

FACTORS RELATED TO PATIENT ADHERENCE TO ANTIDIABETIC DRUG THERAPY¹

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Gimenes HT, Zanetti ML, Haas VJ. Factors related to patient adherence to antidiabetic drug therapy. Rev Latino-am Enfermagem 2009 janeiro-fevereiro; 17(1):46-51.

The objective of the present study was to assess patient adherence to antidiabetic drug therapy and its association with factors related to the patient, patient-provider relationship, therapeutic regimen and the disease itself. The study comprised 46 diabetic patients enrolled in a research and extension education center in the State of Sao Paulo, southeastern Brazil, in 2007. Data was collected through interviews using a questionnaire and the Treatment Adherence Measure (TAM). The patient adherence level to antidiabetic drug therapy was 78.3%. In conclusion, since prevalence of adherence is below that recommended in the literature, and in the light of poor blood glucose control and alleged failure of therapeutic regimen, health providers are urged to measure diabetic patient treatment adherence, because it is key to adequate diabetes management with drugs.

DESCRIPTORS: nursing; diabetes mellitus; patient acceptance of health care

FACTORES RELACIONADOS A LA ADHESIÓN DEL PACIENTE DIABÉTICO A LA TERAPÉUTICA MEDICAMENTOSA

Este estudio tuvo el objetivo de determinar la adhesión del paciente diabético a la terapéutica medicamentosa y verificar la asociación de la adhesión con factores relacionados al paciente, a la relación profesional-paciente, al esquema terapéutico y a la enfermedad. Participaron 46 diabéticos registrados en un centro de investigación y extensión universitaria en el interior del Estado de San Pablo, en 2007. Los datos fueron obtenidos mediante entrevista, utilizándose un cuestionario y la prueba de Medida de Adhesión al Tratamiento – MAT. Los resultados mostraron que la adhesión del paciente diabético al tratamiento medicamentoso para tratamiento de la diabetes fue de 78,3%. Se concluye que, al considerar que la prevalencia de la adhesión obtenida en el presente estudio estuvo por debajo de la recomendada en la literatura y frente a la vigencia del mal control de la glucemia y de la supuesta falencia en el esquema terapéutico, se urgente que los profesionales de la salud reconozcan la importancia de evaluar la adhesión de los pacientes diabéticos, al tratamiento medicamentoso para controlar la diabetes.

DESCRIPTORES: enfermería; diabetes mellitus; aceptación de la atención de salud

FATORES RELACIONADOS À ADESÃO DO PACIENTE DIABÉTICO À TERAPÊUTICA MEDICAMENTOSA

Este estudo teve o objetivo de determinar a adesão do paciente diabético à terapêutica medicamentosa e verificar a associação da adesão, segundo os fatores referentes ao paciente, ao relacionamento profissional-paciente, ao esquema terapêutico e à doença. Participaram 46 diabéticos cadastrados em um centro de pesquisa e extensão universitária no interior do Estado de São Paulo, em 2007. Os dados foram obtidos mediante entrevista, utilizando-se questionário e o teste de Medida de Adesão ao Tratamento – MAT. Os resultados mostraram que a adesão do paciente diabético ao tratamento medicamentoso para o diabetes foi de 78,3%. Conclui-se que, ao se considerar que a prevalência da adesão obtida no presente estudo está abaixo daquela recomendada na literatura, se torna urgente reconhecer a importância da mensuração da adesão dos pacientes diabéticos em tratamento medicamentoso, para o controle do diabetes pelos profissionais de saúde, na vigência de mau controle glicêmico e de suposta falência no esquema terapêutico.

DESCRITORES: enfermagem; diabetes mellitus; aceitação pelo paciente de cuidados de saúde

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BACKGROUND

It has been shown in clinical practice that patients have difficulty in taking the prescribed medications, following a diet and changing their lifestyle as directed by a multidisciplinary team. It is estimated that only a third of patients have adequate treatment adherence⁽¹⁾.

