ORIGINAL RESEARCH

Family functioning is related to health behaviors in patients with type 2 diabetes

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Abstract

In 2014, 8.5% of people worldwide over the age of 18 had type 2 diabetes mellitus. It is estimated that, in recent years, the prevalence of this disease has increased mainly in low- and middle-income countries. Health behaviors are considered fundamental in the prevention, treatment, and control of this disease. The aim of this study was to determine if there is an association between health behaviors and satisfaction with family functioning in patients diagnosed with type 2 diabetes mellitus. This is an observational, transversal, analytical study. In the Family Medicine Unit No.33 in Chihuahua, Mexico, 297 patients with a diagnosis of type 2 diabetes mellitus were identified. Data was collected regarding sex, age and the Instrument for Measuring Lifestyles in Diabetics (IMEVID, for its acronym in Spanish) and the Family APGAR. We found that of the total number of patients, 91.6% presented some degree of unfavorable health behaviors, while 92.6% presented some type of family dysfunction. The categorical analysis positively correlated good family functionality with favorable health behaviors, Fisher's exact test p <0.001. The regression model, adjusted for age and sex, found that for a one-point increase in the Family APGAR, an increase of 1.75 points in the IMEVID was expected (95% CI 1.25 to 2.24; p value <0.001). In conclusion, in the treatment of diabetic patients, it is necessary to influence the functionality of the family, which could contribute to positive changes in health behaviors.

Keywords: Type 2 diabetes mellitus, health behavior, Family dynamics, lifestyles, nutrition, physical activity

Introduction

In 2014, the World Health Organization estimated that 422 million people worldwide had type 2 diabetes mellitus and that this number could double in the coming years. This increase is expected to occur mainly in developing countries, where it would especially affect people aged 45 to 64. In contrast, in developed countries it will mostly affect people 65 and older [1].

The increase in the prevalence of this disease has multiple causes; those that stand out include aging populations, unhealthy diets, obesity, and sedentary lifestyle. [1] Because type 2 diabetes mellitus can be prevented, treated, and controlled through interventions focused on changes in eating habits and increased physical activity, among others, this disease is widely linked to health behaviors [2,3].

On the other hand, family functionality has been related to better glycemic control and health status of diabetic patients [4,5]. Family functionality is defined as the degree of cohesion that exists between group members [6].

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A functional family group is able to respond to conflicts and critical situations with some emotional stability, while members of dysfunctional families prioritize private affairs at the expense of the group and assume no role within the family system [7].

Research suggests that satisfaction with family functioning is related to health behaviors or to some of its domains, such as healthy eating and physical activity [8-11]. However, a review of the literature did not identify investigations conducted in patients with type 2 diabetes mellitus. Therefore, the objective of the present study is to determine if there is an association between health behaviors and satisfaction with family functionality in patients diagnosed with type 2 diabetes mellitus.

Material and Methods

This is an observational, transversal, analytical study. It was conducted on patients of the Mexican Social Security Institute's (IMSS, for its acronym in Spanish) Family Medicine Unit No. 33 in Chihuahua, Mexico; these patients, were between 40 and 60 years of age and of both sexes, had been diagnosed with diabetes mellitus type 2 for at least five years and did not present complications. Those who chose not to enter the study or who were unable to answer the instruments were excluded. In total, 297 adults were interviewed in July 2015 in the waiting room of the

medical unit. This study was carried out in accordance with the Declaration of Helsinki and it was authorized by the IMSS Local Research and Ethics Committee on Health Research No. 801.

Health behaviors

The IMEVID scale is a self-administered tool designed to measure health behaviors in outpatients with type 2 diabetes mellitus. This consists of 25 closed questions spread between seven domains: nutrition, physical activity, tobacco use, and alcohol consumption, awareness of diabetes, emotions, and therapeutic adherence. The instrument was designed to be applied in waiting rooms, and it allows the identification of risk behaviors that can be modified through counseling or integration of subjects who require self-help groups or a specific intervention. The IMEVID scale has three response options; each response prompts a score of 0, 2, or 4, where the highest value corresponds to the most desirable behavior [12]. This instrument has a score ranging from 0 to 100, and classifies the subjects as follows: a score below 60 points corresponds to unfavorable health behaviors; a score between 60 and 80, indicates mild favorable health behaviors; and more than 80 points corresponds to favorable health behaviors [13].

Family functionality

The Family APGAR is a reliable, valid, and useful instrument for measuring people's satisfaction in five components of family functionality [14], and has been previously validated in the Mexican population [15]. This tool aims to demonstrate how a person perceives the functioning of his family at a given time, and evaluates five basic functions of the family: adaptation, partnership, growth, affection, and resolve.

