



Acta Colombiana de Psicología

ISSN: 0123-9155

Universidad Católica de Colombia

Guerrero-Pacheco, Raquel; Galán-Cuevas, Sergio; Cappello, Omar Sánchez-Armáss
Sociodemographic and psychological factors associated with self-
care and quality of life in Mexican adults with type 2 Diabetes Mellitus
Acta Colombiana de Psicología, vol. 20, no. 2, 2017, July-December, pp. 168-177
Universidad Católica de Colombia

DOI: <https://doi.org/10.14718/ACP.2017.20.2.8>

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Factores sociodemográficos y psicológicos asociados al autocuidado y la calidad de vida en adultos mexicanos con Diabetes Mellitus tipo 2

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Recibido, octubre 2/2016

Concepto de evaluación, noviembre 11/2016

Aceptado, marzo 21/2017

Referencia: Guerrero-Pacheco, R. Galán-Cuevas, S. & Sánchez-Armáas, O. (2017). Factores sociodemográficos y psicológicos asociados al autocuidado y la calidad de vida en adultos mexicanos con diabetes mellitus tipo 2. *Acta Colombiana de Psicología*. 20(2), 168-177. doi: <http://www.dx.doi.org/10.14718/ACP.2017.20.2.8>

Resumen

El propósito del presente trabajo fue identificar las variables sociodemográficas y psicológicas relacionadas con el autocuidado y la calidad de vida en adultos mexicanos con diabetes mellitus tipo 2. Se utilizó un diseño transversal en una muestra de 60 personas (93 % mujeres) entre 36 y 66 años de edad ($M = 54.3$, $DE = 4.71$) adscritas al sistema de salud pública en San Luis Potosí, México. Se midieron las variables de autocuidado, autoeficacia, conocimientos en diabetes, ansiedad, depresión y calidad de vida con la aplicación de las escalas EECAC, EAG, DKQ-24, AMAS, BDI-II y SF-36. En el análisis de resultados se utilizó un análisis de regresión lineal para evaluar el impacto de las variables medidas sobre el autocuidado y la calidad de vida. En general, el modelo explicó 33.9 % de la variación del autocuidado a través de las variables depresión ($\beta = -.27$) y autoeficacia ($\beta = .74$). El 56 % de variación en calidad de vida relacionada con la salud física se explicó a partir de las variables depresión ($\beta = -.34$) y autocuidado ($\beta = .34$). En su componente de salud mental, el 43.4 % de la variación en calidad de vida se explicó a través de la ansiedad ($\beta = -.26$) y la depresión ($\beta = -.40$). Finalmente, la percepción positiva de autoeficacia y el estado de salud libre de ansiedad y depresión resultaron ser factores determinantes para el autocuidado y la calidad de vida relacionada con la salud.

Palabras clave: Diabetes mellitus tipo 2, autocuidado, calidad de vida, variables psicológicas, autoeficacia, psicología y salud.

Sociodemographic and psychological factors associated with self-care and quality of life in Mexican adults with type 2 Diabetes Mellitus

Abstract

The purpose of the present study was to identify sociodemographic and psychological variables related to self-care and quality of life in Mexican adults with type 2 Diabetes Mellitus. A cross-sectional design was used in a sample of 60 people (93% women) aged between 36 and 66 years ($M = 54.3$, $SD = 4.71$) attached to the public health system in San Luis Potosí, Mexico. Self-care, self-efficacy, knowledge about diabetes, anxiety, depression and quality of life were measured using the EECAC, EAG, DKQ-24, AMAS, BDI-II and SF-36 scales. For data processing, a linear regression analysis was used to evaluate the impact of the measured variables on self-care and quality of life. In general, the model explained 33.9% of the variance of self-care through the variables depression ($\beta = -.27$) and self-efficacy ($\beta = .74$). The 56% variance in quality of life related to physical health was explained by the variables depression ($\beta = -.34$) and self-care ($\beta = .34$). In their mental health component, 43.4% of variance in quality of life was explained through anxiety ($\beta = -.26$) and depression ($\beta = -.40$). Finally, the positive perception of self-efficacy and health status free from anxiety and depression were determinant factors for self-care and health-related quality of life.

Key words: Diabetes mellitus type 2, self-care, quality of life, psychological variables, self-efficacy, psychology and health.

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Fatores sociodemográficos e psicológicos associados ao autocuidado e à qualidade de vida em adultos mexicanos com diabetes mellitus tipo 2

Resumo

O propósito deste trabalho foi identificar as variáveis sociodemográficas e psicológicas relacionadas com o autocuidado e a qualidade de vida em adultos mexicanos com diabetes mellitus tipo 2. Utilizou-se um desenho transversal numa amostra de 60 pessoas (93 % mulheres) entre 36 e 66 anos ($M = 54.3$, $DP = 4.71$), vinculadas ao sistema de saúde pública em San Luis Potosí, México. Foram medidas as variáveis de autocuidado, autoeficácia, conhecimento em diabetes, ansiedade, depressão e qualidade de vida com a aplicação das escalas EECAC, EAG, DKQ-24, AMAS, BDI-II e SF-36. Na análise de resultados, utilizou-se a análise de regressão linear para avaliar o impacto das variáveis medidas sobre o autocuidado e a qualidade de vida. Em geral, o modelo explicou 33.9 % da variação do autocuidado por meio das variáveis depressão ($\beta = -.27$) e autoeficácia ($\beta = .74$). 56 % de variação em qualidade de vida relacionada com a saúde física foram explicadas a partir das variáveis depressão ($\beta = -.34$) e autocuidado ($\beta = .34$). Em seu componente de saúde mental, 43.4 % da variação em qualidade de vida foram explicadas por meio da ansiedade ($\beta = -.26$) e da depressão ($\beta = -.40$). Finalmente, a percepção positiva de autoeficácia e o estado de saúde livre de ansiedade e depressão foram fatores determinantes para o autocuidado e a qualidade de vida relacionada com a saúde.