Several studies investigating adherence to chronic disease treatment have evidenced that patients often discontinue their medications or even do not take them at all because they consider them ineffective or experience untoward side effects⁽²⁻⁴⁾. Among diabetes patients, many believe they do not need any drug therapies as they have no symptoms.

Different definitions of adherence have been proposed but it is generally defined as no less than 80% use of prescribed drugs and other procedures, as well as compliance with doses, times, and treatment duration. It represents the final step of a proposed rational drug use^(3,5).

Many factors can affect treatment adherence and there is no consensus on which has the greatest impact. First, it should be considered whether patients have access to drugs. Ruling out the possibility of no access, patient adherence to drug therapy can be divided into four groups of factors: patient-related; related to patient-provider relationship, therapeutic regimen, and the disease itself^(1,3).

A complex variety of determinants clearly plays a role in patient adherence to the therapeutic regimen and contributes to non-adherence of those with chronic conditions like diabetes.

There is a lack of studies investigating adherence to antidiabetic drug therapy, and those available have different designs and inconsistent results. Further investigation is needed as most studies have focused on patient adherence to anti-hypertensive and lipid-reducing drugs instead of to oral antidiabetic agents and insulin^(4,6-7).

Researchers and health providers have recently been devoting a great deal of effort to better understand non-adherence to drug therapy. It is though a challenge as people's behaviors involve complex mechanisms. There is a need to further explore this issue in order to identify behaviors that facilitate and/or prevent adherence to drug therapy.

OBJECTIVE

To assess patient adherence to antidiabetic drug therapy and to describe its association to factors related to the patient, patient-provider relationship, therapeutic regimen, and the disease itself.

MATERIALS AND METHODS

Cross-sectional, descriptive study conducted as part of the Diabetes Education Program in a research and extension center in a city in the state of São Paulo, southeastern Brazil, in 2007. The study comprised 46 patients with median age 57; 69.6% of them were females and 78.3% were married; median schooling was eight years; and family income was 4.5 monthly minimum wages (MMWs). The majority had type 2 diabetes (82.6%), and median time from diagnosis was 12.5 years. Median glycosylated hemoglobin (HbA1) level measured before data collection was 8.5. Their main comorbidities were: arterial hypertension (56.5%), dyslipidemia (43.5%), and obesity (41.3%). As for drug therapy for diabetes management, 58.7% were taking oral antidiabetic agents; 30.4% oral antidiabetic agents plus insulin; and 10.9% insulin.

Data was collected using a questionnaire addressing patient information (gender, age, schooling, and family income), patient-provider relationship (information on disease and drugs and patient involvement in therapy choice), therapeutic regimen (changes in daily life, side effects and use of anti-hypertensive agents) and the disease (diabetes duration, HbA1 levels, patient knowledge on diabetes and its management) and the Treatment Adherence Measure (TAM). The TAM instrument consists of seven items and was developed and validated in Portugal with good internal consistency ($p < 0.001$). It also showed good concurrent validity with high correlations in any answer and 0.77 sensitivity and 0.73 specificity, proving to be a good instrument for capturing a variety of behaviors involved in treatment adherence⁽⁸⁾.

A literature search did not find any studies on the applicability of TAM instrument in Brazilian subjects. But given the closeness between European

- the instrument's original language - and Brazilian Portuguese and the fact that different cultural backgrounds do not have an effect on the instrument items, it was first translated from European into Brazilian Portuguese. It was then reviewed by three diabetes specialists and checked for item intelligibility, easy reading comprehension and presentation format, which were deemed adequate for the purposes of the study. A pilot study was carried out with five patients at the study site and the instrument proved to be adequate for administration in the study.

After subjects' consent, data were collected at the study site through guided interviews that lasted on average 30 minutes. Patients were addressed upon their arrival at the center and individually interviewed in a private room by a single interviewer. Medical records as well as diabetes test results of all subjects were reviewed.

