

Research Article

Relationship between Family Life Cycle and Glycemic Control in Patients with Type 2 Diabetes Mellitus in Durango, Mexico

Diaz-Alfaro JA¹, Rivas-Gonzalez MA², Simental-Mendia LE³, Neri-Aragon IA⁴, Corral-Mendoza N⁵ and Ramirez-Leyva DH^{6*}

¹Department of Family Medicine, General Hospital Zone #1 (IMSS), Durango Delegation, Mexico

²Department of Family Medicine, Family Medicine Unit #49 (IMSS), Durango Delegation, Mexico

³Biomedical Research Unit (IMSS), Durango Delegation, Mexico

⁴Department of Family Medicine, Family Medicine Unit #44 (IMSS), Durango Delegation, Mexico

⁵Department of General Medicine, Xochicalco University, Baja California Delegation, Mexico

⁶Department of Family Medicine, Family Medicine Unit #37 (IMSS), Sinaloa Delegation, Sinaloa, Mexico

*Corresponding author: Ramirez-Leyva Diego Hazael, Department of Family Medicine, Family Medicine Unit #37 (IMSS), Sinaloa Delegation, México

Received: August 12, 2018; Accepted: September 07, 2018; Published: September 14, 2018

Abstract

Background: Type 2 diabetes mellitus (T2D) is one of the most frequent chronic diseases. The prevalence of T2D in people 20 years of age or older in Durango is 10.2%. A family who have a chronically ill family member (T2D), has to face significant alterations that occur mainly at the level of structure and family vital cycle, within these changes, glycemic control plays a very important role in the evolution of the disease.

Aim: The purpose of this study is to determine the association between family life cycle and glycemic control in families of Durango, Mexico.

Design and Setting: Comparative cross-sectional study.

Methods: In 209 patients in the General Hospital Zone #1, Durango, Mexico, patients were divided into two groups, with and without glycemic control to make an association in search of associated sociodemographic and family factors in T2D. For statistical analysis, association was established with chi-squared test and ANOVA for statistical significance, it was used 95% interval confidence ($p < 0.05$).

Results: The association of sociodemographic and family variables with glycemic control was: sex ($p=0.55$), marital status ($p=0.02$), educational stages ($p=0.91$), family vital cycle ($p=0.20$). The association between HbA1c (glycemic control) and family vital cycle phase showed an association in the uncontrolled group and independence and retirement and death phase ($p=0.02$).

Conclusion: Family life cycle is not associated with glycemic control in patients with type 2 diabetes. Since the findings are controversial, more studies with multiple variables are required.

Keywords: Family Vital Cycle; Type 2 Diabetes; Glycemic Control

Introduction

Type 2 diabetes mellitus (T2D) is one of the most frequent chronic diseases, its progressive and uncontrolled increase is considered a public health problem worldwide [1]. In Mexico, T2D occupies first place as a cause of mortality and its trend shows a progressive increase in recent years, it is estimated that the death rate grows 3% every year. The prevalence of T2D in people 20 years of age or older in Durango is 10.2%, a percentage higher than reported in the Encuesta Nacional de Salud y Nutricion (ENSANUT) in 2006 (7.4%) [2]. In comparison with national results, the prevalence of diabetes in Durango was above the national average (9.17%) [2].

Previous information has demonstrated an increasing number of people and families facing the process of diagnosis, treatment and the process of adaptation learning to live with a chronic illness in a family member. There is an essential necessity for health professionals to prepare with specific knowledge to manage properly the impact that this type of illness generates in the family environment. To have a better understanding we can define that family is a social group, organized as an open system, constituted by a variable number of

members, who in the majority of cases cohabit in the same place, they can be linked by consanguineous, legal or affinity ties. Family is a primary building block for the proper development of the somatic and cognitive building structure of the human being and all its surroundings. One of the fundamental family objectives is to be responsible for guiding and protecting its members, family structure is also very important for the family functions, provides the ability to diversify and adapt to adverse conditions, as well as being the unit of analysis in the Family Medicine practice that fort the study and a better understanding of the health-disease process [3].

