Nutr Hosp. 2016; 33(6):1312-1316 ISSN 0212-1611 - CODEN NUHOEQ S.V.R. 318

Nutrición Hospitalaria

Trabajo Original

Nutrición en el anciano

Relationship between social support networks and diabetes control and its impact on the quality of life in older community-dwelling Mexicans

Relación entre las redes de apoyo social con el control de la diabetes y su impacto sobre la calidad de vida en ancianos mejicanos que viven en la comunidad

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Abstract

Objective: To determine the relationship between social support networks and diabetes control and its impact on quality of life in older community-dwelling Mexicans.

Methods: A cross-sectional study was carried out on a convenience sample of 182 older diabetic people who were active participants in community self-care and mutual help groups in Mexico City for more than one year. All were independents and had medical diagnostics determining that they had diabetes without complications for one year or more. We measured biochemical and anthropometric parameters, social support networks for older people (SSN-Older) and perceived quality of life. Patients with uncontrolled diabetes mellitus had HbA1c (%) ≥ 8.

Results: It was found that 65% (118/182) of the elderly diabetics in the study were controlled. We observed a significantly higher average score in the SSN-Older scale on the extra-familial support subscale in the controlled diabetic group compared with the uncontrolled group (57 ± 25 *vs.* 49 ± 30, $p < 0.05$). Additionally, the average satisfaction score, as observed from SSN-Older scale data, was significantly higher in the controlled diabetics group compared with the uncontrolled group (51 ± 21 *vs.* 42 ± 22, $p = 0.01$). Likewise, in the quality of life analysis, we observed that 81% of the controlled diabetics perceived a high quality of life compared with 19% of the uncontrolled group ($p < 0.001$).

Conclusions: Our findings suggest that social support networks, especially community self-help groups, represent a determining social capital for control of diabetes mellitus in older people in the community.

Key words:

Diabetes control. Elderly. Networks. Social capital. Quality of life.

Resumen

Objetivo: determinar la relación entre las redes de apoyo social y control de la diabetes, y su impacto en la calidad de vida en adultos mayores mexicanos.

Métodos: se llevó a cabo un estudio transversal en una muestra de 182 adultos mayores diabéticos que estaban participando en grupos comunitarios de autocuidado y ayuda mutua en la Ciudad de México durante más de un año. Todos eran independientes y tenían diagnóstico médico de diabetes mellitus sin complicaciones durante un año o más. Medimos parámetros bioquímicos, incluyendo hemoglobina glucosilada (HbA1c), y antropométricos, las redes de apoyo social para adultos mayores (RAS-mayores) y calidad de vida percibida. Se consideró como diabetes mellitus descontrolada cuando los pacientes tenían HbA1c (%) ≥ 8.

Resultados: se encontró que el 65% (118/182) de los diabéticos participantes estaban controlados. Se observó una puntuación media significativamente mayor en la escala RAS-mayores en la subescala de apoyo social extra-familiar en el grupo de diabéticos controlados en comparación con el grupo de descontrolados (57 ± 25 *vs.* 49 ± 30, $p < 0,05$). Asimismo, la puntuación media de satisfacción de las redes de apoyo social fue significativamente mayor en el grupo de diabéticos controlados (51 ± 21 frente a 42 ± 22, $p = 0,01$). Del mismo modo, en el análisis de la calidad de vida, se observó que el 81% de los diabéticos controlados percibe una calidad de vida alta en comparación con el 19% del grupo de diabéticos descontrolados ($p < 0,001$).

Conclusiones: nuestros resultados sugieren que las redes de apoyo social extra-familiar, en particular los grupos de autoayuda de la comunidad, representan un capital social relevante por el control de la diabetes mellitus de las personas mayores de la comunidad.

Palabras clave:

Control de diabetes. Ancianos. Redes de apoyo. Capital social. Calidad de vida.