The analysis of TAM items was based on answers rated on a Likert-type scale for each question (always (1); almost always (2); frequently (3); sometimes (4); rarely (5); and never (6)). Scores for each TAM question were added up and divided by the total number of questions and then dichotomized as adherent or non-adherent to drug therapy. Univariate and bivariate analyses were conducted using absolute and relative frequencies and 2x2 contingency tables. Fisher's exact test was performed to assess the association between adherence and factors related to the patient, patient-provider relationship, therapeutic regimen, and the disease itself. It was opted for this test because of the small sample size and the expected result frequency (lower than five in all associations studied). A 5% significance level was set. The study was approved by the Research Ethics Committee at the University of São Paulo at Ribeirão Preto College of Nursing (Protocol No. 0541/2005).

RESULTS

Of 46 (100%) subjects studied, 78.3% were adherent and 21.7% were non-adherent to drug therapy. Table 1 shows the prevalence of patient adherence to drug therapy according to factors related to the patient, patient-provider relationship, therapeutic regimen, and the disease itself.

Table 1 - Prevalence of adherence to antidiabetic drug therapy according to factors related to the patient, patient-provider relationship, therapeutic regimen, and the disease itself. Ribeirão Preto, Brazil, 2007

Adherence-related factors	Adherence		Total n (%)	Fisher's exact test p-value
	Yes n (%)	No n (%)		
Gender				
Male	12 (85.7)	2 (14.3)	14 (100)	0.347
Female	24 (75)	8 (25)	32 (100)	
Total	36 (78.3)	10 (21.7)	46 (100)	
Age¹				
30 to 59 years	22 (75.9)	7 (24.1)	29 (100)	0.450
>60 years	14 (82.4)	3 (17.6)	17 (100)	
Total	36 (78.3)	10 (21.7)	46 (100)	
Schooling¹				
1 to 11 years	28 (75.7)	9 (24.3)	37 (100)	0.360
>12 years	8 (88.9)	1 (11.1)	9 (100)	
Total	36 (78.3)	10 (21.7)	46 (100)	
Income (MMWs)				
1 to 4 MMWs	18 (69.2)	8 (30.8)	26 (100)	0.089
>5 MMWs	18 (90)	2 (10)	20 (100)	
Total	36 (78.3)	10 (21.7)	46 (100)	
Information about the disease				
Yes	22 (84.6)	4 (15.4)	26 (100)	0.203
No	14 (70)	6 (30)	20 (100)	
Total	36 (78.3)	10 (21.7)	46 (100)	
Information about the drug ²				
Yes	13 (86.7)	2 (13.3)	15 (100)	0.356
No	23 (76.7)	7 (23.3)	30 (100)	
Do not know	0 (0)	1 (100)	1 (100)	
Total	36 (78.3)	10 (21.7)	46 (100)	
Patient involvement in drug choice ²				
Yes	4 (80)	1 (20)	5 (100)	0.733
No	31 (79.5)	8 (20.5)	39 (100)	
Do not know	1 (50)	1 (50)	2 (100)	
Total	36 (78.3)	10 (21.7)	46 (100)	
Changes in daily life				
Yes	6 (66.7)	3 (33.3)	9 (100)	0.299
No	30 (81.1)	7 (18.9)	37 (100)	
Total	36 (78.3)	10 (21.7)	46 (100)	
Side effects				
Yes	21 (70)	9 (30)	30 (100)	0.064
No	15 (93.8)	1 (6.3)	16 (100)	
Total	36 (78.3)	10 (21.7)	46 (100)	
Use of anti-hypertensive agents				
Yes	20 (74.1)	7 (25.9)	27 (100)	0.328
No	16 (84.2)	3 (15.8)	19 (100)	
Total	36 (78.3)	10 (21.7)	46 (100)	
Diabetes duration				
1 to 5 years	12 (80)	3 (20)	26 (100)	0.582
≥ 5 years	24 (77.4)	7 (22.6)	20 (100)	
Total	36 (78.3)	10 (21.7)	46 (100)	
Knowledge on diabetes management ²				
Yes	15 (68.2)	7 (31.8)	22 (100)	0.124
No	20 (87)	3 (13)	23 (100)	
Do not know	1 (100)	0 (0)	1 (100)	
Total	36 (78.3)	10 (21.7)	46 (100)	
Knowledge on diabetes ²				
Yes	8 (72.7)	3 (27.3)	11 (100)	0.444
No	21 (80.8)	5 (19.2)	26 (100)	
Unknown	7 (77.8)	2 (22.2)	9 (100)	
Total	36 (78.3)	10 (21.7)	46 (100)	