A score ranging from 0 to 4 points is assigned to each answer along the following scale: never, almost never, sometimes, almost always, and always. This instrument produces a score ranging from 0 to 20 points and is scored as follows: a score equal to or less than 9 points indicates severe family dysfunction; 10 to 12 points, moderate family dysfunction; 13 to 16 points, mild family dysfunction; and 17 to 20 points, good family functionality [16].

Statistical analysis

Sex (f/m) and age (years) data as well as IMEVID and Family APGAR scores were captured by duplication. Variables are presented as averages and standard deviation by sex, student T-Test was performed in order to detect statistically significant differences. The Spearman correlation coefficient was used for the analysis between the domains and the basic functions of the instruments.

Fisher's exact test assessed the relationship between health behaviors and satisfaction with family functionality by categories; through linear regression models, the scores were analyzed between both instruments. Values of $p < 0.05$ were considered statistically significant. Statistical analyses were carried out with the statistical program STATA 11.0 for Windows.

Results

The sample consisted mainly of women (71.0%). On average, participants were 54.4 years old (SD 5.8). Women had significantly better scores in the IMEVID domains; exceptions were awareness of diabetes, with no difference, and emotions, where men scored

on average 0.9 point more than women (p value <0.01). On the other hand, in the Family APGAR test's basic functions (affection and resolve), women received higher scores on average than men (see Table 1).

Of the patients, 154 (51.9%) presented unfavorable health behaviors, 118 (39.7%) had mild favorable health behaviors, and only 25 (8.4%) had favorable health behaviors. In relation to family functionality, more than half (157, 52.9%) had severe family dysfunction, 91 (30.6%) had moderate family dysfunction, 27 (9.1%) had mild family dysfunction, and 22 (7.4%) had good family functioning; the latter is not presented in the tables.

The basic functions of the Family APGAR, growth, affection, and resolve, are more broadly related to the seven domains of the IMEVID instrument, values of $p < 0.05$. The nutrition and tobacco consumption domains were related to each of the five basic functions of the Family APGAR, especially with growth, affection and resolve, with values of $p < 0.001$ (see Table 2). A relationship between the categories of family functionality and health behaviors was found, Fisher's exact test p value <0.001 (see Table 3).

On the other hand, the simple linear regression analysis between the scores of both instruments revealed that, with a one-point increase in the Family APGAR, an increase of 1.80 points in the IMEVID was expected (95% CI 1.30 to 2.28; p value <0.001), while the age-adjusted and sex-adjusted model found, with a one-point increase in the Family APGAR, a 1.75-point increase was expected in the IMEVID (95% CI 1.25 to 2.24, p <0.001). This data is not presented in tables.

Table 1. Characteristic of Patients

	Women n=211	Men n=86		
	Mean (SD)	Mean (SD)	Range	P value
Age	54.5 (5.8)	54.3 (5.8)	40 to 60	0.80
IMEVID				
Nutrition	20.5 (7.9)	18.7 (8.5)	0 to 36	0.04
Physical activity	6.1 (3.2)	5.3 (3.4)	0 to 12	0.04
Tobacco use	6.2 (2.9)	4.9 (3.3)	0 to 8	<0.001
Alcohol consumption	6.7 (2.4)	5.1 (3.2)	0 to 8	<0.001
Awareness of diabetes	2.9 (2.4)	2.7 (2.5)	0 to 8	0.33
Emotions	6.8 (3.2)	7.7 (2.6)	0 to 12	<0.01
Therapeutic adherence	9.2 (4.0)	7.8 (4.2)	0 to 16	<0.01
Family APGAR				
Adaptation	2.6 (1.0)	2.5 (0.9)	0 to 4	0.32
Partnership	2.4 (0.9)	2.4 (1.0)	0 to 4	0.45
Growth	1.9 (1.0)	1.8 (0.9)	0 to 4	0.21
Affection	1.7 (1.1)	1.5 (1.0)	0 to 4	0.05
Resolve	1.4 (1.2)	1.2 (1.1)	0 to 4	0.02

Age and scores of the IMEVID and Family APGAR are presented with their mean, standard deviation, and minimum and maximum values.

Table 2. Spearman correlation between the domains of IMEVID and the basic functions of the Family APGAR.