Received: 20/07/2016
Accepted: 10/09/2016

Mendoza-Núñez VM, Flores-Bello C, Correa-Muñoz E, Retana-Ugalde R, Ruiz-Ramos M. Relationship between social support networks and diabetes control and its impact on the quality of life in older community-dwelling Mexicans. Nutr Hosp 2016;33:1312-1316

DOI: http://dx.doi.org/10.20960/nh.776

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INTRODUCTION

Diabetes mellitus is a worldwide public health problem with great economic and social impact, especially for the elderly. The WHO estimated that in 2014, 422 million adults were living with diabetes compared with 108 million in 1980. The global prevalence (age-standardized) of diabetes has nearly doubled since 1980, rising from 4.7% to 8.5% in the adult population, and diabetes caused 1.5 million deaths in 2012. Likewise, the WHO considers diabetes mellitus to be a leading health condition that is associated with disability in the elderly (1). In 2014, the International Diabetes Federation estimated that the average health expenditure per person with diabetes worldwide in 2014 went from $1,583 USD to $2,842 USD. The estimated annual global health expenditure attributable to diabetes ranged from $612 billion USD to $1,099 billion USD (2).

In Mexico, the National Health and Nutrition Examination Survey reported that the prevalence of type 2 diabetes mellitus (DM2) in people over 60 years of age is more than 20%. In this sense, the highest rates are seen in DM2 groups of men aged 60-69 years (24.1%) and women aged 70-79 years (27.4%) (3). Additionally, it has been reported that only 30% of diagnosed adult diabetics in Mexico have adequate control; hence, it is estimated that two out of three diabetics are uncontrolled (4). In this sense, it has been widely shown that uncontrolled diabetes produces diabetic retinopathy, nephropathy and cognitive disturbances, including Alzheimer disease (5-8).

It has been pointed out that the social support networks is a key determinant of therapeutic adherence and diabetes control (9-11), so it is of interest to determine the relationship and mechanisms that explain the effect of social support networks on the control of diabetes mellitus.

Social support networks refer to connections and contacts with people through which they get emotional, informational and instrumental support. Informal networks are shaped by family members, relatives and friends, being the emotional bond the factor that determines mutual support and reciprocity. While formal networks include community groups and organized civil society associations, whose members adhere to the group through a membership that establishes commitments, guidelines and work rules and hierarchical organization are established by themselves. In this regard, seven psychosocial mechanisms have been proposed to explain the positive effect of social support networks on physical and mental health: a) *social influence/social comparison*; b) *social control*; c) *behavioral guidance, purpose, and meaning (mattering)*; d) *self-esteem*; e) *sense of control or mastery*; f) *belonging and companionship*; and g) *perceived social support* (12). In short, the social support is health-promoting, because it facilitates healthier behaviors such as exercise, eating right, and not smoking; as well as greater adherence to medical regimens (12,13).

On the other hand, Uchino (2006) has proposed that there is a links between social support networks and disease, mediated through relevant physiological processes including changes in cardiovascular, neuroendocrine, and immune function (14).

Therefore, formal and informal social supports are determining factors of diabetic control during aging. In this regard, it has been shown that support that is direct, formal and institutional favors adherence and improves diabetic control (10,11,15). Likewise, informal support that is provided by family, friends and community positively influences diabetic control (16,17). A positive relationship between diabetes control and quality of life has also been observed (18,19). Therefore, the aim of this study was to determine the relationship between social support networks and diabetic control and its impact on the quality of life in older community-dwelling Mexicans.

METHODS

SUBJECTS AND DESIGN

A cross-sectional study was carried out in a convenience sample of 182 older diabetic people who were active participants in self-care and mutual help community groups in Mexico City "Delegación Tlalpan" for more than one year. The Ethics Committee of the "Universidad Nacional Autónoma de México (UNAM) Zaragoza Campus" approved the research protocol for this study. The subjects agreed to participate in the study after giving their informed consent.

