Original Research Article

Lifestyle impact on glycemic control in patients diagnosed with type 2 diabetes.

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ABSTRACT

Objective: To determine the association lifestyle and glycemic control of patients with type 2 diabetes.
Study design: This is a descriptive, cross sectional study.
Place and Duration of Study: This study was conducted in the Family Medicine Unit Number 55 of the Mexican Institute of Social Security in Puebla, Mexico during January to June in 2016.
Methodology: a total of 275 patients in whom the lifestyle and glycemic control were correlated. A questionnaire in which the variables included gender, age, level of education, occupation, marital status, lifestyle, glycemic control and number of years since they were diagnosed with diabetes mellitus type 2 was used. Descriptive statistics and X^2 was used.
Results: 275 patients were included who met the inclusion criteria. Their average age was *59.7* years, the female gender prevailed with *64%*. A result of X^2=3.611 and P=0.05 was obtained; therefore the study was considered statistically significant, since value of *P= .05* was considered statistically significant. **Conclusion:** There is an association between the patient's lifestyle and glycemic control.

1. INTRODUCTION

Type 2 diabetes is a public health problem and its prevalence shows an increasing rate, probably due to the life style, longer life expectancy and a rapid growth in adult population [1].

Currently in Mexico, the diabetes represents a problem that affects mainly low-income population, urban citizen whose lifestyle determines the dietary behaviors, physical activity and emotional aspects [2]. In the last years, type 2 diabetes has become a true worldwide emergency. The improper glycemic control is more frequent in those patients that have an unhealthy lifestyle or poor treatment adherence. Approximately 8.2% of the population between 20 and 68 years have diabetes, which represent more than 4 million sick people. According to 2003 mortality statistics in Mexico, it has become the leading death cause in women (15.4 out of 100 000) and second in men (10.3 out of 100 000) [3].

Type 2 diabetes is considered a systemic disease that describes a metabolic disorder of multiple etiologies, characterized by chronic hyperglycemia with disturbances in carbohydrates, fats and proteins metabolism. It is the results of secretion defects or action of insulin [4,5]. Considered as a multiorgan disease, with micro and macrovascular system affectation which causes as consequence injury in different organs and systems in short or long term [6,3]. Patients with type 2 diabetes present insulin resistance (IR), relative deficiency and progressive beta cells depletion [7,8]. Although regularly there is a coexistence of factors, IR is probably the predominant component in early stages in overweight and obesity cases [9]. The causes that trigger type 2

diabetes are unknown in 70-85% of patients, although factors such as polygenic inheritance (undetermined number of gens) participate in addition to nutritional and environmental factors.

The treatment involves different circumstances, said modifications not only depend on the patient but on the social and family environment that determine the treatment success [10]. On the other hand, integral treatment given by the medic and nutritionist is essential for the patient, as well as the adherence to it [11]. The objective of the treatment is the prevention of chronic and acute complications. Usually it is progressive, starting with an adequate diet and exercise, moving to the use of one or more hypoglycemic agents and finally, combinations of these agents with insulin [8]. For a decade, there have been solid evidences that improvement of glycemic control reduces microvascular complication (diabetic retinopathy, nephropathy and neuropathy) regardless of the diabetes type and the used hypoglycemic agent [12].

The recommendations of the last years by the American Diabetes Association (ADA) highlight the main objectives: the early education of the patient and family through the compliance of a standardized program, strict glycemic control criteria based on glycosylated hemoglobin, desirable numbers in arterial pressure, lipid profile and smoking cessation [5].

The WHO considers that sanitary education is a fundamental part in the treatment of diabetes and the only effective one for the disease control and complication prevention. Additionally, it is important to educate the patients, giving them the necessary knowledge and skills to face the demands of the treatment, as well as promoting the motivation, sense of security and responsibility to care daily for their control, without affecting their self-esteem and well-being [5].

This study was conducted with the main objective to determine the association between the life style of the patient and type 2 diabetes and glycemic control.

2. MATERIAL AND METHODS

An observational, descriptive, prospective, cross-sectional study was conducted in a population of patients with type 2 diabetes. A non-probability and convenience sampling was employed, with a total of 275 patients that met the inclusion criteria: type 2 diabetes diagnosis, older than 18, both sexes, and willingness to participate. Among the variables: sex, age, schooling, marital status, occupation, socio-economic status, lifestyle, glycemic control, progression time and type of treatment.