Palavras-chave: autocuidado, autoeficácia, diabetes mellitus tipo 2, psicologia, qualidade de vida, saúde, variáveis psicológicas.

INTRODUCTION

Diabetes mellitus (DM) represents a serious problem for the health care system (Organización Mundial de la Salud [OMS], 2014). Worldwide, its incidence to date is 347 million diagnosed cases. A prevalence of 11.7% among the population between age 20 and 79 is estimated in Mexico, and it is the main cause of death among the economically active population from age 45 to 64 (International Diabetes Federation, 2014). The OMS (2014) has stated the convenience of modifying unhealthy lifestyles in order to prevent and control Type 2 Diabetes Mellitus (Type-2 DM). Keeping the disease in check requires active participation from the patient, since the efficacy of the treatment cannot be fully controlled by the medical staff, and so the patient is directly responsible for the success of the treatment (Amador-Díaz, Márquez-Celedonio & Sabido-Sighler, 2007).

Regrettably, self-care is less than enough among Mexican population with Type-2 DM (Compeán, Gallegos, González & Gómez, 2010; Hernández- Romieu, Elnecavé-Olaiz, Huerta-Urbe & Reynoso-Noverón, 2011). People do not practice self-care behaviors to guarantee their well-being in general terms, and the only indicators of self-care available are the patient's attendance to appointments and whether they take their medication or not, whereas essential behaviors such as the modification of unhealthy habits are overlooked (Amador-Díaz et al., 2007; Compeán et al., 2010; Romero, Dos Santos, Martins & Zanetti, 2010).

Some authors (Hernández- Romieu et al., 2011) have concluded that the problem has multiple dimensions, since there are factors that compromise self-care, such as the time elapsed since diagnosis, age, access to quality medical

attention and information, and quality of life, along with the patient's attitude toward focusing their behavior on positive behavior changes and consistent medication intake. There is evidence that the degree of self-care achieved is strongly associated with doctor-patient dynamics and perceived family support (Hoyos, Arteaga & Muñoz, 2011; Wilkinson, Whitehead & Ritchie, 2014); additionally, the level of knowledge about the disease is indispensable to anticipate health-protective behaviors (Bustos, Bustos, Bustos, Cabrera & Flores, 2011; Vargas, Pedroza, Aguilar & Moreno, 2010).

Sarkar, Fisher and Schillinger (2006) pointed out that self-care practices depend on the patient's motivation and will, as well as their coping skills, self-efficacy and perceived resources (Rose, Fliege, Hildebrandt, Schirop & Klapp, 2002). These researchers postulated that the sense of lost health resulting from the disease, together with the inconveniences and the cost of the treatment, increases the risk of anxiety and depression and the evaluation of personal resources to face the disease is negatively affected as a consequence (Browne, Nefs, Pouwer & Speight, 2015; Gonzalez et al., 2008; Nicolucci et al., 2013).

Explaining low self-care behavior in people with Type-2 DM entails thoroughly identifying the determinants of such behavior, which become risk factors to the adequate maintenance of one's health, since they are perceived as barriers to an effective personal management of the disease (López & Ávalos, 2013; Martín, 2003).

Given that chronic diseases are multifactorial in origin and treatment, prevention and control of such diseases need to be approached from a biopsychosocial perspective where all the relevant factors in connection with patients' lifestyles are taken

into account (Lalonde, 1974; Organización Panamericana de la Salud [OPS], 2014). The health psychology model states that people's health status and quality of life during a disease is a result of the interaction individuals establish with their environment. Environmental, personal, and cultural risk factors have an impact on human behavior, which in turn has a direct effect on the affective, cognitive and behavioral responses of all the participants in any health-disease process (Martín, 2003; Oblitas, 2008).

Achieving self-care among population suffering from Type-2 DM is a complex endeavor. Despite the availability of effective treatments, people fail to adequately adhere to such treatments and consequently start to present medical complications which have an impact on their quality of life and lead them closer to premature death (OMS, 2014). Given that the quality of life experienced during chronic diseases is, to a certain extent, determined by effective and sustained personal care, realizing and measuring conditions and factors affecting self-care behaviors is important. To this end, the present study sought to identify sociodemographic and psychological variables related to self-care behavior and quality of life in Mexican adults with Type 2 Diabetes Mellitus

METHOD

Type of study

A cross-sectional, descriptive, analytical and correlational study was performed.

Participants

This study used a convenience sampling method with the following inclusion criteria: Mexican adults diagnosed with Type-2 DM more than six months before the study, registered at the Mexican Health Institutes (*Instituto de Seguridad y Servicios Sociales de los Trabajadores del Estado* (ISSSTE, for its Spanish acronym) or Centro de Salud Jurisdicción N° 1 (SS, for its Spanish acronym)). All participants signed an informed consent form. The sample was composed of 60 people (93% women), with 10.32 (± 7.05) years since diagnosis. Schooling levels were as follows: no schooling 5%; up to 12 years of schooling 70%; 13 or more years of schooling 25%. Table 1 shows the descriptive analysis.

Instruments

Quality of life. The Short Form Health Survey (SF-36) measures perceptions about quality of life as related with health (HRQL), from two different approaches: physical

health component (PHC) and mental health component (MHC). The results from its 36 items are represented with a 0 - 100 scale. The survey has an adapted for Mexico and standardized version, with reliability coefficients between $\alpha=.56$ and $\alpha=.84$ (Zúñiga, Carrillo-Jiménez, Fos, Gandek & Medina-Moreno, 1999). For the sample in this study, reliability ranged from $\alpha=.65$ to $\alpha=.88$.

Self-care. The Escala para Estimar Capacidades de Autocuidado (EECAC, for its Spanish acronym) measures perceived self-care skills and capabilities in general population. It consists of 24 test items, and the transformed scores range from 0 to 100 as related to a reference group. The EECAC was validated for Mexican population by Gallegos (1995); reported reliability was $\alpha=.81$ (Landeros, 2003). A reliability of $\alpha=.82$ was estimated for the sample in this study.

