

ORIGINAL ARTICLE

Knowledge, adherence to the treatment and prevalence of neuropathy in patients with type 2 diabetes mellitus

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ABSTRACT

Objective: Identify the level of knowledge, adherence and prevalence of diabetic neuropathy (NPD), determine the relationship between knowledge, adherence to treatment, time to suffer from the disease and the NPD in patients with type 2 diabetes mellitus who attend to control in four units of the health sector in Tampico and Cd. Madero Tamaulipas. To describe the sociodemographic characteristics of the patients with type 2 diabetes mellitus that attend control in four units of the health sector in Tampico and Cd. Madero Tamaulipas.

Methods: Descriptive cross-sectional correlational study performed on a sample of 554 patients with type 2 diabetes mellitus who attended to control their disease in four health sector units in Tampico and Cd. Madero, Tamaulipas, the type of sampling was non-probabilistic for convenience

Results: 554 patients were surveyed, the mean age was 55 years, the mean time of diagnosis of type 2 diabetes mellitus was 10 years, 61.9% were women, 62.8% were married, 34.5% were primary and 89.5% were belonged to the lower class. The level of knowledge was insufficient in 74% of the patients, the reported adherence was 75% in the middle level and the NPD prevalence in the period was 5.5, the relationship between knowledge and adherence and time of diagnosis was statistically verified prevalence of NPD.

Conclusions: The results demonstrate the importance of education to patients since the knowledge of their disease contributes to the patient accepting and adhering to the treatment.

Key Words: Diabetes mellitus, Patient, Adherence to treatment, Knowledge, Diabetic neuropathy, Prevalence

1. INTRODUCTION

Diabetes is a major public health problem and one of the four non-communicable diseases (NCDs) selected by world leaders to intervene on a priority basis. In recent decades the number of cases and the prevalence of the disease have increased steadily. According to estimates, 422 million adults worldwide had diabetes in 2014, compared to 108 million in 1980. The global prevalence of diabetes has almost dou-

bled since that year, rising from 4.7% to 8.5% in the adult population. This also implies an increase in the associated risk factors, such as overweight or obesity. In the last decade, the prevalence of diabetes has increased more rapidly in low and middle-income countries than in high-income countries. Diabetes and its complications lead to significant economic losses for people who suffer from it and their families, as well as for health systems and national economies due to direct medical costs and the loss of work and salaries.^[1]

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The World Health Organization (WHO) in its first World Report on Diabetes highlights the enormous scale of the problem, as well as the potential to reverse current trends. The political basis for implementing concerted measures to combat diabetes already exists, framed within the Sustainable Development Goals, the United Nations Political Declaration on Non Communicable Diseases and the WHO Global Action Plan on NCDs. Countries can adopt a series of measures, in line with the objectives of the WHO Global Action Plan on NCDs 2013-2020, to reduce the consequences of diabetes, one of which is to address fundamental deficiencies in knowledge about diabetes.^[1] The latest results of the National Mid-term Health and Nutrition Survey (NMHNS), 2016 in Mexico, state that 9.4% of the respondents had a prior medical diagnosis of diabetes. 87.8% reported receiving medical treatment to control their disease. In the last year, in order to assess its glycemic control, 15.2% had measured glycosylated hemoglobin, 4.7% had measured micro albuminuria and 20.9% had revision of feet. Although there is a slight increase in this prevalence with respect to NMHNS 2012 (9.6%, 4.8% and 14.6%, respectively), the results of this survey show that medical surveillance and prevention of complications specified in NOM-015-SSA2-2010 for the prevention, treatment and control of diabetes mellitus are still far from being achieved.^[2]

The prevalence of complete adherence to drug treatment has remained constant since the 1990s, being 50% in chronic diseases and ranging from 31% to 49% in acute diseases. The lack of complete adherence to treatment is a problem that occurs in all ages, from children to the elderly, in almost all stages of chronic diseases and tends to worsen as the patient takes more time with therapy. The WHO in 2004 considered that the lack of adherence to chronic treatments, due to its negative clinical, personal and economic consequences, is a priority public health issue that needs to be studied in order to design effective intervention strategies. Today adherence to treatment is conceptualized as a complex psychosocial phenomenon in which multiple mediating factors are involved, such as knowledge and beliefs that the patient has of the disease, motivational processes, affective states and the will to recover health. To improve the adherence to the therapy, the patient is required to accept the disease, the health personnel inform the patient extensively and actively involve the patient during the process of therapeutic decision making.^[3]

