



Prevalence of Misconceptions about Diabetes and their Association with Metabolic and Psychological Variables

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Abstract

Objective: To evaluate misconceptions about diabetes in people who attend the first visit at the CAIPaDi program, as well as its association with metabolic and psychological variables at short and long term.

Methods and Analysis: The frequency of misconceptions in diabetes was determined through a true/false survey. We compared sociodemographic, metabolic and psychological variables between people with and without misconceptions at baseline, at 3 months and 1 year after a multidisciplinary educational program.

Results: 902 participants answered the survey, with an age of 50 ± 10 years old, 54.3% were women, with 1 (0-5) years living with type 2 diabetes. At baseline, 53% of the participants had at least 1 misconception, being more frequent in women ($p=0.045$) and in population with lower educational level ($p<0.001$). The most common were "emotional stress and fright cause diabetes" (34.4%), "in the control of my diabetes only matters glucose management" (15.2%) and "women with diabetes should not get pregnant" (11.8%). At basal, patients with misconceptions had higher HbA1c (9.0 ± 2.6 vs 8.4 ± 2.4 , $p<0.001$), lower quality of life (DQOL 95.2 ± 26.2 vs 90.2 ± 23.6 , $p = 0.03$), more problematic areas in diabetes (41.2 [21.2-58.4] vs 35 [17.5-52.6], $p = 0.01$), more depression (42.6% vs 32.9%, $p = 0.003$) and anxiety (58.6% vs 40.6%, $p = 0.001$) compared to patients without misconceptions. With the exception of HbA1c (6.6 ± 1 vs 6.4 ± 0.8 , $p = 0.025$ at 1 year), no differences were observed in the annual visits.

Conclusion: We found a high prevalence of people with misconceptions in diabetes. This group had worst glycaemic control, higher scores in PAID questionnaire, lower quality of life and more depression and anxiety symptoms. Participants with misconceptions had lower educational level. An educative program an educational assistance program can minimize differences by eradicating misconceptions.

Keywords: Diabetes; Misconceptions; Metabolic; Psychological; Education; Glucose

Abbreviations: BMI: Body Mass Index; DQoL: Diabetes Quality of Life; PAID: Problematic Areas in Diabetes; HAD: Hospital Anxiety and Depression Scale.

Introduction

The International Diabetes Federation estimates a prevalence of 463 million people with diabetes around the

world [1]. México is considered the sixth country with more diabetes, with around 17 million people between 20 and 79 years old [1]. According to the National Survey of Health and Nutrition (ENSANUT Medio Camino) 2016, México has a prevalence of 9.4% of people with diabetes previously diagnosed [2]. Considering the high prevalence of diabetes, is important to identify knowledge, perceptions, beliefs, misconceptions and actions related to this chronic condition that could have an impact in diabetes control [3].

Misconceptions have been associated with various factors such as educational level, cultural or religious beliefs which change between countries [4,5]. Mexico has a broad cultural heritage with strong health beliefs and myths around different diseases.

There are some studies around the world describing the most frequent myths and misconceptions in people with diabetes and their families [4-7]. However, there are no studies that associate these beliefs with metabolic and psychological variables in prospective assessments.

The objective of this study was to evaluate misconceptions about diabetes in participants who attend the Center for Comprehensive Care of the Patient with Diabetes (CAIPaDi) at baseline, as well as its association with metabolic and psychological variables in the first visit and in the follow up of 3 months and 1 year. The hypothesis was that participants with misconceptions about diabetes had worst metabolic and psychological parameters.