Knowledge about diabetes. The Diabetes Knowledge Questionnaire (DKQ-24) uses 24 test items to assess familiarity with diabetes. An internal consistency of $\alpha=.78$ has been reported for the test, as well as construct validity, as demonstrated by its sustained sensitivity after a three-month intervention (García, Villagómez, Brown, Kouzekanani & Hanis, 2001). After an analysis, the present study ruled out 10 of the test items. Kuder-Richardson's formula 20 was used to estimate the internal consistency of the instrument after the items were removed, and a reliability coefficient of $KR20=.78$ was found.

Self-efficacy. The Escala de Autoeficacia General (EAG, for its Spanish acronym) evaluates the individual's perception of their own capabilities to deal with situations. It consists of 10 test items, whose summation ranges from 10 to 40 points and are interpreted based on a reference group. The theoretical validity of the construct was studied by comparing two countries (Mexico and Spain); the validity reported for Mexico was $\alpha=.86$ (Padilla, Acosta, Guevara, Gómez & González, 2006). A reliability of $\alpha=.69$ was estimated for the sample in the present study.

Depression. Beck Depression Inventory- Second Edition (BDI-II) evaluates depression intensity as a function of the disorder's symptomatic criteria. Total score ranges from 0 to 63 points, and the inventory consists of 21 test items. The adaptation in Mexican population reported α scores between .87 and .92 (González, Reséndiz & Reyes-Lagunes, 2015). The results obtained with the sample used by the present study indicated a reliability of $\alpha=.86$.

Anxiety. The Adult Manifest Anxiety Scale—Adult Version (AMAS-A) and the Adult Manifest Anxiety Scale—Elderly Version (AMAS-E) (Reynolds, Richmond & Lowe, 2007), evaluate the level of anxiety in individuals by means of 36 and 44 test items respectively. They were validated and standardized for Mexican population with reliability coefficients between $\alpha=.62$ and $\alpha=.68$ (Reynolds et al., 2007). For this

study, reliability coefficients of $\alpha=.88$ for the AMAS-A scale and $\alpha=.91$ for the AMAS-E scale were obtained.

Procedure

After the protocol was presented and subsequently approved by the ethics committees in the public health organizations where the study was carried out, the participants who met the inclusion criteria were summoned. By means of a direct interview, all participants were informed about the purpose of the study, the contents of the measurement instruments, data confidentiality and ethical use of the results. The informed consent forms were signed by the participants, and sociodemographic data were collected inside the facilities of the participants' health care institutions. The battery of six psychometric tests was individually administered to the participants during a 45-minute session performed by the same member of the research group.

Data analysis

The data were statistically analyzed using the *R* software version 3.1.0 (Ihaka & Gentleman, 1996). Significance level was *a priori* set at 0.05. With the purpose of evaluating the influence of demographic factors, quality of life, knowledge about diabetes, self-efficacy, depression and anxiety on self-care, a backward stepwise multiple regression analysis based on the maximum model was performed (Venables & Ripley, 2003). Residual variance normality and homogeneity were estimated by the Shapiro-Wilk and Brown-Forsythe tests, respectively (Heiberger & Holland, 2004). The same analysis was carried out regressing all the variables under study including self-care to explain quality of life. The assumptions of homoscedasticity, normality, and self-correlation were verified.

Ethical considerations

Ethical practices were guaranteed by following the guidelines in the protocols used by the ethics committees with the participating institutions, and all subjects were informed about the procedure and purpose of the study and about the confidentiality of the data. The measurements and instruments to be used were also described to the participants. As part of the inclusion criteria used in the present study, all participants signed consent agreement forms.

RESULTS

What follows is a descriptive analysis of the variables measured with the tests administered to the participants; after that, the information about the minimum significant

model for the response variables self-care and quality of life will be presented, considering their physical (PHC) and mental (MHC) components. The results for the explanatory variables and their relation with the response variable are also shown.

Table 1

Descriptive analysis of patients with Type-2 DM

Continuous variables	<i>n</i> (<i>M</i> ± <i>SD</i>)
Self-care	60 (72.60 ^a ± 3.50)
DM Knowledge	60 (7.43 ± 2.96)
Self-efficacy	60 (33.57 ± 4.02)
Depression	60 (15.68 ^a ± 6.13)
Anxiety in adults (AMAS-A)	47 (17.77 ± 7.62)
Anxiety in adults older than 60 (AMAS-E)	13 (29.62 ± 7.25)
Quality of life (PHC)	60 (50.0 ± 8.16)
Quality of life (MHC)	60 (50.0 ± 9.24)

Note: ^a. Winsorized Mean.

Self-care

The linear regression analysis (see Table 2) revealed that the minimum significant model explains 33.9% of variance in self-care ($F [2, 57]=14.6$, $p \leq .05$, $R^2=0.34$). The η^2 analysis showed that self-efficacy explains 17.8% ($\beta=0.74$) and depression explains 16% ($\beta=-0.27$) of total self-care variance; therefore, these variables remain as explanatory variables. Figure 1 shows the relation between both explanatory variables and the response variable.

Quality of life (physical health component)

The linear regression analysis (see Table 3) revealed that the minimum significant model explains 56% of variance in PHC ($F [3, 56]=23.4$, $p \leq .0001$, $R^2=0.56$).

The η^2 analysis showed that age explains 11.8%, depression explains 36.4% and self-care explains 7.42% of total variance while every explanatory variable remains unchanged. Figure 2 shows the relationship between the explanatory variables and the response variable.

Quality of life (mental health component)

The linear regression analysis (see Table 3) revealed that the minimum significant model explains 43.4% of variance in MHC ($F [2, 57]=21.9$, $p \leq .0001$, $R^2=0.434$). The η^2 analysis showed that anxiety explains 27.38% of total variance and depression explains 16.04% of variance in MHC, while all explanatory variables remain unchanged.