The lack of prevention and the inadequate education of the patient in such important aspects as diet, self-control and taking medications are significant predictors of serious complications associated with type 2 diabetes mellitus.^[4] The care for people with diabetes must be performed within an interdisciplinary care system that places equal emphasis on

clinical care, ongoing therapeutic education and social work, in order to identify and address the difficulties that people with diabetes face or perceive in the development of their daily lives, all of which translates into the improvement of their quality of life and optimal metabolic control. The ultimate goal of comprehensive care for people with diabetes mellitus is to improve their quality of life, avoid the appearance of complications in the short and long term, and ensure the normal development of daily activities.^[5]

From the level of understanding will depend the motivation and practical skills to face the demands of daily self-care, the success or failure of any therapeutic indication. All contact with the patient then has an educational objective, whether explicit or implicit, so that Diabetology of the end of the century assumed the clear idea that there is no effective treatment of diabetes without education and training of the patient. Education thus becomes the cornerstone of the comprehensive care of people with diabetes mellitus, and must be developed effectively in all health services.^[5]

In Mexico, the prevalence of diabetic neuropathy (NPD) increases by 50% after 25 years of evolution of diabetes mellitus, when it is defined based on subjective data, and 100% when using electrophysiological tests. Peripheral neuropathy is often insidious in its onset and may manifest as loss of sensitivity and susceptibility to callus formation that becomes fissure and becomes infected, which ultimately predisposes to neuropathy. Preventive treatment through the adequate control of blood glucose is the most important aspect to avoid or delay this type of complication. Controlling hyperglycemia and early diagnosis through annual screening tests is a key aspect in the management of these patients.^[6]

Derived from the above, the following objectives were proposed in the present study, to describe the sociodemographic characteristics of patients with type 2 diabetes mellitus, to identify the level of knowledge about the disease, the level of adherence to treatment and the prevalence of NPD in patients with type 2 diabetes mellitus. Determine the relationship between the level of knowledge of the disease and adherence to treatment. To determine the relationship between knowledge, the time of diagnosis and the prevalence of NPD in patients with type 2 diabetes mellitus who come to control to the outpatient clinic of four health institutions of Tampico, Mexico.

2. METHODS

Transversal cross-sectional descriptive study^[7] carried out during August-December 2016, in four institutions of the health sector, located in Tampico and Cd Madero, Mexico. The type of sampling used for this study was convenience

non-probabilistic. The total sample of the four hospitals was 554 patients. The inclusion criterion were: patients of both sexes over 18 years of age, with a minimum year of being diagnosed with type 2 diabetes mellitus and in control with their family doctor. As an exclusion criterion, were those patients with a diagnosis of type 2 diabetes mellitus in control who had serious vascular complications: amputation and varicose ulcers.

The selection and recruitment of patients who met the inclusion criteria was carried out in the outpatient areas of the institutions involved in the scheduled dates and was carried out by a research team that received training from a diabetologist and had the corresponding permits from the participating health institutions. The instruments used for the data collection were: The questionnaire DKQ-24,^[8] in the Spanish-speaking subjects version, it contains 24 questions with three potential response options: 1) Yes, 2) No, and 3) I do not know, the correct answers add up to get a total score. In 11 of the 24 items the correct answer is Yes (5, 6, 8, 11, 14, 15, 16, 18, 19 and 20) in 13 the correct answer is No (3, 4, 7, 9, 10, 12, 13, 17 and 21), the greater the number of correct answers, the knowledge is sufficient. To measure adherence to treatment, the Adherence to Treatment Scale in Diabetes Mellitus 2, version III (EATDM-III) was used.^[9]

It is aimed at measuring a series of factors that may indicate the level of comprehensive adherence of the patient with type 2 diabetes mellitus, the questionnaire includes 36 sentences that deal with behavioral factors, linked to adherence to treatment in type 2 diabetes mellitus, using a Likert scale of five options that evaluate frequency of execution of the situation. The five answer options are: 0. I never do it; 1. I almost never do it; 2. I do it regularly; 3. I almost always do it; and 4. I always do it. There are also six factors to be considered: Family Support, Community Support and Organization, Physical Exercise, Medical Control, Diet and Information. The value of each factor is from 0 to 100 points, the following category will be used to classify the adhesion: considering high adherence when the score is $> 50\%$, 110-220, average adherence when it is $\leq 49\%$, 55-109 and low adherence when the score is $\leq 48\%$ from 0 to 54 points.

