

Personality Traits and Self-Care Behaviors in Adults with Type 2 Diabetes Mellitus

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Purpose: Personality traits are an important factor in health behaviors. However, personality traits and self-care in T2DM in the Mexican population are not yet explored due to this; the purpose of this work was to explore the relationship of personality traits with self-care in Mexican adults with type 2 diabetes mellitus.

Patients and Methods: A cross-sectional study was carried out in a sample of 197 T2DM patients from a primary care center in Oaxaca, Mexico. The Big Five Inventory and the Summary of Diabetes Self-care Activities (SDSCA) were the tools used. Correlation models and multiple linear regression models were used for the analysis.

Results: Most of the study participants were women (74.6%). The mean age was 53.1 years (SD = 8.4). The average years of schooling of the participants were 5.7 (SD = 4.3). The number of years lived with T2DM was 9.0 (SD = 6.5). The waist circumference was 96.3 (SD = 14.2), and the BMI was 27.5 kg/m² (SD = 4.1). The traits of conscientiousness ($r = 0.283$) and openness ($r = 0.259$) were positively correlated with self-care activities, while neuroticism was inversely correlated ($r = -0.144$). In the multiple linear regression models, only the conscientiousness and openness traits were predictors of self-care; they explained 19% of the variance.

Conclusion: People with greater openness and conscientiousness were associated with greater compliance with self-care. Conversely, neuroticism was inversely associated with self-care in patients with T2DM.

Keywords: type 2 diabetes mellitus, adults, traits personality, self-care

Introduction

Diabetes mellitus (DM) is a pandemic and a health system emergency, affecting mainly low and middle-income countries.¹ In Mexico, the prevalence of DM increased from 9.4% in 2016² to 10.3% in 2018.³ Type 2 diabetes mellitus (T2DM) is the second cause of death in Mexico; 69.1% of patients are reported to have at least one complication, and 75.2% have some comorbidities,⁴ which constitutes a heavy budgetary burden for the health system. In Mexico, indirect costs of diabetes were for disability and premature death (5.3 billion) and direct costs of care (4.2 billion), 35% of costs were to the patients with major complications.⁵

Self-care is an integral aspect of human life, and its requirements become more complex while living with chronic diseases.⁶ However, self-care in T2DM is considered to improve glycemic control and reduce the risk of complications.⁷ The main activities of self-care in T2DM are diet, exercise, self-monitoring of glucose, foot care, and medication adherence.⁸ Despite the above, the evidence

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showed that in low and middle-income countries, self-care activities are lacking, and these measures are deficient if compared with the activities of patients in high-income countries.⁹ In Mexico, 46.4% of patients do not take measures to prevent complications.² The self-care activity that Mexican patients most comply with is adherence to medication, and the one they least comply with is glucose self-monitoring.^{4,9}

Several factors can hinder people from complying with their self-care in T2DM, the most important being psychological factors.¹⁰ Psychological factors are mediators that determine whether people can perform healthy behaviors in T2DM.¹¹ Personality traits is an important psychological factor have not been thoroughly studied in patients with T2DM, although personality traits have shown great relevance in other diseases.

Personality traits are particular ways of seeing life, feeling, thinking, and behaving under various circumstances, which are constant throughout adult life. The theory of the five-factor personality traits includes neuroticism (temperamental, impulsive, anxious, mood swings; emotionally unstable character is present, easily stressed and worries a lot), extroversion (gregarious, talkative, enthusiastic, energetic as well as assertive), openness to experience (curious, imaginative, likes art, likes to experience new things and has diverse interests), conscientiousness (hard-working, efficient, makes plans, sets goals, is organized and likes to achieve), and agreeableness (kindness, generosity, that helps others, is forgiving and trusting).¹²

Moreover, personality traits determine the ways to scope, accept, and adapt to T2DM. The neuroticism is negatively associated with self-care behaviors,^{13–16} lack of adherence to treatment,^{14,17} low self-efficacy, and poor glycemic control.^{16,18,19} In contrast, extraversion, conscientiousness, and agreeableness are related to better self-care and glycemic control.^{14,19} The Mexican personality is described as hardworking, intelligent, responsible, honest, cheerful, partying, drunk and supportive.²⁰ When the psychological personality traits of the Mexican population are analyzed, it has been found that those who most represent it are: open to experience, agreeableness, conscientiousness, and extraversion however; neuroticism trait is the one with the least presence.^{21,22}

So far, there are no studies on the relationship between personality traits and self-care behaviors in the Mexican population. Knowledge of personality traits in the Mexican population can help a health professional identify

populations at risk of non-compliance with their self-care in T2DM. Therefore, the study aimed to explore the relationship of personality traits on self-care behaviors in Mexican adults with T2DM.

Materials and Methods

Study Design and Population

A cross-sectional study was conducted. Participants were recruited from a primary care center located in Santiago Pinotepa, Oaxaca, Mexico. Participants were recruited from December 2018 to February 2019. People with a previous diagnosis of T2DM and aged 18 years or older were included in the study. People with a recent diagnosis of T2DM (<1 year), with a psychiatric diagnosis and who presented fever, stomach pain or muscle pain that limited their participation at the time of the survey were excluded. In the end, a sample size of 197 participants was obtained. Convenience sampling was used.