Table 2

Linear Regression for self-care response variable

Explanatory variable	F	Pr(>F)	β	t	η^2
Self-efficacy	13.4	.00055	0.7387	3.66	17.8
Depression	13.9	.00045	-0.2670	-3.72	16.0

Note: >F = value and significance of explanatory variable; β = standardized regression coefficient; t = variable relation value; η^2 = correlation ratio presented as percentage. $p \leq 0.01$.

Table 3

Linear Regression for quality of life response variable

QL	Explanatory variable	F	Pr(>F)	β	t	η^2
PHC	Age	12.61	.00079	-0.3460	-3.55	11.8
	Depression	21.64	2.2e-05	-0.3358	-4.63	36.4
	Self-care	9.36	.00340	0.3383	3.06	7.42
MHC	Anxiety	4.21	.04475	-0.2558	-2.05	27.38
	Depression	16.16	.00017	-0.3968	-4.02	16.04

Note: QL = Quality of life. Quality of life components: PHC = Physical Health Component; MHC = Mental Health Component. >F = value and significance of explanatory variable; β = standardized regression coefficient; t = variable relation value; η^2 = correlation ratio presented as percentage. $p \leq 0.05$.

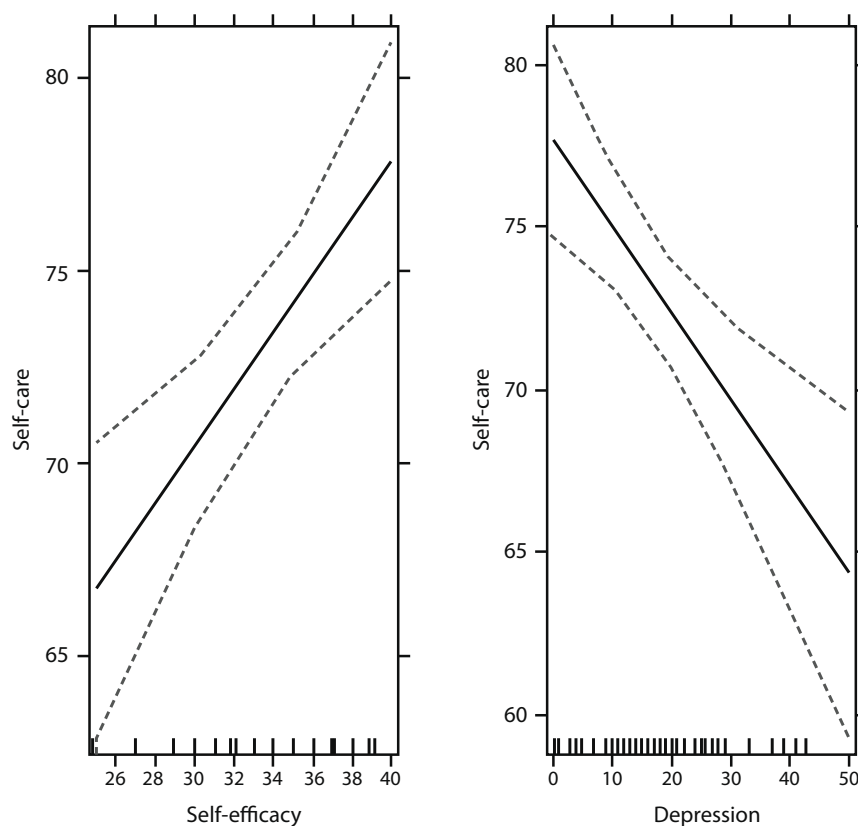


Figure 1. Linear regression for self-care variable

Figure 3 shows the relationship between the explanatory variables and the response variable.

DISCUSSION

The steep increase in the development of comorbidities and premature death associated with Type-2 DM is alarming (OMS, 2014). In view of the evidence of low self-care among Mexican population (Compeán et al., 2010), identifying the sociodemographic and psychological variables that represent risk factors for lack of self-care and HRQL becomes necessary. Besides evidencing variables related to self-care and quality of life, the findings of this study allowed us to showcase the presence and influence of the psychological variables at play during the process of a physical disease.

Among the risk factors measured during this investigation, it was found that a negative perception of self-efficacy

is significantly and inversely related to the presence of self-care behaviors. When people suffering from Type-2 DM perceive that they have enough personal and material resources to look after themselves, they tend to increase their self-care behaviors, which impact the therapeutic scope of the treatment, and consequently improve metabolic control (Rose et al., 2002; Sarkar et al., 2006).

The development of comorbidities, not only physical but also psychological ones, is expected during the course of a chronic disease as a result of its evolution and care. The actuality of a diagnosis, the patient's responsibility in their own recovery, and their compliance with treatments alter the person's emotional state, and they begin to develop symptoms associated with depression and anxiety that considerably affect their self-care capabilities (Rivas-Acuña et al., 2011). A poor emotional management in the presence of a chronic disease has a negative impact on the person's well-being and quality of life. As has been demonstrated by