Materials and Methods

Patient and Public Involvement

For the CAIPaDi program, we included participants with type 2 diabetes with less than 5 years of diagnosis, without disabling complications, non-smokers, between 18 and 70 years old, and body mass index (BMI) <45 kg/m². The CAIPaDi program-consist of 4 monthly visits and annual follow up evaluations. These interventions include medical care, lifestyle, mental health assessment and diabetes education. All interventions are patient-centered of a multidisciplinary team (endocrinologist, nutritionist, nurse, psychologist, psychiatrist, physiotherapist, ophthalmologist/optometrist, periodontist and diabetes educators). In the diabetes education interventions, the issues addressed are diabetes pathophysiology, risk factors, glycaemic and metabolic goals, self-monitoring blood glucose, foot care, insulin injection technique and chronic complications [8,9].

The protocol was approved by Investigation and Ethics Committees of the Instituto Nacional de Ciencias Médicas y Nutrición Salvador Zubirán (Ref 1198) and all participants

signed an informed consent letter. The protocol was registered at ClinicalTrials.gov no. NCT02836808 on July 19th of 2016. Informed written consent was obtained from all patients, at baseline [9].

Study Design

We conducted a prospective study with the assessment of 10 key misconceptions through a true/false survey. Some of the key misconceptions included in this survey were identified in the diabetes education sessions with patients and others were taken from other published studies [3,10]. It was applied to patients who attended the first visit of the CAIPaDi program from October 2014 to January 2018. For the study, we included participants who filled out the survey at baseline and came to their follow up visit at 3 months and 1 year. The survey was filled out at the beginning of the diabetes education sessions, so a possible bias of the study could have been the influence of the accompanying relatives.

Sociodemographic, metabolic and psychological variables were evaluated. Sociodemographic variables were age, sex and educational level. Educational level was stratified as basic (preschool, elementary and middle school), medium (high school) and advance level (bachelor, master and doctorate). Likewise, the body mass index (BMI), glycated haemoglobin (HbA1c), blood pressure, non-HDL cholesterol and triglycerides were evaluated. The instruments applied to assess the mental health variables were Problematic Areas in Diabetes (PAID), Diabetes Quality of Life (DQoL) and Hospital Anxiety and Depression Scale (HAD). The PAID questionnaire is used to identify difficulties related to diabetes, aiming to measure the stress associated with this condition [11]. The DQoL questionnaire evaluates 5 general dimensions related to diabetes and its treatment, which are: treatment satisfaction, treatment impact, concern about the future effects of diabetes, concern about social and professional effects and perceived health status. The total score can be between 0 and 229, considering good quality of life associated with health from 0 to 74, regular from 75 to 108 and low quality of life with >108 [12]. The HAD scale identifies symptoms of anxiety and depression. This scale considers a score of <8 as mild symptoms, 9 to 10 as moderate and >11 as severe for anxiety; for depression the score of mild symptoms is <7, moderate from 8 to 10, and severe >11 [13].

Statistical Analysis

Results are reported as means (\pm SD) or medians and interquartile ranges (25-75) if they followed or not a normal distribution respectively, according to the Kolmogorov-Smirnov test. Percentages were used for discrete values. The analysis included t test for related samples. X² and Fisher

tests was used for analysing data from categorical variables. We considered a level of statistical significance of $p < 0.05$.

Results

The survey was answered by 902 participants who attended the first visit of the CAIPaDi program. The population was 50 ± 10 years old, with 1 (0-5) years living with type 2 diabetes and 54.3% were women. Up to 52.8% of the participants had at least 1 misconception, being more frequent in women ($p=0.045$) and in population

with lower educational level ($p < 0.001$). In the group with misconceptions 31.1% of participants had basic, 18.7% medium and 50.1% advanced educational level. In the group of participants without misconceptions, 17.1% had basic educational level, 16.4% medium and 66.4% advanced. The most common misconceptions were “emotional stress and fright cause diabetes” (34.4%), “in the control of my diabetes only matters glucose management” (15.2%) and “women with diabetes should not get pregnant” (11.8%). The prevalence of misconceptions is shown in Table 1.

	n=902 (%)
Insulin injected causes blindness	56 (6.2)
Diabetes can be cured	80 (8.9)
Emotional stress and fright cause diabetes	310 (34.4)
Women with diabetes should not get pregnant	106 (11.8)
Home remedies can replace medical treatment	18 (2)
Insulin prescription means last stage of the disease	36 (4)
There is good and bad diabetes	102 (11.3)
Injected insulin causes addiction	31 (3.4)
If glucose level normalizes, means diabetes is cured	38 (4.2)
For diabetes control, only matters glucose management	137 (15.2)

Table 1: Prevalence of misconceptions about diabetes.