Study Tool

Personality traits were evaluated with the Big Five Inventory.²² The instrument contains 44 questions grouped in five dimensions: neuroticism, extraversion, openness, conscientiousness, and agreeableness. Each responses are likert scale—1-totally disagree to 5-totally agree. Each dimension or trait was evaluated independently, where the higher the score, the greater the presence of the trait. Cronbach's alpha ranged from 0.65 to 0.78.

Self-care was assessed with the Summary of Diabetes Self-care Activities (SDSCA).²³ The questionnaire evaluates four dimensions: diet (4 items), exercise (2 items), glucose self-monitoring (2 items), and foot care (2 items). The questions are oriented to the fulfillment of each behavior of self-care in the last seven days (0–7). The total sum of the scores ranges from 0 to 70 points, and higher values indicate better self-care. In this study, Cronbach's alpha was 0.76. The covariates that were evaluated were age, sex, number of years lived with T2DM, previous diagnosis of hypertension, Body Mass Index (BMI), and waist circumference (WC).

Data Collection

The information was collected from all people who came to the primary care center for medical consultation and self-reported a previous diagnosis of T2DM. Each person who met the inclusion criteria was made aware of the purpose of the study, given the informed consent form, and asked to

provide their signature on the document. The questionnaires and the obtaining of anthropometric measurements (weight, height and WC) were carried out by the researchers, in an area assigned by the primary care center, to maintain the confidentiality and privacy of the participants. This study was conducted in accordance with the Declaration of Helsinki and was approved by the Ethics and Research Committees of the Faculty of Nursing of Autonomous University of Baja California, Mexico #0192088.

Statistical Analysis

The surveys were captured and analyzed in the SPSS version 25 program. Descriptive analysis was used, such as frequencies, percentages, and measures of central tendency and dispersion (mean and standard deviation). Pearson's correlation was used for the bivariate analysis. Finally, a multiple linear regression model was performed.

Results

Most of the participants were women (74.6%). The mean age was 53.1 years (SD= 8.4), the mean years of schooling was 5.7 (SD= 4.3), the number of years lived with T2DM was 9.0 (SD= 6.5), waist circumference was 96.3 (SD= 14.2), and BMI was 27.5 kg/m² (SD= 4.1) (see Table 1). According to the analysis, compliance with self-care activities was low. Glucose self-monitoring was the least-performed activity, and diet was the best-performed one. Of the personality traits, the trait with the lowest score was neuroticism, while the one with the highest score was extraversion (see Table 2).

Table 3 shows the correlation analysis between personality traits and self-care activities. The traits of conscientiousness and openness were positively correlated with self-care activities, and neuroticism was inversely correlated. Additionally, the conscientiousness trait was positively correlated with the sub-dimensions of diet, exercise, and foot care. Openness was positively correlated with exercise and foot care. Agreeableness was correlated with foot care.

A multiple linear regression model was performed for self-care in T2DM. While adjusting the model with the variables of age, education, number of years diagnosed, waist circumference, and BMI, only openness ($\beta = 0.141$) and conscientiousness ($\beta = 0.273$) were significantly related. The model explained 19% of the variance of self-care in T2DM (see Table 4).

Discussion

This study aimed to explore the relationship between personality traits and self-care behaviors in people with

Table 1 Baseline Characteristics

Variables	Mean $\pm$ SD
Sex	
Male%(f)	74.6 (147)
Female%(f)	25.4 (50)
Marital status	
Married %(f)	44.2 (87)
Single %(f)	17.3 (34)
Consensual union %(f)	23.3 (46)
Other %(f)	15.2(30)
Age	53.1 $\pm$ 8.4
Schooling	5.7 $\pm$ 4.3
Time lived DMT2	9.0 $\pm$ 6.5
WC	96.3 $\pm$ 14.2
BMI	27.5 $\pm$ 4.1
Normal %(f)	23.4 (46)
Overweight %(f)	49.2 (97)
Obesity %(f)	27.4 (54)

Abbreviation: SD, standard deviation.

T2DM. Self-care in T2DM requires knowledge, skills, emotional adjustments, and social support for its fulfillment. Several studies report that the lack of self-care over

Table 2 Description of Self-Care Activities and Personality Traits of People with T2DM

Variables	Mean $\pm$ SD
Self-care (0–70)	28.0 $\pm$ 11.8
Diet (0–28)	15.8 $\pm$ 6.6
Exercise (0–14)	3.5 $\pm$ 1.9
Glucose SM (0–14)	1.6 $\pm$ 1.2
Foot care (0–14)	6.7 $\pm$ 5.3
Personality traits	
Conscientiousness (9–45)	32.8 $\pm$ 4.3
Neuroticism (8–40)	23.4 $\pm$ 4.2
Openness (10–50)	31.0 $\pm$ 5.8
Extraversion (8–40)	33.5 $\pm$ 4.6
Agreeableness (9–45)	32.5 $\pm$ 4.0

Abbreviations: SM, self-monitoring; SD, standard deviation.