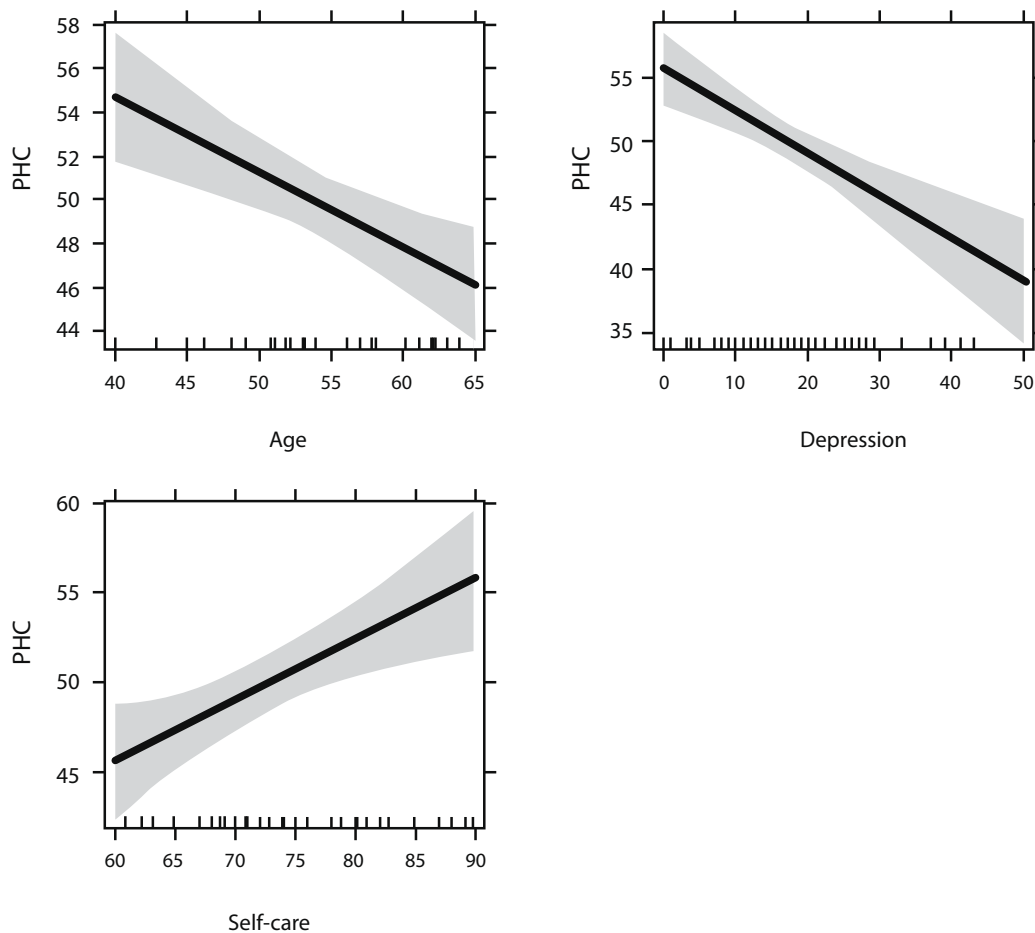


Figure 2. Regression analysis for the physical health component (PHC) of quality of life.

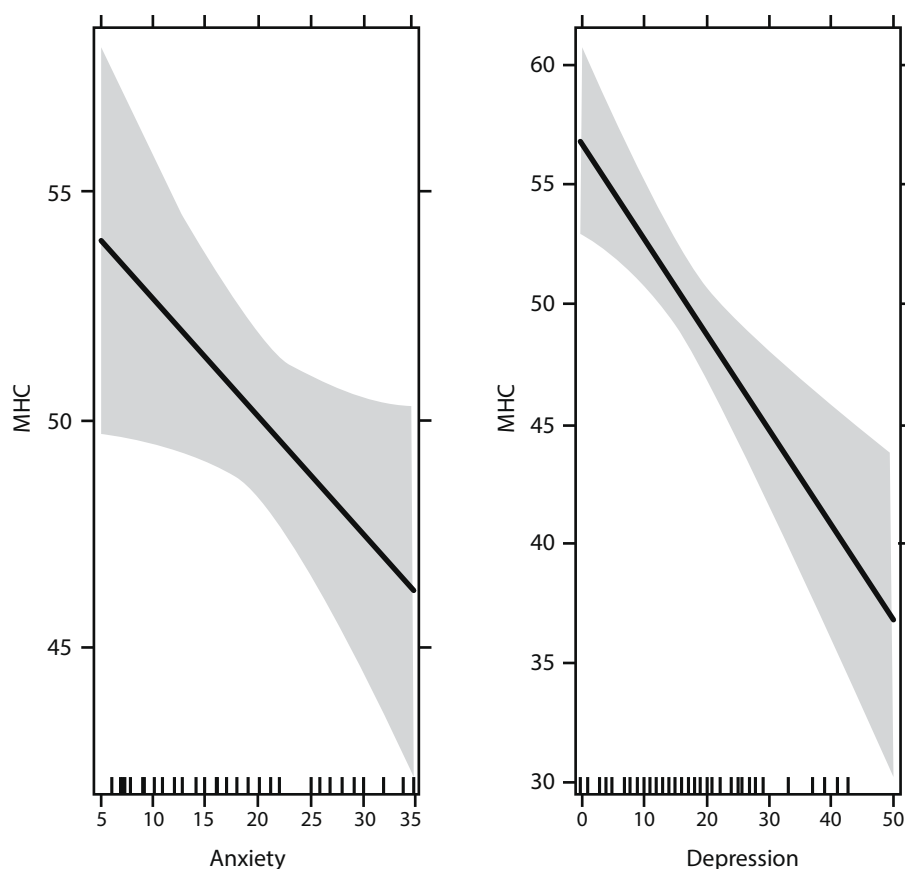


Figure 3. Regression analysis for the mental health component (MHC) of quality of life.

the present study, the appearance of depressive symptoms will significantly decrease self-care behaviors, especially treatment adherence (Browne et al., 2015; Gonzalez et al., 2008).

The existence of a chronic disease diagnosis and the many demands of the treatment make it difficult for people to adapt themselves to their new health status, which subsequently leads to a decrease in their quality of life. Studies on people with DM conducted in many countries have reported, as the present study has also found, a reasonably good perception of HRQL (Lau, Quareshi & Scott, 2004; Luyster & Dunbar-Jacob, 2011), yet insufficient as compared to the general population (Graham et al., 2007; Hervás, Zabaleta, De Miguel, Beldarrain & Díez, 2007). For instance, scores reported for Mexican population without a Type-2 DM diagnosis are PHC $M=79$ ($SD=.2$) and MHC $M=76.7$ ($SD=.2$) (Durán-Arenas, Gallegos-Carrillo, Salinas-Escudero & Martínez-Salgado, 2004); when compared with the results of the present study (PHC: $M=50$, $SD=8.16$; MHC: $M=50$, $SD=9.24$) those results show statistically significant differences for PHC ($t(59)=27.53$,

$p < 0.001$) and also for MHC ($t(59)=22.38$, $p < 0.001$), which confirms that HRQL decreases considerably when a chronic disease such as Type-2 DM has been diagnosed.