We compared the BMI, blood pressure, metabolic and psychological variables a baseline, at 3 months and 1 year between participants with and without misconceptions at the first visit, as shown in Table 2. At basal, participants with misconceptions had worst glycaemic control, higher scores in PAID questionnaire, lower quality of life and

more depression and anxiety symptoms. Participants with misconceptions had lower educational level. At 3 months people with misconceptions at baseline had worst HbA1c and more problematic areas in diabetes. There were no significant differences between groups at a 1 year follow up.

	Basal			3 months			Annual visit		
	Without misconceptions (n= 426)	With misconceptions (n= 476)	p	Without misconceptions at basal (n= 332)	With misconceptions at basal (n= 335)	p	Without misconceptions at basal (n= 183)	With misconceptions at basal (n= 170)	p
BMI (kg/m ²)	29.6 ± 4.9	29.2 ± 4.9	0.156	28.8 ± 4.7	28.6 ± 4.5	0.57	28.7 ± 4.7	28.5 ± 4.1	0.676
HbA1c mmol/mol (%)	68.7 ± 26.2 (8.4 ± 2.4)	75.2 ± 29.1 (9.0 ± 2.6)	< 0.001	47.5 ± 8.8 (6.4 ± 0.8)	49.3 ± 11.6 (6.6 ± 1)	0.025	51.3 ± 14.6 (6.8 ± 1.3)	55.1 ± 21.2 (7.1 ± 1.9)	0.054
Systolic Blood Pressure (mmHg)	126 ± 14.6	123 ± 14.7	0.014	117.6 ± 11	117 ± 11	0.83	120.5 ± 11.6	118.6 ± 11	0.106
Diastolic Blood Pressure (mmHg)	78 ± 7.7	77 ± 7.4	0.044	73.78 ± 6.8	73.27 ± 6.7	0.335	75.18 ± 6.5	73.5 ± 6	0.017

Non-HDL cholesterol (mmol/l)	3.7 ± 0.9	3.8 ± 1.2	0.583	2.7 ± 0.6	2.6 ± 0.6	0.85	3.2 ± 1	3.2 ± 0.9	0.782
Tryglicerides (mmol/l)	1.9 (1.3-2.6)	1.9 (1.4-2.7)	0.423	1.2 (1.0-1.6)	1.3 (1.0-1.7)	0.349	1.5 (1.1-2.1)	1.7 (1.2-2.2)	0.055
DQoL	90.2 ± 23.6	95.2 ± 26.2	0.003	70.1 ± 17.2	72.6 ± 16.5	0.068	73.6 ± 20.4	72.2 ± 17.6	0.503
PAID	35 (17.5-52.6)	41.2(21.2-58.4)	0.011	10 (3.7-18.7)	12.5 (5-24)	0.037	10 (3.7-23.7)	13.7 (5-27.5)	0.211
HAD depression n (%)	140 (32.9)	203 (42.6)	0.003	58(17.5)	68 (22.2)	0.374	39 (21.3)	43 (25.2)	0.381
HAD anxiety n (%)	173 (40.6)	245 (58.5)	0.001	40 (12)	56 (16.7)	0.098	33 (18)	37 (21.7)	0.424

Table 2: Comparison of participants with and without misconceptions at basal, 3 months and 1 year.

Note: BMI: Body Mass Index; DQoL: Diabetes Quality of Life; PAID: Problematic Areas in Diabetes; HAD: Hospital Anxiety and Depression Scale.