Like all living organisms, family system tends to the conservation and evolution; the demands of change activate the mechanisms that counteract atypical elements and the system evolves towards an increasing complexity. Although family usually fluctuates within certain limits, it has an immense capacity to adapt and change, maintaining key elements of continuity. Family, therefore, is considered a social cell, whose membrane protects its individuals inside and relates them to the outside. Family reproduces, declines and also dies [4]. The most significant alterations that can be found, from the systemic point of view of a family who have a chronically

Table 1: Association between factors associated and glycemic control.

Variable	Subtype	Controlled Group (HbA1c <7%)	Uncontrolled Group (HbA1c >7%)	Total	P
		N (%) (n=88)	N (%) (n=121)	N (%) (n=209)	
Sex	Male	22 (25%)	26 (21%)	48 (23%)	0.551
	Female	66 (75%)	95 (79%)	161(77%)	
Marital Status	Single	17 (19%)	9 (7%)	26 (13%)	0.022
	Married	55 (63%)	81 (67%)	136 (65%)	
	Free Union	6 (7%)	5 (4%)	11 (5%)	
	Widower	10 (11%)	26 (22%)	36 (17%)	
Schooling	Illiterate	3 (3%)	3 (2.5%)	6 (3%)	0.911
	Primary	46 (52%)	67 (55%)	113 (54%)	
	Secondary	22 (25%)	31 (26%)	53 (26%)	
	High school	13 (15%)	17 (14%)	30 (14%)	
	Bachelor's degree	4(5%)	3 (2.5%)	7 (3%)	
Family Vital Cycle (Geyman)	Dispersion	13 (15%)	9 (7%)	22 (11%)	0.206
	Independence	39 (44%)	54 (45%)	93 (44%)	
	Retirement and death	36 (41%)	58 (48%)	94 (45%)	

N: Frequency, %: Percentage, HbA1c: Glycosylated hemoglobin, <: Less than, >: More than, p: Chi Square.

Table 2: Association between HbA1c and family vital cycle.

Family Vital Cycle (Geyman)		Controlled Group (HbA1c)	p	Uncontrolled Group (HbA1c)	p
		Dispersion	6.34% ± 0.55	0.29	10.27 ± 2.74
Independence	6.59% ± 0.65	8.88 ± 1.78			
Retirement and death	6.46% ± 0.37	8.58 ± 1.45			

±: Standard deviation, %: Percentage, HbA1c: Glycosylated hemoglobin, p: ANOVA.

ill family member, occur mainly at the level of structure, evolution of the family cycle and its emotional response [4-5]. Family life goes through a cycle of birth, growth and decline. From this theoretical perspective, a cycle begins when two people form a couple and ends with the dissolution of the union when one dies, without forgetting that during this period, families expand or reduce, as their children join or leave them.

The family life cycle involves traversing by stages necessary according to the evolutionary moments of the family, and also of the development and personal contribution of those who comprise it. Therefore, the cycle transforms according to the needs of the group over time. Family, like individuals, evolves through several phases that are commonly known as the family evolutionary cycle. This cycle includes the expected transitions or life events that most families go through during their development, in a sequence that is quite predictable, but also variable, and includes coping with the social, economic, socio-demographic and political changes that surge on the daily basics [6].

Chronic diseases, due to their long-term evolution, can occur through all phases of the family's evolutionary cycle, from the expansion phase to the retirement and death phase, the facing of chronic disease are a real challenge for the whole family nucleus, including economic, educational, mental, emotional, physical and social factors. Due to the previous knowledge, the objective of this study is to determine the association between family life cycle and glycemic control in families of Durango, Mexico.