As reported by other studies (Al Hayek, Robert, Al Saeed, Al Zaid & Al Sabaan, 2014; Hadi, Ghahramani & Montazeri, 2013; Newmann et al., 2014; Nicolucci et al., 2013) this research has shown that multiple personal variables such as self-care behaviors and the presence of depressive and anxiety symptoms, paired with sociodemographic factors such as age are significantly related ($p < 0.001$) with the mental and physical components of HRQL. In this regard, the DAWN2™ study (Nicolucci et al., 2013) showed that people with Type-2 DM perceive their quality of life as poor, and determined that anxiety and depression have a strong influence on such assessment.

This is a source of concern, since the prevalence of anxiety and depression among the general Mexican population is high: 6.8% and 4.8%, respectively (Demyttenaere et al., 2004); the situation worsens when we think that symptoms tend to exacerbate in the presence of a chronic disease and with the length of time since the diagnosis (Tovilla-Zárate

et al., 2012). Fabián, García, and Cobo (2010) showed the presence of anxiety symptoms (8%), depression symptoms (24.7%), or symptoms of both disorders (5.4%) in individuals with Type-2 DM, and highlighted that these disorders become obstacles for patients to adhere to medical treatments.

The results presented here evince that a satisfactory HRQL is available for people with Type-2 DM, since HRQL is related, for the most part, with variables that can be changed. The development of positive self-care behaviors is beneficial to physical health. Therefore, as long as people practice behaviors favorable to personal and responsible self-care and their depressive and anxiety symptoms are well managed, they will manifest HRQL. However, given that self-care behavior is determined by a positive perception of self-efficacy and by the absence of anxiety and depression symptoms, the task becomes complex, since, as shown by the DAWN2™ study (Nicolucci et al., 2013) those psychological ailments are not a priority for either the population or the health care system.

These findings become relevant when the variables related to self-care behaviors are revealed; as the results of many other studies have stressed (Compeán et al., 2010; Praveen, & Vittal, 2012), the level of self-care of people with Type-2 DM has an impact on long-term HRQL. Such negative impact is thus a result of poor self-care along time, which brings ill consequences to people's physical, social, and mental health. In Mexico, Type-2 DM is the first cause of disability, and it represents a considerable decrease in the number of years of healthy life that can be achieved without losing autonomy and functionality (Gómez Dantés et al., 2011).

When people face inevitable health complications, they not only impoverish their quality of life, but they also represent a serious coverage challenge for health care systems. The economic expenditure on DM in Mexico is already high, but in the future it will become insufficient, since the costs generated by the growing number of referrals due to increased incidence of DM and its comorbidities, low treatment adherence, and subsequent failure of the whole treatment are beyond the human and economic resources that could be allocated to health care (Arredondo & De Icaza, 2011).

Every person practices self-care to a certain extent, but sometimes that is not representative of the range of behaviors necessary to meet the demands of their health status. It is necessary to highlight that failing to initiate personal actions as well as actions involving the family and the health care system will make the personal attempt to manage the disease the main risk factor for experimenting poor quality of life (Nicolucci et al., 2013).

A limiting factor in the present study was the size of the sample, which could not allow for the generalization of the results. For future research in the area, we recommend the exploration of variables related to coping skills, motivation, social support and doctor-patient relations. Objective measurements by means of standardized tests with validation for the target population are also recommended, as well as the measurement of biochemical variables.

The methodological strength of this study is the simultaneous measurement of several variables that have been considered risk factors for lack of self-care and quality of life. Concerning clinical implications, it was found that psychological aspects such as depression and anxiety co-exist with Type-2 DM, inhibiting self-care behavior and consequently deteriorating HRQL. It is also important to point out that programs addressing chronic diseases neglect the presence of mood disorders and their influence on the continuation or modification of risk behaviors (OMS, 2014). The results in this paper present useful information to be used in the design of interventions aimed at improving well-being and quality of life by engaging the adequate management of emotions as an intervention strategy and by having effective self-care as the foremost goal.

REFERENCES

- Al Hayek, A., Robert, A., Al Saeed, A., Al Zaid, A., & Al Sabaan, F. (2014). Factors associated with health-related quality of life among Saudi patients with type 2 diabetes mellitus: a cross-sectional survey. *Diabetes & Metabolism Journal*, 38(3), 220-229. doi: 10.1093/dmj.2014.38.3.220
- Amador-Díaz, M., Márquez-Celedonio, F., & Sabido-Sighler, A. (2007). Factores asociados al auto-cuidado de la salud en pacientes diabéticos. *Archivos en Medicina Familiar*, 9(2), 99-107. Recuperado de <http://www.redalyc.org/articulo.oa?id=50711454006>
- Arredondo, A., & De Icaza, E. (2011). Costos de la diabetes en América Latina: Evidencias del caso Mexicano. *Value in Health. ISPOR. Elsevier*, 14(5), 585-588. doi:10.1016/j.jval.2011.05.022
- Browne, J., Nefs, G., Pouwer, F., & Speight, J. (2015). Depression, anxiety and selfcare behaviours of young adults with type 2 diabetes: results from the International Diabetes Management and Impact for Long-term Empowerment and Success (MILES) Study. *DIABETIC Medicine*, 32(1), 133-140. doi: 10.1111/dme.12566
- Bustos S. R., Bustos M. A., Bustos M. R., Cabrera A. I., & Flores C. J. (2011). Falta de conocimientos como factor de riesgo para ser hospitalizados en pacientes diabéticos tipo 2. *Archivos de Medicina Familiar*, 13(2), 64-73. Recuperado de <http://www.medigraphic.org.mx>