	Adaptation	Partnership	Growth	Affection	Resolve
Nutrition	0.11 *	0.11 *	0.24 ***	0.35 ***	0.32 ***
Physical activity	0.03	0.05	0.14 **	0.15 **	0.15 **
Tobacco use	0.03	0.09	0.18 ***	0.32 ***	0.40 ***
Alcohol consumption	0.11 *	0.18 **	0.13 *	0.25 ***	0.23 ***
Awareness of diabetes	0.07	0.12 *	0.24 ***	0.29 ***	0.34 ***
Emotions	-0.06	0.00	0.04	0.21 ***	0.22 ***
Therapeutic adherence	0.06	0.03	0.22 ***	0.36 ***	0.32 ***

P values < 0.05 = *, p < 0.01 = ** y p < 0.001 = ***

Table 3. Relationship between the categories of satisfaction with family functionality and health behaviors in diabetic patients through Fisher's Exact test.

	Severe family dysfunction	Moderate family dysfunction	Mild family dysfunction	Good family functionality
Unfavorable health behaviors	106 (67.5%)	39 (42.9%)	6 (22.2%)	3 (13.6%)
Mild favorable health behaviors	45 (28.7%)	44 (48.3%)	16 (59.3%)	13 (59.1%)
Favorable health behaviors	6 (3.8%)	8 (8.8%)	5 (18.5%)	6 (27.3%)

P value <0.001

Discussion

This study was conducted on a group of 297 diabetic patients of the IMSS in the City of Chihuahua, Mexico, it was found that 91.6% had unfavorable or mild favorable health behaviors and more than 92.6% presented some degree of family dysfunction. Furthermore, a positive and statistically significant relationship was found between health behavior domains and basic functions of family functionality, mainly in growth, affection and resolve, p value <0.001.

In most of the IMEVID domains—nutrition, physical activity, tobacco use, alcohol consumption, awareness of diabetes and therapeutic adherence—women on average scored higher than men, which could mean that women are more health-conscious. Moreover, men received, on average, one more point than women in the emotions field.

The results of this study corroborate the finding, widely reported in literature, that men have higher scores in beliefs, and women have higher scores in health responsibility [17,18].

The IMEVID domains correlate with growth, affection and resolve; these basic functions are defined, respectively, as the physical and emotional development and self-realization, the relationship of love that exists between the members of the family and the commitment to devote time to addressing the physical and emotional needs of other family members. This could mean that, in order to demonstrate healthy behaviors, it is important to fulfill these basic functions of the Family APGAR. [8-11, 19]

The results of this study are consistent with those reported in previous studies. Jiang et al. [8] conducted a study on 55 male and 33 female stroke survivors and found that better family functionality corresponded to better health behaviors, Pearson's correlation R = -0.535, p <0.01. Lee et al. [9] evaluated a population of 190 men and identified that family functionality had a positive correlation with health behaviors, Pearson correlation analysis r = .510, p <.001. Li et al. [10], in a study of 131 low-income

women, found that lower family functioning was independently associated with longer TV viewing time when controlling for other variables, hierarchical multiple regression analysis (B = 33.0, p <0.05). Flemming's research carried out on 12,624 adolescents showed similar results; [11] in this case family functionality was associated with physical activity and consumption of fruits and vegetables, ANCOVA (p <0.05).

It has been reported that most people with type 2 diabetes mellitus present disordered behavioral patterns in diet and physical activity, inadequate consumption of medication and control of glucose levels, and poor emotional state, all of which worsened the state of the patient [20,21]. It has also been described that adequate family functionality is related to adequate glycemic control [5,22] and glucose levels [23]. Other investigations emphasized the family's positive impact on adherence to treatment [24] and how family members can help the self-care of the diabetic patient [25].

This suggests that an adequate satisfaction with family functionality could favor better decisions in patients with type 2 diabetes mellitus and preserve their health. It is important to emphasize the work of the family physician, as well as nursing and nutrition professionals in the identification of family dysfunction for a better and multiple approaches to this disease.

Among the limitations of this study it can be mentioned that, because of the cross-sectional design, causality cannot be determined; use of non-probabilistic sampling limits the generalization of results. However, one of the study's strengths is that the questionnaires were only provided by a physician trained to handle these instruments; moreover, they have been validated in this population and widely used in research studies [11-16, 20,22].

A World Health Organization report recommends addressing common lifestyle risk factors for non-communicable diseases, taking into account their cost-effectiveness, relative ease, and speed of implementation [1]. There are proven programs in multidisciplinary interventions to plan effective preventive and therapeutic interventions in the care of these patients [13].

Conclusion

Good family functionality is related to favorable health behaviors in patients with type 2 diabetes mellitus. Interventions aimed at the prevention or treatment of diabetic patients should consider family support, which is fundamental. This is the first research study to find a relationship between satisfaction with family functionality and lifestyle in diabetic patients. Further studies are needed to test these findings.

Acknowledgements

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