Discussion

This study presents the prevalence of misconceptions about diabetes in people who attend the first visit at CAIPaDi, as well as its association with educational, metabolic and psychological variables at baseline, 3 months and 1 year of follow up. We found a high prevalence of participants with misconceptions about diabetes. At baseline, this group had worst glycaemic control, more problematic areas in diabetes, lower quality of life and more depressive and anxious symptoms. People with misconceptions had a lower educational level. At 3 months, participants who had misconceptions in the first visit had higher HbA1c and more problematic areas in diabetes. Although mean HbA1c improved in both groups, it was lower in patients who did not have misconceptions at baseline. At 1 year of follow up, triglycerides and HbA1c were in better control in the group who did not have misconceptions at baseline, but was not statistically significant.

Other studies in Mexico have found similar misconceptions. Andrade, et al. [14] explored misconceptions about diabetes in clinics in a qualitative study, where they found that 31.2% of the people with diabetes thought that “emotional stress and fright causes diabetes”, very similar to our population (34.4%). In the same study, 43.7% of the patients had the misconception that “home remedies can help in diabetes control”; in our study only 2% thought that home remedies can replace medical treatment [14]. Garza-Elizondo, et al. [15] found that 22% of the participants with type 2 diabetes had the misconception that fright causes diabetes. Recent studies have found that psychological chronic stress and depression are linked to type 2 diabetes, through various mechanisms such as inflammatory cytokine

expression leading to chronic low grade inflammation, release of glucose and lipids into the circulation and the modification of health behaviours such as exercise, food choice and adherence to medication [16]. However, in the Mexican population, people generally consider that a single stressful situation can lead to diabetes, without taking into account other potential risk factors as obesity, first degree relatives with diabetes, physical inactivity, dyslipidemia, hypertension, and age, among others [17].

Other study explored myths and misconceptions of 300 patients with diabetes who attend a Mexican Social Security Institute (IMSS) clinic and found that some of the most prevalent misconceptions were “if I feel well it is because my sugar levels are normal” (84%), “insulin causes blindness” (46.3%), “insulin treatment means I am on last stage of diabetes” (45%), “home remedies help in diabetes control” (31.8%), “anger causes diabetes” (41.3%), “fright causes diabetes” (40%) and “diabetes can be cured” (11.7%) [8]. The first misconception was not included in our study, but will be included in a second phase because it can have an impact on treatment abandonment. In our study, the misconceptions “diabetes can be cured” and “fright causes diabetes” were found in a similar proportion, but the other misconceptions were less common. Our population was less afraid to insulin treatment (only 6.2% thought that insulin causes blindness and 4% believe that insulin prescription means last stage of the disease) compared with Salazar et al results [10]. In a recent study, it was found that people with (i) recent diagnosis of diabetes (< 6 years), (ii) overweight or obesity, and (iii) not taking insulin, could achieve diabetes remission, defined as HbA1c <6.5% after at least 2 months without antidiabetic medications. This remission was achieved in 46% of the intervention group, being higher in persons who lost 5-10

kg (57%) and >15 kg (86%) in a follow up of 12 months. So according to this study diabetes remission can be achieved in some patients with a low calorie diet, exercise and a maintained weight loss for up to 12 months [18]. However in the Mexican population, the misconception of “diabetes can be cured” can lead the patients to take alternative therapies that have no scientific evidence of working and to abandon medical treatment.

In a study conducted in the United States of America and Europe, misconceptions about insulin were evaluated in people with type 2 diabetes with recent insulin prescription. From the 87 participants of the study, only 43.7% decided to start insulin treatment. Misconceptions founded as a barrier to insulin initiation were “insulin prescription means last stage of diabetes” (21%) and “insulin treatment causes vision loss” (6.9%). The incidence of the latter misconception was very similar to that of our study’s population (6.2%), but the incidence of the former misconception was 5 times higher than in our study [7]. In an Indian study analyzing 505 people with type 2 diabetes who refused insulin injections, it was found that the main barriers were “fear of side effects” (68.7%) and “injected insulin causes addiction” (64.7%) which were much higher than in our study’s population [19]. Although insulin is essential when patients no longer have pancreatic insulin reserve, its prescription does not imply that the patient is in the last stage of the disease or that his condition is serious. The problem of these misconceptions is the rejection or delay in its use.

