refillable prescription	60	28	88	36.36

Table 3: Glycemic control and refillable prescription postCOVID isolation.

	Controlled	Uncontrolled	Total	%
Refillable prescription	54	100	154	63.63
No refillable prescription	156	28	88	36.36

Table 4: Therapeutic adherence.

Adherence	n	%
High	49	31.81
Medium	83	53.89
Low	22	14.28

Results

In a sample of 242 adult patients with type 2 diabetes mellitus between 30-50 years of age, 51.65% (125 patients) were women and 48.34% (117 patients) were men. When analyzing the age ranges of the entire sample population, 80 patients of both sexes are in the age range between 30-40 years, while 162 patients were in the range of 41-50 years. When analyzing the frequency of age, the mean age was 43.48. In the age range of 30-40 years, 65 patients had good glycemic control prior to the pandemic, of which 37 are women and 28 men. On the other hand, 15 patients were not controlled, 14 being women and 1 man in this group. Of those 41-50 years of age, 145 patients were in good control prior to the pandemic, of which 60 were women and 85 men. Only 17 patients were found in the uncontrolled group, being 14 women and 3 men.

Before the pandemic, there were 210 patients (86.77%) with adequate glycemic control, and 32 patients (13.22%) were not controlled. Within this population, only 154 patients (63.63%) had a refillable prescription during the COVID-19 pandemic period. Of the total number of patients with a refillable prescription, it was observed that only 35.06% presented adequate post-pandemic glycemic control, with women having the highest prevalence of adequate control, which corresponds to 50% of the female population and 21.25% of the male population.

When analyzing the association between the use of a refillable prescription and poor glycemic control with the chi-square test, a value of p 0.034 with 1 degree of freedom was obtained, rejecting the null hypothesis and accepting the research hypothesis. Additionally, Cramer's V test was used to measure the strength of the relationship between these variables, giving a value of 0.136, which indicates that there is a weak association between them.

Regarding adherence to treatment after the pandemic, a higher frequency was obtained at the medium level with 51.23% (124 patients), at the high level with 30.99% (75 patients) and at the low level with 17.76% (43 patients). Of this population, those who had a refillable prescription were 31.81% (49 patients) with high adherence, at a medium level 53.89 (83 patients) and with a low level it was 14.28% (22 patients).

Discussion and Conclusion

In a 2019 study, conducted by Sung-Don Park [8], it was observed that isolation was a negative factor for patients diagnosed with diabetes mellitus to present poor glycemic control, especially in those under 50 years of age. This contingency measure during the COVID-19 pandemic was intended to reduce crowding in health centers and thus reduce the risk of contagion. In this study we wanted to verify this same behavior with patients with type 2 diabetes mellitus.

Taking into account what was mentioned by the ADA [7] as control goals, in the data analyzed in this study it was observed that there is a high prevalence of glycemic uncontrol in those patients who had a refillable prescription. The number of patients with a refillable prescription and in poor glycemic control is greater (64.93%) than those with a refillable prescription and in good control (35.06%). This result is expected due to the change in routine due to isolation, as well as the closure of

health centers, as mentioned in an article carried out in India, where this same behavior was observed.

Prior to the start of the pandemic, 86.77% (210 patients) of the population had adequate glycemic control, which according to the ADA, the goal level of glycosylated hemoglobin is less than 7.0%, only 35.06% (54 patients) continued with glycosylated hemoglobin levels in control goals. During the COVID-19 pandemic, the population was urged to reinforce healthy habits and keep their chronic degenerative diseases under adequate control, since it was seen that advanced age, a history of type 2 Diabetes mellitus, high blood pressure and obesity are risk factors for present severe symptoms of the disease [9].

When analyzing the data from this research work, it was observed that at the time of granting refillable prescriptions to patients, who should have adequate control of their comorbidities, most of them had poor control after isolation. As mentioned above, the doctor can positively influence patients to motivate them to maintain a healthy lifestyle and reduce their risk factors, as well as adherence to treatment that is related to personal factors of the patient, type of treatment managed and the quality of the doctor-patient relationship that exists [10].

In a study carried out on patients with diabetes mellitus in 2022, changes in lifestyle and restrictions due to isolation have altered dietary habits, mental health, physical activity and even the patients' treatment plan and adherence, since that health centers were also operating in a different way from everyday life. To measure the above, in terms of adherence to treatment, the Morisky scale-8 (MMAS-8) was used, being one of the simplest methods to know a patient's adherence to treatment. The result was that 51.23% of the total study population presented a medium level of adherence to the treatment, which was reflected in their glycemic control. Of 154 patients with a refillable prescription, 53.89% were in the medium level, 31.81% in the high level and 14.28% in the low level, the majority of the latter being male [11].

In the chi-square test, $p < 0.05$ was obtained, which indicates that there is a relationship between the use of refillable prescriptions and glycemic imbalance, but in Cramer's V test, the value of 0.136 indicates a weak association between the use of refillable prescriptions and lack of glycemic control. These findings could have important implications since they could suggest the need for greater attention and control in patients who use refillable medical prescriptions to avoid problems of poor glycemic control.

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