¹Variables were dichotomized for Fisher's exact test;

²"Do not know" and "Unknown" answers were considered missing information to perform Fisher's exact test

The analysis of *patient-related factors* showed higher prevalence of adherence among men (85.7%), the elderly (82.4%), those with more than 12 years of schooling (88.9%) and family income greater than five MMWs (90%).

As for *factors related to the patient-provider relationship*, those who received information about the disease and specific information about the drug prescribed (84.6 and 86.7%, respectively) were more adherent to antidiabetic drug therapy. As for patient involvement in drug therapy choice, prevalence of adherence was similar in patients who were asked their opinion and those who were not.

In regard to *factors related to the therapeutic regimen*, of 46 (100%) subjects studied, 80.4% did not report any changes in their daily life while 19.6% did report them. Of these subjects reporting changes, 8.7% said they made drug use more difficult. The prevalence of adherence was higher (81.1%) in those who did not report any changes. Drug side effects were reported in 65.2% of subjects and prevalence of adherence was 70% among them. Those who did not report any side effects had 93.8% prevalence of adherence.

With respect to *factors related to the disease itself*, of 80.4% who had HbA1c results available, the prevalence of adherence was 66.7% among those with HbA1c above 7% and 33.3% among those with HbA1c lower than 7%. It should be noted that prevalence of non-adherence in those with HbA1c greater than 7% was 85.7%.

As for diabetes duration, prevalence of adherence in subjects with five years or less of diagnosis was 80%, against 77.4% in those with more than five years. As for patient knowledge on diabetes management, the prevalence of adherence was 87% in those who reported poor glucose control and 68.2% in those who reported good control. The prevalence of adherence in those subjects who had knowledge on the prescribed drug was 72.7%, against 80.8% among those with limited knowledge.

Although different prevalences of adherence were found for each factor studied, these differences were not statistically significant ($p > 0.05$) in Fisher's exact test, as shown in Table 1.

DISCUSSION

The prevalence of patient adherence to drug therapy for diabetes management found in the study

was 78.3%. It is similar to that described in diabetes patients receiving drug therapy, 79.7%⁽⁹⁾. Another study showed 95.7% prevalence of adherence to antihyperglycemic agents in type 2 diabetic patients⁽⁴⁾.

As for *patient-related factors* associated to adherence to drug therapy, higher adherence among men than women could be explained by the fact that women are more prone to stress and to develop mental health conditions. Thus, emotional disorders like depression can be associated with non-adherence to drug therapy⁽¹⁰⁾.

Data on age is consistent with the literature; chronic patients' age affects adherence to drug therapy, as lower adherence was seen among younger patients⁽¹¹⁾.

In regard to schooling, more educated patients were more adherent to therapy. Low schooling makes learning more difficult; as diabetes drug therapy gets more complex, patients are required to have more complex cognitive skills to be able to understand the prescribed drug therapy and to adhere to treatment for good glucose control.

As for family income, the study data corroborates the findings of another study that reported that those with family income less than five MMWs showed lower adherence when compared to those with higher income⁽⁹⁾.

As for *factors related to the patient-provider relationship*, the present study showed that patients' knowledge on diabetes and the proposed treatment directly influences their adherence to drug therapy. Patients' perception of the expected treatment benefits increases their adherence. However, it was verified that health providers rarely assess patient knowledge as part of their clinical routine⁽⁷⁾.