In 2016, Nitsche, et al. conducted a study on a population in South America. 306 individuals (25% health professionals, 14% patients with diabetes and 15% caregivers) were asked about beliefs and myths in diabetes, feelings related to the disease, nutritional issues and medical treatment. They found that 10% of the population believed that “diabetes can be cured with natural treatments” and 15% that “there is good and bad diabetes”, both misconceptions very similar to our findings (8.9% and 11.3%, respectively) [3].

In India, a country with deep-rooted beliefs in spiritual treatment and alternative medicine, common misconceptions were “diabetes is contagious” (17.8%), “soaking feet in water helps decrease blood sugar level” (11.8%), and “diabetes occurs because of past sins and can be cured with spiritual treatment” (9.4%) [5]. We did not include these misconceptions in our survey because no one referred them in our interventions. Some interesting results of this study are that people without diabetes had more misconceptions than participants with this condition (related to causes and treatment), and there were no differences on misconceptions between religions (Muslim vs Hindu). Only the misconception “spiritual treatment can cure diabetes”

($p=0.02$), was higher in Muslim population. Similar to our results, women had more misconceptions than men and more common in population with less educational level [5].

Misconceptions like “women with diabetes should not get pregnant”, “if glucose levels normalize, diabetes is cured” and “for diabetes control, only matters glucose management” were not found in the reviewed literature. However, they were mentioned in our population and were found in an important proportion. It is important to mention that women in reproductive age that lives with diabetes should receive preconception counseling as part of their diabetes care routine in order to achieve a good diabetes control and an HbA1c <6.5% (before and during pregnancy) to reduce the risk of congenital anomalies, macrosomia, preeclampsia, and other maternal-fetal complications [20].

The strength of our study is the number of patients evaluated and the comparison of metabolic and psychological parameters in prospective basis. It is a fast, simple and low-cost strategy that provides an overview of the knowledge and beliefs about the disease of the population with diabetes, which facilitates the accuracy of the approach. This study has external validity in Mexican population since we considered Mexican culture and misconceptions.

The limitations of the study were that the misconceptions were not directly related to actions and were not evaluated in subsequent visits. Is important to search for misconceptions related to other diabetes areas, as nutrition, exercise, mental health or medical treatment, that could have more influence in decision making. Based on this, a second survey was developed to assess myths and misconceptions of different areas in diabetes that have more impact in self-care, and therefore the identification and eradication of these beliefs could help in diabetes control, reinforce treatment adherence and promote the prevention of complications in a long-term basis.

Funding Sources

Competing Interest

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Conflict of Interest

There was no conflict of interest by the authors of the study.