Materials and Methods

A comparative cross-sectional study was carried out, in the General Hospital of Zone #1, of the Instituto Mexicano del Seguro Social (IMSS), located in Durango, Mexico; in patients which were selected by a consecutive sampling techniques; that met the following inclusion criteria: age between 30 to 75 years, with diagnosis of type 2 diabetes, that accepted and signed an informed consent, with at least one glycosylated hemoglobin (HbA1c) in the last three months; patients with psychiatric illness and chronic renal failure were not included and eliminated those who did not complete the survey or those with incomplete information.

The following data were obtained directly from the patients or medical records: age, sex, marital status, educational stages, glycemic control (HbA1c) and family vital cycle. The procedure for the data collection was as follows: age was calculated in years according to the year of birth, sex was determined by the phenotype characteristics of each individual, marital status was expressed by each patient, education was determined by asking the last degree of studies, glycemic control was evaluated according to the recommendations of the American Diabetes Association (ADA) with HbA1c, we considered controlled values those who had a HbA1c <7%. Family vital cycle was based on Geyman's life cycle, developed by this same author in 1980 [7]. Glycosylated hemoglobin was taken from a venous blood sample with an 8 hour fasting in an AU-480 chemistry system.

The recollected data was integrated into data collection sheets and analyzed using the SPSS program version 20 in Spanish, where

we applied descriptive statistics; for qualitative variables, frequencies and percentages were used and for quantitative variables, mean and standard deviation were used. For the bivariate analysis, the Chi-square test was used in the dichotomous qualitative variables; in the quantitative variables an Analysis of Variance (ANOVA) was used to determinate statistically significant differences between the groups of the family life cycle and glycemic control. The Kolmogorov-Smirnoff test was used to establish the normality of the data. It was considered a $p < 0.05$ as statistically significant, with a 95% confidence interval. The Protocol was authorized by the Local Committee of Research and Ethics in Health Research from the Regional General Hospital #1, where this study took place.

Results

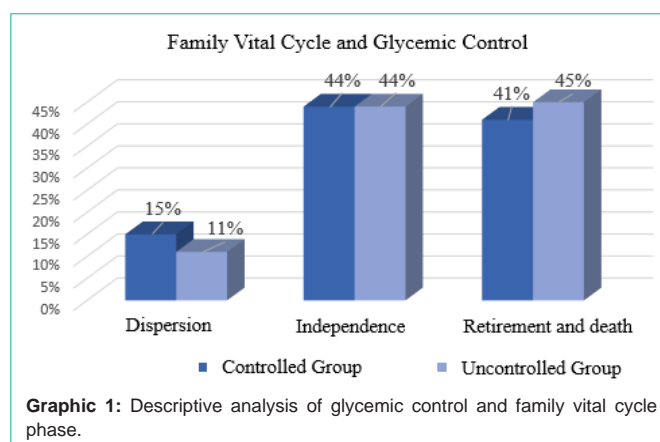
We analyzed a sample of 209 patients, of whom 161(77%) were women and 48(23%) men. The average age was 58 ± 10.3 . The most frequent marital status was married (65%) and 113(54%) had a primary education. The sociodemographic characteristics are described in table 1. Groups were classified according to glycemic control (HbA1c $< 7\%$) in controlled (n=88) and uncontrolled (n=121). The family life cycle according to Geyman was classified as follows (Graphic 1): in the uncontrolled group 22 families in dispersion phase (11%), 93 families going through independence phase (44%) and 94 families in phase of retirement and death (45%). In the controlled group 15% families in dispersion phase, 44% families in independence phase and 41% families in phase of retirement and death. No families were found in the phase of marriage or expansion in any group.

The following results were obtained from the association of sociodemographic variables with glycemic control (Table 1): sex (p 0.55), marital status (p < 0.02), educational stages (p 0.91), family vital cycle (p 0.20). Finally, the concentration of HbA1c was determined according to the stages of the family life cycle and glycemic control (Table 2). In the uncontrolled group it was found that the participants in the dispersion phase had a higher glycosylated hemoglobin concentration compared with those in independence and retirement and death (p 0.02); whereas in the control group no significant differences were observed (p 0.29).