The Michigan Neuropathy Screening (MNSI) questionnaire^[10] was used to measure the presence of peripheral neuropathy, which is constructed in two parts. The first part is a self-assessment of 15 questions about the sensitivity of the feet and the presence of neuropathic symptoms, with the option of a dichotomous response: Yes and No. The second part is a physical evaluation of the feet, for this evaluation, feet were at a temperature of $> 30^{\circ}\text{C}$, first feet were inspected for dry skin, fissures or deformities; secondly the sensitivity of the feet was corroborated using a Rydel-Seiffer diapason

of 128 Hz for this purpose. Ankles were examined using a Hergom brand reflex hammer for which the patient had to be seated and relaxed and his feet should be hanging. Finally, the monofilament test was carried out, to make this measurement the Hergom monofilament was used and it was necessary that the patient's feet were resting on a flat and hot surface.

The filament was prestressed from 4 to 6 applications perpendicularly on the back of the patient's first finger, then the filament was applied on the back of the first toe, between the nail fold and the joint, it should be placed perpendicularly and for a short time, < 1 second with a uniform pressure of 10 grams. For this measurement the patient were asked to close their eyes and asked to respond if they felt the filament; eight correct answers of 10 applications were considered normal sensation, one to seven correct answers indicate reduced sensation, if there were no correct answers it was considered absence of sensitivity.

The statistical package SPSS version 20.0 was used to capture and process the data. Firstly, a descriptive analysis of the sociodemographic variables of the patients was carried out. Then, a descriptive analysis of the variables, knowledge of the disease, adherence to the treatment and prevalence of NPD was done. Finally, an inferential analysis was performed using the Chi-square parametric test to identify the relationships between the study variables. Regarding respect for the dignity and protection of human rights and the patient's informed consent, as well as the ethical principles we observed the established in the Helsinki declaration.^[11,12]

3. RESULTS

Of the 554 patients included in the study, the mean age of the patients was 55.41, the average time of diagnosis of diabetes mellitus was 10.76 years, the female sex was predominant with 61.1%, 62.8% were married, 34.5% had completed elementary school, the socioeconomic level that was mostly found in the patients was the 89.5% lower class (see Table 1).

Table 2 shows the distribution of the patients according to the level of knowledge of the disease. It is observed that 74% of the patients had an insufficient level of knowledge, 294 of the patients with insufficient knowledge presented an average level of adherence and 334 of the patients with insufficient knowledge did not present neuropathy.

Of the total of patients who participated in the study, 75% had an average adherence to treatment, which corresponds to 415 patients, of these 294 patients had a level of insufficient knowledge of the disease. This distribution can be seen in Table 3.

Table 1. Characterization of patients with type 2 diabetes mellitus

Variable	f	%
Sex		
• Female	343	61.9
• Male	211	38.1
Marital status		
• Single	81	14.6
• Married	348	62.8
• Widowed	72	13.0
• Domestic partnership	53	9.6
Level of schooling		
• Elementary	191	34.5
• Junior high school	170	30.7
• Senior high school	123	22.2
• College	64	11.6
• No studies	6	1.1
Socioeconomic class		
• Lower class	496	89.9
• Middle class	53	9.6
• Upper class	5	0.9

Note. Source: Sociodemographic Charter; n = 554

Table 2. Classification of patients with type 2 diabetes mellitus according to the level of knowledge

Level of knowledge	f	%
Sufficient	144	26
Insufficient	554	74

Note. Source: DKQ24; n = 554

Table 3. Classification of patients with type 2 diabetes mellitus according to the level of adherence

Level of adherence	f	%
High	21	4
Medium	415	75
Low	118	21

Note. Source: EATDM – III; n = 554

Regarding the NPD, the results of the study reported a prevalence of 5.5. 82.1% of the patients classified in the range of without neuropathy, 16.8% with mild neuropathy and only 1.1% with moderate neuropathy. Of the 93 patients who presented mild neuropathy, 30 had a diagnosis time of 11 to 20 years, 27 patients with more than 20 years of diagnosis time, 19 of 6-10 years of diagnosis time and 17 of 1-5 years of having been diagnosed with type 2 diabetes mellitus (see Table 4).