INCLUSION CRITERIA

All subject: a) were independents and had a medical diabetes diagnosis without complications for one year or more; b) were under medical treatment and were taking metformin as a hypoglycemic treatment; c) without comorbidity nor associated mental disorders; d) had indicated a diet of 1,800 Kcal/day low in saturated fat; and e) practice of walking four days per week during 40 minutes (six or more months).

BIOCHEMICAL ANALYSIS

Blood samples were collected by venipuncture after a 12-h fasting period and placed in a vacutainer in siliconized test tubes containing a separating gel without additives. Heparin and ethylenediaminetetraacetic acid (EDTA) were used as anticoagulant agents. Blood samples containing heparin were analyzed using the complete hemoglobin test protocol (including hemoglobin, hematocrit, and leukocyte counts). All reagents used in the biochemical tests were obtained from Randox Laboratories, Ltd. (Crumlin Co., Antrim, UK).

GLYCOSYLATED HEMOGLOBIN (HBA1C)

It was measured with an immunoturbidimetric assay with a Shimadzu UV-1601 UV-Vis spectrophotometer (Kyoto, Japan). Patients with uncontrolled diabetes mellitus had HbA1c (%) ≥ 8.

ANTHROPOMETRIC MEASUREMENTS

After the clinical history was taken and the physical examination was conducted, we performed the following anthropometric measurements:

- *Weight.* It was measured while the subject was in a fasted state (after evacuation). The Torino scale® (Tecno Lógica, Mexicana, México, TLM®) was used and calibrated before each weight measurement.
- *Height.* It was obtained with an aluminum cursor stadiometer that was graduated in millimeters while the subject was barefoot with back and head in contact with the stadiometer in the Frankfurt horizontal plane.
- *Body mass index (BMI).* It was calculated by dividing weight (in kilograms) by height (in squared meters). Waist circumference was measured with a tape measure to the nearest 0.5 cm at the umbilical scar level.

SOCIAL SUPPORT NETWORKS FOR OLDER PEOPLE SCALE (SSN-OLDER)

Social support networks for older people were assessed by administering the Spanish version of the SSN-Older scale, which was validated in older Mexican people. This questionnaire assesses the following three social support networks: a) *Familial:* wife or husband, brothers, sisters, cousins, sons, daughters, grandsons, granddaughters, nephews and nieces; b) *Extra-familial:* friends and partners, community groups; and c) *Institutional:* health care institutions and social care institutions. The SSN-Older scale includes 18 network-related questions. Each item of the questionnaire is scored using the following Likert scale scores for social contact: 0, never; 1, rarely (less than once a month); 2, sometimes (once or twice a month); and 3, often (at least once a week). SSN-Older also assesses the satisfaction grade of social support networks (20).

WHO QUALITY OF LIFE-BREF

The World Health Organization Quality of Life (WHOQOL)-BREF is a generic quality of life (QoL) questionnaire comprised of 26 items: 24 items covering four domains (physical health, psychological health, social relationships and environment) and two global questions about overall QoL and satisfaction with health. Each item is scored on a five-point scale, with higher scores indicating better QoL. The time frame for the assessment is the past 2 weeks. The overall score is the summation of all subscale scores and two global item scores (21,22). The scores are then classified into three QoL groups by the overall scoring criteria according to: a) bad, 26-60; b) average, 61-95; and c) good, 96-130 (23).

SOCIODEMOGRAPHIC VARIABLES

A questionnaire was administered to the study subjects to assess the following sociodemographic variables: age, sex, marital status, education, place of food consumption and number of years of diagnosis. Subjects were classified into the following two age categories: 60-74 years and 75 years or more. With respect to education, subjects were classified into the following three categories based on the number of years of schooling they had received: 0-5 years and > 5 years. The study participants were also separated into the following two categories, food consumption at home or outside the home. The time of diabetes diagnosis was also considered (1 to 5 years and 6 years or more).