Table 3 Pearson's Correlation Between Personality Traits and Self-Care Activities on T2DM

	Self-Care	Diet	Exercise	Glucose SM	Foot Care
Conscientiousness	0.283**	0.230**	0.201**	0.063	0.167*
Neuroticism	-0.144*	-0.055	-0.112	-0.108	-0.097
Openness	0.259**	0.077	0.207**	0.103	0.248**
Extraversion	0.097	0.071	0.038	-0.024	0.116
Agreeableness	0.133	0.017	0.078	-0.021	0.197**

Notes: $p < 0.05^*$; $p < 0.01^{**}$.

Abbreviation: SM, self-monitoring.

Table 4 Linear Regression Model for Self-Care Activities in DM2

Variables	β^a	t	p	95% IC
Conscientiousness	0.273*	2.784	0.025	0.122, 0.609
Neuroticism	-0.118	-1.458	0.147	-0.474, 0.132
Openness	0.141**	1.616	0.006	-0.061, 0.311
Extraversion	-0.393	-2.269	0.064	-0.543, -0.141
Agreeableness	0.297	1.869	0.108	-0.055, 0.275

Notes: $p < 0.05^*$; $p < 0.01^{**}$; ^aadjusted for age, education, number of years lived with T2DM, waist circumference, and BMI.

time decreases the quality of life and increases the presence of complications.^{24,25} In our study, the score for compliance with self-care activities was low. These results are consistent with other studies, which report that in low- and middle-income countries, compliance with self-care is poor.⁹

In this study, neuroticism was negatively correlated with self-care, consistent with previous studies.^{13–16} This is because people with neuroticism have less emotional control. They have a greater risk of presenting stress, loneliness, anxiety, depressive symptoms and are less likely to seek medical attention,²⁶ which negatively influences self-care compliance. Also, people with a diagnosis of chronic diseases report an increase in neuroticism,²⁷ associated with a growth in mortality.²⁸ However, in the multiple linear regression model, of this study, no significant relationship was found, so more studies are required to determine the relationship between these variables.

In contrast, our study found that the conscientiousness trait was related to greater compliance with self-care activities, similar to those reported in other studies.^{14,19} The conscientiousness trait has been described as encouraging responsibility, order, self-control, and acceptance of obligations and rules.²⁹ Therefore, there is a greater

probability that people with higher indices of this personality trait, there could be the possibility that they present greater compliance with self-care. People with greater conscientiousness could be create a plan to meet goals and commit to following the health recommendations imparted to manage T2DM and, therefore, have better control of this disease. Finally, clinical studies report that the conscientiousness trait is associated with lower BMI, waist circumference, and HbA1c.³⁰

The openness trait was also positively related to self-care in T2DM. People with openness are characterized by their intelligence, curiosity, search for new activities, being analytical, and being able to reflect.³¹ Therefore, the diagnosis of T2DM and self-care activities can be seen as a new life experience and a different way of living. Other studies report that the openness trait is related to a better scope to the diagnosis of T2DM, as well as the search for emotional support.³² This personality trait is also associated with a more significant initiative by the patient to use health applications, which helps them improve self-care in T2DM.³³ In addition, some studies report a lower percentage of body fat, lower total cholesterol level,³⁴ lower BMI, and higher glucose self-monitoring,¹⁵ as well as a lower risk of mortality.³⁵ In this way, people with T2DM and greater openness might present more willing to give a change in routine that helps them control their disease.

Unlike other studies,^{14,19} in the Mexican population we found that extraversion was not significantly correlated in a general or specific way with T2DM self-care activities, while agreeableness was only correlated with greater foot care. Similar results are shown in the multiple linear regression model, presenting no significance. This could suggest that in the Mexican population, the traits of extraversion and agreeableness are not relevant for compliance with self-care in T2DM.

Finally, we would like to point out the strengths and weaknesses of our study, within the strengths that we found we can say that 1) this is the first study that evaluates personality traits with self-care in DMT2 in the Mexican population 2) the questionnaires used have been used internationally and are validated in the Mexican population, so the results may be useful for comparison with other countries. Within the limitations we have to mention that: first, since it is a cross-sectional design, causality effects cannot be granted. Second, the participants in this study were patients who attended a primary care center in Oaxaca, so the results cannot be generalized. Third, the sampling in this study was for convenience, therefore the results should be interpreted with caution.

Conclusion

In this study, self-care behaviors in T2DM was reported low and personality traits extroversion scored higher. Consciousness, openness, and extraversion traits were positively correlated with self-care, while neuroticism was negatively correlated, but, only openness to experience and conscientiousness were predictors of self-care in T2DM. The results obtained allow us to suggest that health professionals could consider the evaluation of personality traits as an important factor in complying with self-care. Likewise, promote the skills of conscientiousness and openness to favor self-care. Future studies are required to be carried out in other Mexican contexts and to use randomized samplings; we also consider that the relationship with glycemic control and longitudinal studies should be evaluated to analyze the risk of developing complications or mortality according to personality traits.

Disclosure

The authors report no conflicts of interest in this work.

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