- Compeán, O. L., Gallegos, C. E., González, G. J., & Gómez, M. M. (2010). Self-care behaviors and health indicators in adults with type 2 diabetes. *Revista Latino-Americana de Enfermagem*, 18(4), 675-680. doi:org/10.1590/S0104-11692010000400003
- Demyttenaere, K., Bruffaerts, R., Posada-Villa, J., Gasquet, I., Kovess, V., Lepine, J.,... Chatterji, S. (2004). Prevalence, severity, and unmet need for treatment of mental disorders in the World Health Organization World Mental Health Surveys. *JAMA The Journal of the American Medical Association*, 291(21), 2581-2590. doi:10.1001/jama.291.21.2581
- Durán-Arenas, L., Gallegos-Carrillo, K., Salinas-Escudero, G., & Martínez-Salgado, H. (2004). Hacia una base normativa mexicana en la medición de calidad de vida relacionada con la salud, mediante el Formato Corto 36. *Salud Pública de México*, 46(4), 306-315. Recuperado de <http://bvs.insp.mx/>
- Fabián, S. M., García, S. M., & Cobo, A. C. (2010). Prevalencia de síntomas de ansiedad y depresión en pacientes con diabetes mellitus tipo 2 y su asociación con el tipo de tratamiento, complicaciones de la diabetes y comorbilidades. *Medicina Interna de México*, 26(2), 100-108. Recuperado de <http://new.medigraphic.com/cgi-bin/resumen.cgi?IDREVISTA=83&IDARTICULO=25297&IDPUBLICACION=2572>
- García, A., Villagómez, E., Brown, S., Kouzekanani, K., & Hanis, C. (2001). The Starr County Diabetes Education Study. Development of the Spanish-language diabetes knowledge questionnaire. *Diabetes Care*, 24(1), 116-21. doi: 10.2337/diacare.24.1.16
- Gómez-Dantés, O., Sesma, S., Becerril, V., Knaul, F., Arreola, H., & Frenk, J. (2011). Sistema de salud de México. *Salud Pública de México*, 53(2), 220-232. Recuperado de http://bvs.insp.mx/rsp/articulos/articulo_e4.php?id=002625
- González D.A., Reséndiz R. A., & Reyes-Lagunes, I. (2015). Adaptation of the BDI-II in Mexico. *Salud Mental*, 38(4), 237-244. doi:10.17711/SM.0185-3325.2015.033
- Gonzalez, J., Safren, S., Delahanty, L., Cagliero, E., Wexler, D., Meigs, J., & Grant, R. (2008). Symptoms of depression prospectively predict poorer self-care in patients with type 2 diabetes. Author manuscript. *Diabet Med*, 25(9), 1102-1107. doi: 10.1111/j.1464-5491.2008.02535.x
- Graham, J., Stoener-May, D., Ostir, G., Al Snih, S., Peek, M. K., Markides, K., & Ottenbacher, K. (2007). Health related quality of life in older Mexican Americans with diabetes: a cross-sectional study. *Health and Quality of Life Outcomes*, 5(39), 1-7. doi:10.1186/1477-7525-5-39
- Hadi, N., Ghahramani, S., & Montazeri, A. (2013). Health related quality of life in both types of diabetes in Shiraz, Irán. *Shiraz E-Medical Journal*, 14(2), 112-122. Recuperado de http://emedicalj.com/?page=article&article_id=20116pdf
- Heiberger, R.M., & Holland, B. (2004). *Statistical analysis and data display: an intermediate course with examples in S-Plus, R, and SAS*. New York: Springer.
- Hernández- Romieu, A., Elnecavé-Olaiz, A., Huerta-Urbe, N., & Reynoso-Noverón, N. (2011). Análisis de una encuesta poblacional para determinar los factores asociados al control de la diabetes mellitus en México. *Revista Salud Pública en México*, 53(1), 34-39. Recuperado de <http://www.redalyc.org/articulo.oa?id=10619407006>
- Hervás, A., Zabaleta, A., De Miguel, G., Beldarrain, O., & Díez, J. (2007). Calidad de vida relacionada con la salud en pacientes con diabetes mellitus tipo 2. *An. Sist. Sanit. Navar*, 30(1), 45-52. doi:org/10.4321/S1137-66272007000100005
- Hoyos, D. T., Arteaga, H. M., & Muñoz, C. M. (2011). Factores de no adherencia al tratamiento en personas con diabetes mellitus tipo 2 en el domicilio. La visión del cuidado familiar. *Investigación y Educación en Enfermería*, 29(2), 194-203. Recuperado de <http://www.redalyc.org/articulo.oa?id=105222400005>
- Ihaka, R. & Gentleman, R. (1996). A language for data analysis and graphics. *Journal of Computational Graphical Statistics*, 5(3), 299-314. Recuperado de <https://www.stat.auckland.ac.nz/~ihaka/downloads/R-paper.pdf>
- International Diabetes Federation. (2014). Diabetes Atlas 6th edition 2014 update. Recuperado de <http://www.idf.org/diabetesatlas>
- Lalonde, M. (1974). A new perspective on the health of Canadians. A working document [Documento de trabajo. Una nueva perspectiva sobre la salud de los canadienses]. Recuperado de <http://www.phac-aspc.gc.ca/ph-sp/pube-pubf/perintrod-eng.php>
- Landeros, O. E. (2003). *Capacidades de Autocuidado y Percepción del Estado de Salud en Adultos con y sin Obesidad* (Tesis de Maestría en Ciencias de Enfermería con énfasis en Salud Comunitaria). Universidad Autónoma de Nuevo León, México. Recuperada de <http://eprints.uanl.mx/6689/1/1080124318.PDF>
- Lau, C., Quareshi, A., & Scott, S. (2004). Association between glycaemic control and quality of life in diabetes mellitus. *J Postgrad Med*, 50(3), 189-94. Recuperado de <http://www.jpgmonline.com/article.asp?issn=0022-3859;year=2004;volume=50;issue=3;spage=189;epage=194;aulast=Lau>
- López, R. C., & Ávalos, G. M. (2013). Diabetes Mellitus hacia una perspectiva social. *Revista Cubana de Salud Pública*, 39(2), 331-345. Recuperado de <http://web.a.ebscohost.com/creativapplus.uaslp.mx/ehost/pdf-viewer/pdfviewers?id=04966855-308d-4adc-9bbf-cff2979ba570%40sessionmgr4003&vid=3&hid=4214>
- Luyster, F., & Dunbar-Jacob, J. (2011). Sleep quality and quality of life in adults with type 2 diabetes. Diabetes Educ. Author manuscript available in PMC 2011. *National Institutes of Health Public Access*, 37(3), 347-355. doi:10.1177/0145721711400663
- Martín, A. L. (2003). Aplicaciones de la psicología en el proceso salud enfermedad. *Revista Cubana Salud Pública*, 29(3), 275-81. Recuperado de http://scielo.sld.cu/scielo.php?pid=S086434662003000300012&script=sci_arttext
- Newmann, A., Schoffer, O., Nurström, F., Norberg, M., Klug, S., & Lindham, L. (2014). Health-related quality of life for pre-

