Factors associated with adherence to drug therapy among patients with diabetes without hypertension

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ABSTRACT

Objective: To identify the factors associated with adherence to drug therapy among patients with type 2 diabetes mellitus without hypertension.

Materials and methods: A cross-sectional, analytical study conducted with patients with type 2 diabetes mellitus without hypertension, divided into an adherent group ($n = 145$) and a non-adherent group ($n = 49$), determined by the 4-item Morisky Medication Adherence Scale (MMAS-4). The associated factors were sex, cohabitation, schooling, occupation, age in 10-year groups and diabetes progression time grouped in less than 1 year, from 1 to 5 years, from 6 to 10 years and more than 10 years. The statistical analysis plan included the chi-square test.

Results: The factors associated with adherence to drug therapy were identified as sex ($p = 0.045$), cohabitation ($p = 0.045$), age ($p = 0.001$) and disease progression time ($p = 0.001$). Schooling was not identified as a factor associated with adherence to drug therapy among patients with type 2 diabetes mellitus ($p = 0.289$). The older the patient with diabetes, the lower the adherence to drug therapy; the cut-off point was 60 years of age, after which the percentage in the non-adherent group was higher than in the adherent group ($p = 0.001$). The longer the diabetes progression time, the lower the probability of adherence; in the non-adherent group the percentage of patients with more than 10 years of disease progression was 67.3 % and in the adherent group the percentage was 33.8 % ($p = 0.001$).

Conclusions: The factors associated with adherence to drug therapy among patients with type 2 diabetes mellitus without hypertension were identified.

Keywords: Medication Adherence; Diabetes Mellitus, Type 2; Essential Hypertension (Source: MeSH NLM).

INTRODUCTION

For patients with diabetes mellitus, preventing complications depends on the drug therapy and lifestyle; in this process, adherence to drug therapy is important [1-7].

Adherence to drug therapy has several definitions, all of which coincide in the degree of patient behavior and consistency with the drug therapy, nutrition therapy or lifestyle treatment prescribed by the healthcare provider [8-11].

Non-adherence to drug therapy is a multidimensional phenomenon in which several factors are involved, including those related to the patient, disease, treatment, socioeconomic factors and factors associated with the healthcare system [8,10-17].

Non-adherence to drug therapy increases the risk of morbidity and mortality, reduces quality of life and increases healthcare costs. Among patients with chronic diseases, adherence accounts for 25 % to 50 % in developed countries, and due to the lack of resources and unequal access to health services, this gap is greater in less developed countries [11,14,18,19].

Non-adherence has been defined as the difficulty in initiating a treatment, temporarily stopping a treatment, missing doses,

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taking the medication at the wrong time, and changing the lifestyle to improve body and mood, medication or prescribed treatment [10,14,17,20-22].

Non-adherence to drug therapy may arise from drug shortage, change of dosage, inadequate prescription, poor doctor–patient relationship and drug schedule change; consequently, poor health status and health deterioration are generated [9,10,23-28].

There are several tools to assess adherence, including the Self-Efficacy for Appropriate Medication Use Scale (SEAMS), the Culig questionnaire, the Adherence to Refills and Medications Scale (ARMS) and the 4-item Morisky Medication Adherence Scale (MMAS-4) [8,18,29-32].

The MMAS-4 has been used in various pathologies and languages; includes four short questions; and is easy to understand, inexpensive and easy to interpret. It provides information on the most frequent causes of non-adherence and a patient is considered non-adherent when at least one of the criteria is not met [8,18,29,32-34].

In this context, the present article aims to identify the factors associated with adherence to drug therapy among patients with type 2 diabetes mellitus without hypertension.

MATERIALS AND METHODS

Study design and population
A cross-sectional, analytical study conducted with patients with type 2 diabetes mellitus without hypertension, treated in a social security institution in the city of Oaxaca, Mexico, from June to October 2022.

Variables and measurements
The study variables included sex, cohabitation, schooling, occupation, age in 10-year groups and diabetes progression time grouped in less than 1 year, from 1 to 5 years, from 6 to 10 years and more than 10 years.

The comparison groups consisted of an adherent group and a non-adherent group. Adherence to drug therapy was determined with the MMAS-4, which includes four items with a yes or no response.

Did you ever forget to take your medications for your disease?

Do you forget to take your medications at the prescribed time?
When you feel well, do you stop taking your medication?
If your medication made you feel sick, do you stop taking it?

A patient was considered adherent is he/she answered a negative response (no) to all four items. In addition, the study included patients over 20 years of age with a diagnosis of type 2 diabetes mellitus assigned to a family medicine unit and excluded patients with retinopathy, chronic kidney disease as well as neurocognitive and behavioral disorders.

The sample size was calculated using a percentage formula for two groups with a 95 % confidence interval, for a rejection zone of the null hypothesis (Z_α = 1.64) and power of the test of 80 % (Z_β = 0.84). Moreover, it was determined that patients older than 60 years accounted for 70 % (p_0 = 0.70) and 25 % (p_1 = 0.25) in the non-adherent and adherent groups, respectively. The calculated sample size was 49 non-adherent patients and 145 adherent patients, i.e., a ratio of 1 to 3.

Consecutive sampling, a non-probability sampling technique, was used based on the list of patients who were treated at the family medicine unit.

Statistical analysis
The statistical analysis plan included percentages and the chi-square test.