For the lifestyle variable, the instrument to measure diabetic lifestyles (IMEVID) was used. It is a specific, standardized, global and self-administered questionnaire. This instrument has a logic and content validity, in addition to a proper level of internal consistency and reliability of test-retest [1]. As for the glycemic control variable, glycosylated hemoglobin was employed (HbA1c) which reflects the long-term glycemic control and is more accurate and stable test than serum glucose. Values <7% are considered as proper control and >7% are improper glucose control [13].

Subsequent to the survey recollection, data was input in a database of the statistic program SPSS v22 for PC. Quantitative variables were analyzed with central tendency and dispersion measures such as the mode, mean, median and standard deviation. Qualitative variables were analyzed with percentage and correlated with X^2. Hereinafter, data analysis, tables and graphics was performed in order to deliver a discussion, conclusion and proposals.

3. RESULTS

A total of 275 patients, mode age was 58, minimum 18 and maximum 93. Most part of survey respondents had elementary schooling, 62.2% were married (n=171), 61.5% had unfavorable lifestyle, most frequent occupation was housewife with 46.5% (n=128), most patients had uncontrolled glucose levels 67.3% (n=185) and have between 6 and 10 years of diabetes progression with a total of 28.% (n=79). Regarding descriptive statistics:

Table 1: Socio-demographic characteristics of patients.

Schooling level	n	%
Iliterate	44	16
Elemental	127	46.2
Junior high	58	21.1
High school	36	13.1
College	10	3.6
Total	275	100
Marital status	**n**	**%**
Single	10	3.6
Married	171	62.2
Free union	24	8.7
Divorced	10	3.6
Widowed	42	15.3
Separeted	18	6.5
Total	275	100
OCUPACIÓN	**n**	**%**
Manual worker	18	6.5
Employed	54	19.6
Housewife	128	46.5
Retired	75	27.4
Total	275	100
LIFE STYLE	**n**	**%**
Unfavorable	20	7.2
Little favorable	169	61.4
Favorable	86	31.4
Total	275	100
GLYCEMIC CONTROL	**n**	**%**
Controlled	90	32.7
Uncontrolled	185	67.3
Total	275	100
YEARS OF PROGRESSION	**n**	**%**
1-5	78	28.4
6-10	79	28.8
11-15	50	18.2
16-20	33	12
21-25	14	5
26-30	12	4.4
31-35	3	1
36-40	5	1.9
41-45	1	0.3
Total	275	100

The type of treatment most frequent was oral in 55% (n=152) and only 10% (n=27) uses insulin as monotherapy.

Graph 1: Type of treatment
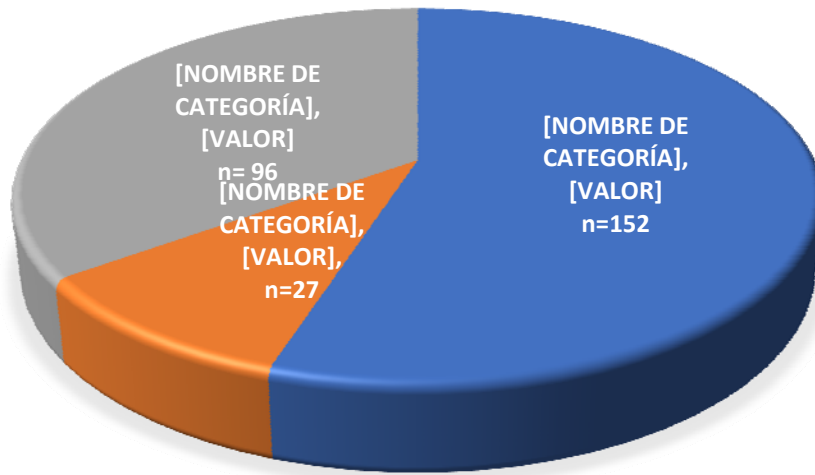
Lifestyle was dichotomized as favorable and unfavorable in order to relate using Chi square to glycemic control.

An X^2= 3.611 and a p=0.05 were reported, therefore, it is statistically significant. Thus, confirming the relation between uncontrolled glycemic levels and lifestyle.

Table 2: Contigency table for glycemic control and lifestye.

Glycemic control	Dichotomized lifestyle		Total
	Unfavorable	Favorable	
Proper control	55	35	90
Improper control	134	51	185
Total	189	86	275

4. DISCUSSION

The diabetes is considered as a pandemic with an increase rate. Recent estimations refer the existence of 143 millions of ill people in the world, a number that could duplicate by 2030. It is a disease with a high morbidity and an important cause of premature mortality. In 2005, 1.1 million of people perished due to diabetes, half of deaths were younger than 70, and more than half (55%) were women. The estimated diabetes prevalence in Mexico is approximately 6.5% for population between 30 and 65 years old, and in other studies between 6 and 12% [14].