Treatment adherence is a complex phenomenon influenced by multiple determinants. The patients' beliefs on drugs may be the key for their adherence to drug therapy, as they often choose to take a drug or not based on information they have about them.

A study reported that 82% of the diabetic patients studied believed the prescribed drugs would relieve their symptoms and 83% believed they would protect their health in the future. These subjects had higher adherence rates to drug therapy than those who distrusted it (98.5 and 87%, respectively)⁽⁴⁾.

It is crucial that patients are actively involved in drug therapy choice. When patients are involved

at the moment health providers propose a therapeutic plan, they feel more motivated and their positive beliefs overcome their concerns about the drug prescribed, resulting in greater adherence to the proposed therapy⁽¹¹⁾.

In regard to *factors related to the therapeutic regimen*, drug therapy adherence was more prevalent among those subjects who reported changes in their daily life as well in those who did not have side effects.

Depending on the type of drug prescribed, diabetic patients have to make changes in their daily life. The administration of certain drugs, such as insulin, requires patients to make adjustments in their daily habits, especially regarding meal times and physical activity.

As for drug side effects, they are quite often attributed to non-adherence to drug therapy. However, patients are seldom asked about them during multiprofessional team care.

A study of type 2 diabetic patients reported that, for the majority (58%), side effects were a main factor limiting adherence. Only 23% of them reported these effects to their doctors and 83% experienced them for more than a month⁽⁴⁾. Side effects can thus become chronic and patients may experience them for long periods of time, which can affect their adherence to drug therapy.

While prescribing drugs for diabetes management, prescribers should inform their patients on potential side effects that may occur in the beginning or throughout therapy. In every follow-up visit, providers should ask their patients about any side effects and how they are affecting drug use and make adjustments to the therapeutic regimen as needed. When providers show concern about patient well-being, patients are more likely to attend the visits and have an adequate follow-up^(5,7).

Patients should be asked about any problems affecting adherence due to the complexity of drug therapy. Doctors may offer patients less complex therapies, adjusted to the patient's needs, to help them better comply with the therapeutic regimen⁽⁷⁾.

In regard to *disease-related factors*, the literature shows a significant association between changes in HbA1 levels and patient adherence to drug therapy for diabetes management. For each 10% improvement in adherence to oral antidiabetic

agents, HbA1 levels were reduced by about 0.19% ($p < 0.0001$)⁽⁹⁾.

It is thus suggested that, in patients with abnormal HbA1 levels, rather than increasing the prescribed dose, adding a different drug or even replacing the prescribed drug, health providers should first assess patient adherence to drug therapy⁽¹²⁾.

More aggressive, earlier intervention in diabetes treatment has been recommended with a view to glucose management. This recommendation is supported by the fact that, in the United States, the proportion of type 2 diabetic patients with HbA1 levels below 7% has dropped 20% in recent years. The Brazilian scenario is quite similar. It stresses patient non-adherence to the prescribed drug therapy⁽¹³⁾ as a probable cause.

Another important aspect that affects disease-related adherence to drug therapy is diagnosis duration. The present study findings are consistent with those reported by the World Health Organization (WHO), pointing out a negative relationship between diabetes duration and patient adherence to drug therapy. Those patients with longer disease duration tend to be less adherent to treatment⁽¹⁴⁾.

Lower adherence rates to drug therapy for diabetes management is a matter of concern as disease progresses because diabetes is a progressive silent disease, and chronic complications due to poor glucose control are likely to increase with time.

As for patient knowledge on diabetes management, the study showed higher rates of adherence among those reporting poor glucose management. This is an important finding because it highlights the fact that patients with good metabolic control seem less concerned about disease management and have lower adherence rates. With respect to patient knowledge on diabetes drugs, adherence was higher among those subjects with limited knowledge.

Despite all recommendations and protocols, since patients are not properly advised on the use of oral antidiabetic agents, their use is inadequate, resulting in poor glucose control⁽¹³⁾. Limited knowledge on drug therapy has proven to have great impact on patients' health and quality of life, especially in those with one or more chronic conditions. Hospital admissions and premature

deaths have increased and been associated to limited knowledge⁽¹⁵⁾.