Ethical considerations
The project was registered and accepted by the ethics and research committee of the health institution. The patients were selected from the waiting room of the family medicine outpatient department and were invited to participate in the research; once they accepted, they were asked to sign an informed consent form and then were interviewed.

RESULTS

An association between sex and adherence to drug therapy was identified: 59.3 % and 42.9 % were females in the adherent and non-adherent groups, respectively (p = 0.045). Cohabitation was identified as a factor associated with adherence to drug therapy: 77.2 % and 57.1 % of adherent and non-adherent patients lived with a partner, respectively (p = 0.007). The information is shown in Table 1.

Table 1. Association of sex and cohabitation with adherence to drug therapy among patients with type 2 diabetes mellitus

	Non-adherent	Adherent		
Characteristics	Percentages		Chi-square	*p*
Sex				
Male	57.14	40.68	4.00	0.045
Female	42.85	59.31		
Cohabitation				
No	42.85	22.75	7.36	0.007
Yes	57.14	77.24		

Schooling was not identified as a factor associated with adherence to drug therapy among patients with type 2 diabetes mellitus (*p* = 0.289). Employees accounted for 43.4 % and 20.4% in the adherent and non-adherent groups, respectively; 16.8 % and 26.5 % were engaged in household activities in the adherent and non-adherent groups, respectively (*p* = 0.025). Table 2 shows this information.

Table 2. Association of schooling and occupation with adherence to drug therapy among patients with type 2 diabetes mellitus

	Non-adherent	Adherent		
Characteristics	Percentages		Chi-square	*p*
Schooling				
None	6.12	1.37		
Primary	22.44	20.68		
Secondary	24.48	18.62	5.18	0.289
Bachelor's degree	18.36	19.31		
Professional title	28.57	40.00		
Occupation				
Employee	20.40	43.35		
Household activities	26.53	16.78		
Trader	8.16	12.58	11.15	0.025
Construction worker	6.12	4.19		
Other	38.77	23.07		

The older the patient with diabetes, the lower his/her adherence to drug therapy. The cut-off point is age 60; after this age, the percentage in the non-adherent group is higher than in the adherent group (*p* = 0.001). Table 3 shows this information.

Table 3. Association of age with adherence to drug therapy among patients with type 2 diabetes mellitus

	Non-adherent	Adherent		
Age in years	Percentages		Chi-square	*p*
20 to 39	6.12	13.79		
40 to 59	26.53	46.89	16.80	0.001
60 to 74	32.65	27.58		
75 and older	34.69	11.72		

The longer the progression time of diabetes, the lower the probability of adherence. The percentage of patients with more than 10 years of progression is 67.3 % and 33.8 % in the non-adherent and adherent groups, respectively (*p* = 0.001). Table 4 shows this information.

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Table 4. Association of progression time with adherence to drug therapy among patients with type 2 diabetes mellitus

Progression time	Non-adherent	Adherent	Chi-square	p
	Percentages			
1 to 11 months	0.00	4.82		
1 to 5 years	10.20	20.00	17.71	0.001
6 to 10 years	22.44	41.37		
More than 10 years	67.34	33.79		

DISCUSSION

To manage diabetes, metabolic control is essential due to the complications that can occur in the short or long term. It has been pointed out that low glucose levels can delay chronic complications and that the degree of control depends, to a large extent, on adherence to drug therapy and non-drug therapy. This research addresses the factors associated with adherence to drug therapy among patients with diabetes and without hypertension: a population that is assumed to behave differently because they suffer both pathologies, which is the reason for its importance [1,2,8,9].

It is true that there are different methods for measuring adherence, but it is also true that the one used in this study is the most widely accepted method for assessing adherence when researching chronic degenerative diseases. The MMAS-4 is inexpensive, practical and easy to answer; moreover, it has high specificity and a high positive predictive value. Therefore, its use can be considered a strength of the research [8,18,29,32-34].

The female sex has a higher prevalence of adherence to drug therapy, which has been described in other articles. In this regard, it could be assumed that discipline and adherence to current norms, conditions that may favor adherence to drug therapy, are characteristics of the female sex [2,11,12,15].

Cohabitation is identified as a factor associated with adherence, which has been pointed out by other authors. In this regard, it could be assumed that the dynamics and established roles of cohabitation allow greater support for adherence to drug therapy [10,14].

In adults, the 40 to 59 age range is a factor associated with adequate adherence to drug therapy; on the other hand, the group of young and older adults is identified as a factor associated with non-adherence. The argument to explain this behavior does not seem to be clear; however, it opens two possibilities: the first, in the context of research to identify risk factors, and the second, around the type of support required by this population to achieve adherence, which is evidently a modifiable factor susceptible to specific programs that can have a favorable impact on patients and health systems [15].

The time of treatment initiation is identified as an associated factor: 10 years is the reference time; nevertheless, after that point, adherence is lost. In this regard, it could be pointed out that the patient's behavior is the consequence of a state of denial after having the disease for a long time and realizing that the therapy will not eliminate the disease or modify its course. This is important because it could be assumed that the medical advice related to the course of the disease could be beneficial for adherence to drug therapy; however, this is an issue that will have to be demonstrated [8,10-12,14,15].

In conclusion, the factors associated with adherence to drug therapy among patients with type 2 diabetes mellitus include sex, cohabitation, age and the disease progression time.

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