This entity is a health problem due to its repercussion magnitude on the biologic area as well as the psychologic and social one. It is one of the main causes of morbidity and mortality, the third or fourth cause of outpatient consult demand and mortality raise from fourth in 1990 to third in 2001. It is necessary to evaluate whether lifestyles favor a greater damage, to propose alternatives and to improve the attention programs [3].

In the paper by Figueroa Suarez and cols paper "Lifestyle and metabolic control in diabetes". Demographic and clinic aspects were measured with IMEVID. 539 type 2 diabetics were included, with female predominance (73.3%) and in occupation, housewife (56.6%). In the Rodriguez Chavez and cols paper, there was with a total 275 diabetics in which female predominance was 64%, and as occupation dominated housewife with 46.5%. These numbers which are similar to two reports, probably attributable to the female sex prevalence in both studies. Figueroa found that the elementary schooling was the most common level which is similar to our own study with 46.2%. The rate of combined therapy with oral medication with insulin was 19.3% and insulin alone 2.4% in Figueroa´s; and in our case combined therapy was 35% and insulin alone as 10% [2].

Corona and Meléndez and cols. In their article "Relation between life style and glycemic control in patient with type 2 diabetes", its objective was to determine the relation between the lifestyle evaluated with IMEVID and glycemic control measured with HbA1 in patients with type 2 diabetes, as well as to assess the glucose control with glycosylated hemoglobin. Comparable to our study; the objective was to determine the relation between the IMEVID lifestyle score and glycemic control measured with glycosylated hemoglobin in patients with type 2 diabetes. Figueroa´s methodology consisted in cases study (patients with improper glucose control) and controls (proper glycemic control) and a exposition risk factor such an unfavorable lifestyle in the Family Medicine Department in a second level hospital center, with a total population of 43 patients. For Corona more than 85% in both groups are older than 50, with 50% between 50 and 65 years old, and in our case was 58 years old. They report that in their cases group 79% were female and 21% male and in their control group 59% was female and 41% male, in both the female sex prevailed. Likewise, in our study the female sex prevailed with 64% and male only had 36%. Regarding the age when diagnosed with diabetes, Corona found a greater portion between 11 and 20 years old (57% in cases and 48% in controls). In contrast, our study reported between 11 and 20 years only 30.2%. Concerning the lifestyle, Corona Meléndez and cols applied the IMEVID questionnaire which delivered that out of the total with a favorable lifestyle, 37.5% conforms the cases groups (HbA1c >6.5%) and 62.5% to control groups (HbAc1 < 6.5%). On the other hand, out of the total of patients with unfavorable lifestyle, the 26% were in the cases groups and 74% to controls group, providing an odd ratio (OR) value of 0.59 (p=0.05) and an X^2 value of 3.611 (p=0.05). In our research, the unfavorable lifestyle and little less than favorable were 68.8% and favorable 31.4%. The glycosylated hemoglobin was considered as control parameter, 32.7% had a proper control (HbAc1 <7%), and 67.3% had an improper one. Thus, when correlating to life style to controls, an X2=3.611 and p=0.05 were delivered, which is similar in both groups [13].

Ramirez and Ordoñez and cols, in their paper "Current lifestyle of patients with type 2 diabetes" for the information recollection, the IMEVID questionnaire was employed. Their population was 30 patients who assisted without fail to diabetes control. In our study, a total population of 275 patients with diabetes was used for the data recollection which variables were: nutrition, physical activity, smocking, alcoholism, information about diabetes, emotions, treatment adherence and lifestyle. Ramírez O. reports a mean age of 66.5, different to us with 59.7 years old. There was no predominance in sex (50% female and 50% male), unlike our study were female sex prevailed. 80% of their survey patients had healthy lifestyles, which contributes to the complication prevention in relation to their pathology and improve their wellbeing and progression of the disease. Nevertheless, our population, only 31.4% had a favorable lifestyle and the remaining patients had a unfavorable one. This could be due to the fact that Ramirez studied a population where the patients attended a diabetes program; unlike us that an open population was used, in addition to the greater number of patients [15].

5. CONCLUSSIONS

In our most important objective, relating the glycemic control to lifestyle scored by the IMEVID, X^2 was used. This delivered a significant p value; hence, we could conclude that there is a relation between the variables, therefore, it exists an association between lifestyle and the glycemic control of patients with diabetes type 2. Thus, modification in the lifestyle can have a favorable or unfavorable impact on the disease evolution.

CONSENT (IF APPLICABLE)

Not applicable.

ETHICAL APPROVAL (IF APPLICABLE)

The ethics committee approved this study.

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