When accurate and clear information on diabetes drugs is provided, patients are encouraged towards self-care and adherence to drug therapy. A joint approach of health providers and patients can help narrowing patients' knowledge gap.

Although different prevalence rates of adherence were found for all factors in the present study, these differences were not statistically significant. This could be explained by the small size of the convenience sample, which included patients attending a health service with the purpose of improving their knowledge on diabetes. It is thus a differentiated sample, because patients supposedly sought diabetes education to better understand their disease and drug therapy and, thus, increase adherence to the prescribed

therapy. In the light of the factors discussed here, efforts should be made to improve diabetic patient adherence to drug therapy and, consequently, diabetes management.

CONCLUSIONS

The present study found 78.3% patient adherence to antidiabetic drug therapy. Although different prevalences of adherence were seen for each factor studied, the association was not statistically significant. It can be concluded that, since the prevalence of adherence found in the present study is below that recommended in the literature, it is crucial that health providers assess adherence of patients to drug therapy in the event of poor glucose control and presumed failure of the prescribed therapeutic regimen.

REFERENCES

1. Valle EA, Viegas EC, Castro CAC, Toledo Jr AC. A adesão ao tratamento. *Rev Bras Clín Ter* 2000; 26(3):83-6.
2. Donnan PT, Macdonald TM, Morris AD. Adherence to prescribed oral hypoglycemic medication in a population of patients with type 2 diabetes: a retrospective cohort study. *Diabet Med* 2002; 19(4):279-84.
3. Leite SN, Vasconcellos MPC. Adesão à terapêutica medicamentosa: elementos para a discussão de conceitos e pressupostos adotados na literatura. *Ciênc Saúde Coletiva* 2003; 8(3):775-82.
4. Grant RW, Devita NG, Singer DE, Meigs JB. Polypharmacy and medication adherence in patients with type 2 diabetes. *Diabetes Care* 2003; 26(5):1408-12.
5. Osterberg L, Blaschke T. Adherence to medication. *N Engl J Med* 2005; 353(5):487-97.
6. Brown JB, Nichols GA, Glauber HS, Pharm AB. Ten-year follow-up of antidiabetic drug use, nonadherence, and mortality in a defined population with type 2 diabetes mellitus. *Clin Ther* 1999; 21(6):1045-57.
7. Rubin RR. Adherence to pharmacologic therapy in patients with type 2 diabetes mellitus. *Am J Med* 2005; 118(5A):27S-34S.
8. Delgado AB, Lima ML. Contributo para a validação concorrente de uma medida de adesão aos tratamentos. *Psicologia, Saúde & Doenças* 2001; 2(2):81-100.
9. Schectman JM, Nadkarni MM, Voss JD. The association between diabetes metabolic control and drug adherence in a indigent population. *Diabetes Care* 2002; 25(6):1015-21.
10. ciechanowski PS, Katon WJ, Russo JE, Walker EA. the patient-provider relationship: attachment theory and adherence to treatment in diabetes. *am J Psychiatry* 2001; 158(1):29-35.
11. Horne R, Weinman J. Patients' beliefs about prescribed medicines and their role in adherence to treatment in chronic physical illness. *J Psychosom Res* 1999; 47(6):555-67.
12. Cramer JA. A systematic review of adherence with medication for diabetes. *Diabetes Care* 2004; 27(5):1218-24.
13. Sociedade Brasileira de Diabetes (SBD). Novas diretrizes da SBD para o controle glicêmico do diabetes tipo 2. Posicionamento oficial nº 4. *RBM Rev Bras Med* 2007; supl. esp.(4):3-22.
14. Organização Mundial de Saúde (OMS). Cuidados inovadores para as condições crônicas: componentes estruturais de ação: relatório mundial. Brasília (DF): OMS; 2003.
15. Willians B. Medication education. *Nurs Times* 1991; 87(29):50-4.