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References

- Williams R, Colagiuri S, Almutairi R (2019) IDF Diabetes Atlas, 9th (Edn.), International Diabetes Federation.
- (2016) National Health and Nutrition Survey-MC 2016. Final report of results half way, National Institute of Public Health, pp: 47-50.
- Prado de Nitsch F, Nitsch-Montiel MA, Alveo-Lorenzo JA, Araúz AC, Arias-Henriquez AE, et al. (2016) Survey results: Beliefs about diabetes in Central America and the Dominican Republic 2014-2015. *Rev ALAD* 6: 18-28.
- Rai M, Kishore J (2009) Myths about diabetes and its treatment in North Indian population. *Int J Diabetes Dev Ctries* 29(3): 129-132.
- Nisar N, Khan IA, Qadri MH, Sher SA (2007) Myths about diabetes mellitus among non-diabetic individuals attending primary health care centers of karachi subrubs. *J Coll Physicians Surg Pak* 17(7): 398-401.
- Bertran EA, Pinelli NR, Sills SJ, Jaber LA (2017) The Arab American experience with diabetes: Perceptions, myths and implications for culturally-specific interventions. *Prim Care Diabetes* 11(1): 13-19.
- Brod M, Alolga SL, Meneghini L (2014) Barriers to Initiating Insulin in Type 2 Diabetes Patients: Development of a New Patient Education Tool to Address Myths, Misconceptions and Clinical Realities. *Patient-Patient-Centered Outcomes Res* 7(4): 437-450.
- Hernández-Jiménez S, García-Ulloa C, Mehta R, Aguilar-Salinas CA, Kershenobich-stalnikowitz D (2014) Innovative Models for the Empowerment of Patients with Type 2 Diabetes: The CAIPaDi Program. *Recent patents Endocrine, Metab Immune Drug Discov* 8(3): 202-209.
- Hernandez-Jiménez S, García-Ulloa AC, Bello-Chavolla OY, Aguilar-Salinas CA, Kershenobich-Stalnikowitz D (2019) Long-term effectiveness of a type 2 diabetes comprehensive care program. *The CAIPaDi model* 151: 128-137.
- Salazar-Fonseca E, Ponce-Rosas ER, Cervantes-Naranjo A, Jiménez-Hernández JC (2018) Mitos y creencias sobre la diabetes en pacientes de una unidad médica de atención primaria en la Ciudad de México. *Especialista en Medicina Familiar* 20(1): 15-21.
- Schmitt A, Reimer A, Kulzer B, Haak T, Ehrmann D, et al. (2016) How to assess diabetes distress: Comparison of the Problem Areas in Diabetes Scale (PAID) and the Diabetes Distress Scale (DDS). *Diabet Med* 33(6): 835-843.
- Burroughs TE, Desikan R, Waterman BM, Gilin D, McGill J (2004) Development and validity of the Diabetes Quality of Life Brief Clinical Inventory. *Diabetes Spectr* 17(1): 44-49.
- López-Alvarenga JC, Vázquez-Velázquez V, Arcila-Martínez D, Sierra-Ovando ÁE, González-Barranco J, et al. (2002) Accuracy and diagnostic utility of the Hospital Anxiety and Depression Scale (HAD) in a sample of obese Mexican patients. *Rev Invest Clin* 54(5): 403-409.
- Andrade Cordoba S, Antonio Lopez MT, Cerezo Bautista AM (2012) Creencias en Salud de la Persona que Vive con Diabetes. *Desarro Cientif Enferm* 20(8): 255-260.
- García Elizondo ME, Calderón Dimas C, Salinas Martínez AM, Núñez Rocha G (2003) Atribuciones y creencias sobre la diabetes mellitus tipo 2. *medigraphic Artemisa* 41(6): 465-472.
- Hackett RA, Steptoe A (2017) Type 2 diabetes mellitus and psychological stress-a modifiable risk factor. *Nat Rev Endocrinol* 13(9): 547-560.
- American Diabetes Association (2020) Classification and Diagnosis of Diabetes: Standards of Medical Care in Diabetes-2020. *Diabetes Care* 43(S1): S14-S31.
- Lean ME, Leslie WS, Barnes AC, Brosnahan N, Thom G, et al. (2018) Primary care-led weight management for remission of type 2 diabetes (DiRECT): an open-label, cluster-randomised trial. *Lancet* 391(10120): 541-551.

19. Aleali AM, Payami SP, Latifi SM, Yazdanpanah L, Hesam S, et al. (2018) Evaluation of psychological resistance to insulin treatment in type II diabetic patients. *Diabetes Metab Syndr Clin Res Rev* 12(6): 929-932.
20. American Diabetes Association (2020) Management of Diabetes in Pregnancy: Standards of Medical Care in Diabetes-2020. *Diabetes Care* 43(S1): S183-S192.