- diabetic states and type 2 diabetes mellitus: a cross-sectional study in Västerbotten Sweden. *Health and Quality of Life Outcomes*, 12(1), 150. doi: 10.1186/s12955-014-0150-2
- Nicolucci, A., Kovacs, K., Holt, R., Comaschi, M., Hermanns, N., Ishii, H., Peyrot, M. (2013). Diabetes attitudes, wishes and needs second study (DAWN2™): cross-national benchmarking of diabetes-related psychosocial outcomes for people with diabetes. *Diabetic Medicine*, 30(7), 767-777. doi: 10.1111/dme.12245
- Oblitas, G. L. (2008). El estado del arte de la psicología de la salud. *Revista de Psicología*, 26(2), 219-254. Recuperado de http://pepsic.bvsalud.org/scielo.php?pid=S0254-92472008000200002&script=sci_arttext
- Organización Mundial de la Salud. (2014). Informe sobre la situación mundial de las enfermedades no transmisibles 2010. Recuperado de http://apps.who.int/iris/bitstream/10665/149296/1/WHO_NMH_NVI_15.1_spa.pdf
- Organización Panamericana de la Salud. (2014). Plan de acción para la prevención y el control de las enfermedades no transmisibles en las Américas 2013–2019. Recuperado de http://www.paho.org/hq/index.php?option=com_content&view=article&id=11275%3Aplan-action-ncds-americas-2013-2019&catid=7587%3Ageneral&Itemid=41590
- Padilla, J.L., Acosta, B., Guevara, M., Gómez, J., & González, A. (2006). Propiedades psicométricas de la versión española de la escala de autoeficacia general aplicada en México y España. *Revista Mexicana de Psicología*, 23(2), 245-252. Recuperado de <http://www.redalyc.org/articulo.oa?id=243020649010>
- Praveen, G., & Vittal, B. (2012). A study of knowledge and self care practices in patients of type 2 diabetes mellitus. *Electronic Physician*, 4(3), 551-554. Recuperado de <http://www.ephysician.ir/2012/551-554.pdf>
- Reynolds, C., Richmond, B., & Lowe, P. (2007). *AMAS: escala de ansiedad manifiesta en adultos*. México: El Manual Moderno.
- Rivas-Acuña, V., García-Barjau, H., Cruz-León, A., Morales-Ramón, F., Enríquez-Martínez, R., & Román-Álvarez, J. (2011). Prevalencia de ansiedad y depresión en las personas con diabetes mellitus tipo 2. *Revista Salud en Tabasco*, 17(1-2), 30-35. Recuperado de <http://www.redalyc.org/pdf/487/48721182005.pdf>
- Romero, B., Dos Santos, M., Martins, T., & Zanetti, M. (2010). Self-care of patients with diabetes mellitus cared for at an emergency service in Mexico. *Revista Latino-Americana de Enfermagem (RLAE)*, 18(6), 1195-1202. Recuperado de http://www.scielo.br/pdf/rlae/v18n6/es_21.pdf
- Rose, M., Fliege, H., Hildebrandt, M., Schirop, T., & Klapp, B. (2002). The network of psychological variables in patients with diabetes and their importance for quality of life and metabolic control. *Diabetes Care*, 25(1). doi:10.2337/diacare.25.1.35
- Sarkar, U., Fisher, L., & Schillinger, D. (2006). Is self-efficacy associated with diabetes self-management across race/ethnicity and health literacy?. *Diabetes Care*, 29(4), 823-829. doi: 10.2337/diacare.29.04.06.dc05-1615
- Tovilla-Zárate, C., Juárez-Rojop, I., Peralta Jimenez Y., Jiménez, M., Vázquez, S., Bermúdez-Ocaña, D.,... López, N. (2012). Prevalence of anxiety and depression among outpatients with type 2 diabetes in the Mexican population. *PLoS ONE*, 7(5), e36887. doi:10.1371/journal.pone.0036887
- Vargas, I. A., Pedroza, A. G., Aguilar, P. M., & Moreno, C. Y. (2010). Estudio comparativo del impacto de una estrategia educativa sobre el nivel de conocimientos y la calidad de vida en pacientes con diabetes mellitus tipo 2. (Spanish). *Revista De La Facultad De Medicina De La UNAM*, 53(2), 60-68. Recuperado de <http://www.medigraphic.com/pdfs/facmed/un-2010/un102d.pdf>
- Venables, W.N., & Ripley, B.D. (2003). *Statistics and Computing. Modern Applied Statistics with S*. (4a. ed.). New York: Springer.
- Wilkinson, A., Whitehead, L., & Ritchie, L. (2014). Factors influencing the ability to self-manage diabetes for adults living with type 1 or 2 diabetes. *International Journal of Nursing Studies*, 51(1), 111-122. doi:10.1016/j.ijnurstu.2013.01.006
- Zúñiga, M., Carrillo-Jiménez, G., Fos, P., Gandek, B., & Medina-Moreno, M. (1999). Evaluación del estado de salud con la Encuesta SF-36: resultados preliminares en México. *Salud Pública de México*, 41(2), 110-118. Recuperado de <http://www.redalyc.org/articulo.oa?id=10641205>