Discussion and Conclusion

The findings of our study suggest that the family life cycle is not related to glycemic control. In this study, an association between the glycemic control and the dispersion phase was found, which is different from what was found by Gil-Alfaro in 2002 in Veracruz, they describe the influence of the family on the metabolic control of patients with T2D. 121 families were described and it was found that 16% of patients were controlled, which does not coincide with the glycemic control result of this study (42%). In addition, a strong association was found between uncontrolled patients with the independence and retirement phase, showing that the problem is frequent, which could be secondary to the emotional and economic dependence of the elderly who are more vulnerable to a chronic disease [8].

The results obtained in the present study show a similar percentage in the different phases of family life cycle according to glycemic control, which is different from what was previously reported, where a higher percentage of uncontrolled patients was found in the



retirement and death stage [8]. This can be explained because at this stage patients live alone in their homes, and have no low income or poverty support programs. In the present study, it was found that the participants in the dispersion group had the highest levels of HbA1c and those in the retirement and death stage had the lowest. According to the stage of the participants in the family life cycle, it is congruent that the most frequent phases were the retirement and death and independence, since the average age and marital status of the studied population is concordant.

Despite not finding statistically significant differences in the comparison of proportions between study groups, it is interesting to point that in the group of patients with glycemic control, the percentage of participants who are in the phase of retirement and death is greater, while in the dispersion phase a lower frequency of uncontrolled patients was observed. Another interesting aspect is that in the independence phase, the same percentage of controlled and uncontrolled patients was found (44%). It is also important to observe when analyzing HbA1c mean in the different phases of the family life cycle, no significant differences were found. Finally, the results of this study show that family life cycle is not associated with glycemic control in patients with type 2 diabetes. Since the findings are controversial, more studies with multiple variables are required to establish if the phases of family life cycle are associated with glycemic control.

References

- Gil-Velazquez LE, Sil-Acosta MJ, Aguilar-Sanchez L, Echevarria-Zuno S, Michaus-Romero F, Torres-Arreola LP. Perspectiva de la diabetes mellitus tipo 2 en el Instituto Mexicano del Seguro Social. *Rev Med Inst Mex Seguro Soc.* 2013; 51: 58-67.
- Gutiérrez JP, Rivera-Dommarco J, Shamah-Levy T, Villalpando-Hernández S, Franco A, Cuevas-Nasu L, et al. Encuesta Nacional de Salud y Nutrición 2012. Resultados Nacionales. Cuernavaca, México: Instituto Nacional de Salud Pública (MX), 2012.
- Asociación Latinoamericana de Profesores de Medicina Familiar AC. Conceptos básicos para el estudio de las familias. *Archivos en Medicina Familiar.* 2005; 7: 15-19.
- Rojas-Dasilva MA, Bonilla-Muñoz PM, Trejo-Gonzalez L. Perspectiva familiar alrededor del paciente diabético. *Neurol Neurocir Psiquiat.* 2005; 38: 63-68.
- Fernández-Ortega MÁ. El impacto de la enfermedad en la familia. *Rev Fac Med UNAM.* 2004; 47: 251-254.
- Moratto-Vasquez S, Zapata-Posada JJ, Massager T. Conceptualización de ciclo vital familiar: una mirada a la producción durante el periodo comprendido

- entre los años 2002 a 2015. CES Psicología. 2015; 8: 103-121.
7. Irigoyen-Coria A. Nuevos fundamentos de medicina familiar. 3^{ra} ed. Mexico: Editorial Medicina Familiar Mexicana; 2006.
 8. Gil-Alfaro I, Perez-Hernandez C. Perfil de la familia del diabético: características sociodemográficas y clínicas. Archivos en Medicina Familiar. 2002; 4: 95-98.