When applying the non-parametric Chi-square test to verify

the relationship between the level of knowledge and adherence to treatment, it was found to be statistically significant: $\chi^2 = 12.231$, $df = 2$, $p = .002$. When relating the level of knowledge and the prevalence of neuropathy, the Chi-square test results did not show statistical significance: $\chi^2 = 0.621$, $df = 2$, $p = .733$. The results when relating the variables time of suffering the disease with the prevalence of neuropathy showed that if there is a relationship between these two variables with a level of statistical significance of: $\chi^2 = 46.577$, $df = 6$, $p = .000$.

Table 4. Classification of patients with type 2 diabetes mellitus according to the presence of DNP

Classification of the neuropathy	f	%
Without neuropathy	455	82.1
Mild neuropathy	93	16.8
Moderate neuropathy	6	1.1

Note. Source: MNSI; n = 554

4. DISCUSSION

The level of knowledge of the patients in this study was insufficient in 74% of the patients, 75% of them reflected an medium adherence level and the prevalence of the NPD period was 5.5, 17.9% of the patients reported NPD according to the results of the MNSI. And as for the relationship between knowledge about the disease and adherence to treatment, the results showed that there is a relationship between these two variables ($p = .002$). When relating knowledge to the prevalence of NPD, no statistical significance was found, regarding the time of diagnosis and the prevalence of NPD if a relationship was found with a level of statistical significance of $p = .000$. These results are similar to those reported in other studies conducted in Mexico and Cuba in which insufficient knowledge was found in patients, in those studies 87% of patients had insufficient knowledge, another study reported 52% of patients with bad level of knowledge and another study found that 56.7% had an insufficient level of knowledge.^[4, 4, 14]

In studies carried out in other contexts, results differ from what was reported in this study in terms of knowledge: as the level of regular knowledge with an average of 14.52, or 70% of sufficient level of knowledge and 64.9% of level of knowledge. Sufficient knowledge was reported in another study.^[15-17] Adherence to treatment found by other authors was relatively better than that reported in this study as they found that 72.5% of patients had a high level of adherence, 56% they presented a medium level of adherence, 72.5% good adherence and 55.4% of the participants had a good adherence to treatment.^[3, 17-19]

In a study conducted in Cuba, the results showed that 74.13%

of the participants had a level of medium adherence.^[20] NPD is one of the main complications in patients with type 2 diabetes mellitus, in studies conducted in Latin American countries in the reported results, only one study conducted in Brazil reported that 63.11% of the patients did not present NPD.^[21]

Other studies conducted in Mexico and Peru found results that do not coincide with what it is reported in this study since these studies reported high prevalence, 99% of the patients presented NPD data, 55% of the patients had NPD and another study reported an 88.7% of patients with severe NPD.^[21-24]

About the relationship between knowledge and adherence, one of the studies reviewed reported results similar to those we found with a statistical significance at a rate of $p < .001$. Regarding the relationship between the time of diagnosis and prevalence of NPD, the results of the studies conducted in Brazil and Mexico established statistically significant results between these two variables.^[21, 23, 24]

Only in the study conducted in Peru, there was no statistical significance when relating these two variables. These results are representative of the health education needs that the nursing staff must cover in these patients, complying with the established regulations and generating self-help groups in

this type of population.

5. CONCLUSIONS

The results of this study suggest the importance of educating patients diagnosed with type 2 diabetes mellitus, since the knowledge of their disease contributes to the patient accepting and adhering to treatment. These results allow us to highlight the importance of opportunely assessing, as established in the regulations, the presence of data suggesting NPD in this type of patient, as a way to prevent this complication that occupies one of the first places in the complications of diabetes mellitus and that is the main cause of ulceration and amputations. Peripheral neuropathy can manifest in many different ways and the limitations of ability to perform activities of daily living can be devastating. It is for this reason that patients need early detection of symptoms and supportive care, and health care practitioners play a key role in educating diabetic population.

Limitations of the study

The questionnaires are self-filled in, thus the possibility of professionals handling it to the patients without all the necessary previous explanations.

CONFLICTS OF INTEREST DISCLOSURE

The authors declare they have no conflicts of interest.

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