STATISTICAL ANALYSIS

The data were processed by use of the standard statistical software package SPSS V. 20.0 (IBM SPSS Statistics Armonk, NY, USA).Descriptive statistics are means standard deviations (SD). Results were analyzed using the paired t-test and chi-squared test. Also, a multivariate analysis of logistic regression was calculated for a risk factor when odds ratio (OR) > 1. A p value < 0.05 was considered significant.

RESULTS

We found that 65% (118/182) of the elderly diabetics in the study were controlled. The sample was divided into two groups, controlled and uncontrolled elderly diabetics, whose biochemical and anthropometric parameters are shown in table I. Regarding the sociodemographic characteristics for the controlled diabetics, no significant differences were observed; however, we found that frequency was significantly higher in the group of people who ate

Table I. Biochemical parameters and weights by study group

	Diabetics		p value
	Controlled n = 118	Uncontrolled n = 64	
HbA1c (%)	6.2 ± 1	10.7 ± 1	0.001
Glucose (mg/dL)	115 ± 32	211 ± 66	0.001
Cholesterol (mg/dL)	207 ± 50	209 ± 41	0.7
Triglycerides (mg/dL)	161 ± 128	174 ± 85	0.4
HDL-C (mg/dL)	59 ± 18	60 ± 12	0.6
LDL-C(mg/dL)	115 ± 50	113 ± 35	0.8
Weight	68 ± 16	65 ± 11	0.2
Waist-to-hip ratio			
Men	0.97 ± 0.69	0.96 ± 0.98	0.7
Women	0.96 ± 0.64	0.96 ± 0.64	0.9
BMI (kg/m2)	30 ± 6	29 ± 4	0.3

Sixty-five percent (118/182) of the population was controlled, with HbA1c (%) < 8, BMI: body mass index; HbA1c: glycosylated hemoglobin; HDL-C: high-density lipoprotein cholesterol; LDL-C: low-density lipoprotein cholesterol. Student's t-test.

their food at home compared with those who ate outside the home (68% *vs.* 50%, $p < 0.05$). Additionally, the group of diabetics who had been diagnosed between one to five years had a significantly higher percentage of elderly compared with those with 6 or more years of diagnosis time (76% *vs.* 60%, $p < 0.05$) (Table II).

With regard to social support networks and SSN-Older scores, a significantly higher average score on the extra-familial support subscale was observed in the controlled diabetic group in contrast to the uncontrolled group (57 ± 25 *vs.* 49 ± 30, $p < 0.05$). Additionally, the average satisfaction score from the SSN-Older was significantly higher in the controlled elderly diabetics group in comparison with the uncontrolled group (51 ± 21 *vs.* 42 ± 22, $p = 0.01$) (Table III).

In the quality of life analysis, we observed that 81% of the controlled elderly diabetics perceived a higher quality of life compared with 19% in the uncontrolled group ($p < 0.001$). Likewise, the percentage of elderly who perceived good health was significantly higher in the controlled diabetic group compared with the uncontrolled diabetic patients (33% *vs.* 5%, $p < 0.001$) (Table IV).

DISCUSSION

Control of diabetes mellitus is a major challenge worldwide, considering that a high percentage of patients diagnosed do not adhere to treatment and, therefore, have an uncontrolled illness for many years, increasing the risk of complications. In the present study, the percentage of adults with controlled diabetes was more than twice that reported nationally for the adult population (3). The results suggest that the difference is the effect of the participation of older adults in community health promotion programs where they receive self-care training to adopt healthy lifestyles and help to strengthen mutual adherence. In this sense, it has been shown that community work and peer support has a positive effect on improving the self-care and health status of adults and older adults (24-26).

Demographic and socio factors such gender, age and marital status have been associated with diabetes mellitus (3); however, in our study, we found no statistically significant differences in the percentage of diabetic control and these variables. These results suggest that the support and cohesion that develops in self-care and mutual help community groups is independent of such variables (27).

In our study, we found a higher percentage of diabetic control in people who prepared and ate their food at home. This indirectly shows the effect of compliance with a healthy diet for people who prepare meals at home because, in our culture, supply and consumption of food away from home is high in carbohydrates and saturated fats.

On the other hand, a higher percentage of diabetic control in the group of people with previously diagnosed diabetes was found fewer times. This finding suggests that newly diagnosed people entering community groups promoting health are more willing to adhere. In this sense, it is important to consider that the patient prognosis depends largely on detection and diabetes management, as metabolic memory can be a determining factor for complications (28).

Table II. Sociodemographic characteristics, place of food consumption and time from diagnosis

Variable	Diabetics		p value
	Controlled n = 118	Uncontrolled n = 64	
Sex			
Women	102 (66%)	51 (34%)	0.2
Men	16 (55%)	13 (45%)	
Age			
60-74 years	85 (64%)	48 (36%)	0.6
75 years and more	33 (67%)	16 (33%)	
Scholarship			
0-5 years	52 (63%)	30 (37%)	
> 5 years	66 (66%)	34 (34%)	0.7
Status marital			
Single or widowed	18 (75%)	6 (25%)	0.04
Married	100 (63%)	58 (37%)	
Food consumption			
In the home	101 (68%)	47 (34%)	
Out of home	17 (50%)	17 (50%)	0.02
Diagnostic years			
1 to 5 years	44 (76%)	14 (24%)	
6 years and more	74 (60%)	50 (40%)	0.03

Chi-square test.

Table III. Social support networks for older people by study group

Variable	Diabetics		p value
	Controlled n = 118	Uncontrolled n = 64	
SSN: Familial	53.6 ± 22	47 ± 24	0.07
SSN: Extra-familial	57 ± 25	49 ± 30	0.04
SSN: Institutional	37.8 ± 28	33.3 ± 28	0.07
SSN: Satisfaction grade	51 ± 21	42 ± 22	0.01

SSN: social support networks. Student t-test.

Table IV. Quality of life by study group

Variable	Diabetics		p value
	Controlled n = 118	Uncontrolled n = 64 xs	
Quality of life			
Good	50 (42%)	12 (19.0%)	
Average or bad	68 (58%)	52 (81%)	< 0.001
Health perception			
Good	39 (33%)	3 (5%)	
Bad	79 (67%)	61 (95%)	< 0.001

Chi-square test.

Family, friends, community self-help groups and institutional state programs make up social support networks. It has been shown that family support significantly influences the health and welfare of people (15). Equally, family and friends provide emotional and material support and share knowledge for welfare and health (29,30).

In our study, a significantly higher score was observed in the controlled diabetic group compared with the uncontrolled group in the extra-familial network and satisfaction support subscales. This finding suggests that social capital that is represented by friends and community self-help groups is a large determining factor in the percentage of controlled older adult diabetics that were found in our study compared with those reported nationally. In this regard, it has been shown that community self-help groups are an option for the prevention and control of diabetes mellitus (31-33), which should be recognized and promoted by the National System of Health.

Regarding the relationship between quality of life and diabetes mellitus, it has been shown that disease control is linked with social support networks and positively influences the quality of life perception (34-36).

In conclusion, our findings suggest that:

- Social support networks have a significant influence on the control of diabetes mellitus in the elderly.
- Community self-help groups represent a determining social capital for control of diabetes mellitus in older people in the community.
- The management of diabetes mellitus should not be limited to medical treatment and institutional professional nutrition, in which it is assumed that the indications are sufficient to control the disease.

Finally, it must be considered as limitations of our study that its design was cross-sectional, and several data were obtained through self-report, also the sample was not representative; therefore it is necessary to carry out prospective studies with representatives samples to confirm our findings.

ACKNOWLEDGMENTS

The study was carried out with the financial support by Research United of Gerontology, FES Zaragoza, Programa de Apoyo a Proyectos de Investigación e Innovación Tecnológica, DGAPA, proyecto PAPIIT IN222015.

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