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Depression, self-esteem, diabetes care and self-care behaviors among middle-aged and older Mexicans[☆]

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Abstract

Aims—Examine the associations of depression and self-esteem on self-care activities and care received among Mexicans with diabetes.

Methods—Using data from the Mexican Nutrition and Health Survey 2012, logistic regression models were fit to test the associations between each self-care activity and diabetes care, and self-esteem and depression.

Results—People with low self-esteem were less likely to follow a diet, but no other associations were found. Contrary to what was expected, there were no relationships between depression and quality of care received or self-care behaviors.

Conclusion—Current findings support the importance of looking at mental health and emotional state among older adults with diabetes. Future studies should explore the relationship between different psychological barriers to proper diabetes management.

Keywords

Diabetes; Depression; Diabetes self-care behaviors; Self-esteem; Older adults; Hispanics

1. Introduction

Diabetes mellitus is a public health concern in Mexico. The direct cost of diabetes for the Mexican Institute of Social Security (IMSS) was estimated to be US \$452,064,988 and the average cost per patient was US \$3,193 [1]. Diabetes is a major cause of morbidity, mortality and disability in older adults. According to the Mexican Nutrition and Health Survey (ENSANUT), diabetes affected approximately 9.2% of adults aged 20 and older [2]. Diabetes was the second-highest occurring cause of mortality for women and men in Mexico, with 41,926 deaths (or 16.1%) and 38,862 (11.7%) deaths, respectively [3]. This condition may have deleterious effects on emotional well-being, including symptoms of depression and low self-esteem [4]. Along with diabetes, depression is also a major health concern in Mexico. Approximately 9.2% of surveyed individuals had depression over the

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Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at <http://dx.doi.org/10.1016/j.diabres.2014.04.017>.

life course [5]. Depression is associated with disability, other medical comorbidities (including diabetes and cardiovascular diseases), and increases health care costs and utilization [6]. Therefore, the relationship between diabetes and depression deserves careful examination.

The association between diabetes and depression has been found consistently [7]. Although the pathway connecting these conditions is still not fully understood, depression among people with diabetes appears to have a negative effect on health outcomes and self-care behaviors. For example individuals with diabetes and depression displayed poor glycemic control [8] and poor diet, exercise and glucose testing patterns [9]. In addition, a few studies have shown that depression has an impact on the quality of care received by individuals with diabetes [10]. Depressed individuals may also show low levels of self-esteem [11], which in turn may also affect diabetes self-care behaviors [12]. However, in Mexico, the literature about the association of depression and self-esteem on diabetes and diabetes management remains scarce. In fact, there are only a few studies that have tried to determine the prevalence of depression among patients with type 2 diabetes [13–15]. To my knowledge, only two studies have looked at the associations between depression symptoms and health outcomes among Mexicans with diabetes [15,16]. Even when other psychological factors have shown to impact diabetes management such as self-esteem [17], there are not many studies that have looked at the association of these factors and depression, diabetes care and self-management among Mexicans.

1.1. Why self-esteem and diabetes management?

Low levels of self-esteem have been associated with diabetes and diabetes management [18]. Evidence shows that self-esteem can be a key factor influencing health care behaviors [19]. In people with diabetes, studies performed in the US have shown that low self-esteem have negative effects on self-care behaviors in younger and older adults [17,20]. For example, Johnston-Brooks et al. [21] found that self-esteem was related to diet and exercise self-care behaviors among patients with insulin-dependent diabetes. In addition, Knecht et al. [22] found that high levels of self-esteem were associated with exercise adherence, ability to adjust insulin dosage, and oral hygiene in a sample of people aged 16–72. Some explanations for these associations may be that people with high self-esteem have more ability and/or capacity to deal with the disease and self-management activities. In a qualitative study of Hispanic men with diabetes, Rustveld et al. [23] found that self-esteem was one of the main barriers to self-care management. These men had low self-esteem because they felt that they were treated differently than individuals with no diabetes. Consequently, these feelings seemed to affect the way that these men engage in self-care behaviors, which suggests that self-esteem may be an important factor in influencing or hindering people's self-management activities.

Another explanation about the effects of self-esteem on self-management may be its connection to self-efficacy. While one concept is the personal assessment of one's own self-worth and value, and the other relates to individual's perception of their own ability to perform certain specific tasks of behaviors, both of these constructs may influence individuals' motivations and ability to adjust to new situations [24]. In turn, individuals who

have high self-esteem and believe they can achieve a desired outcome may be better motivated to adhere to diabetes self-care behaviors. The combination of self-efficacy and self-esteem may increase the perception of coping [25], which has been found to influence adherence to self-management [26]. In addition, people with high self-esteem may feel empowered to take responsibility in their self-care. Diabetes empowerment has been associated with self-care behaviors including diet and exercise [12]. Based on this, psychosocial factors may also play an important role in the management of diabetes in Mexico. More research is required to understand different paths among these processes and diabetes self-management in older adults in Mexico.

Therefore, the purpose of this study was to expand the literature in Mexico by examining the associations of depression and self-esteem on self-care activities and care received among Mexicans with diabetes. Based on prior studies done in the US [10,27], it was hypothesized that individuals with symptoms of depression and low self-esteem would be less likely to perform self-care activities and to receive diabetes care than those with low symptoms of depression and higher self-esteem.

2. Methods

2.1. Data and sample

Data on depression, self-esteem, self-management and health care among people with diabetes was obtained from the ENSANUT [28]. The ENSANUT is a nationally representative survey with a probabilistic multistage stratified cluster sampling design that in 2012 had a sample of 50,528 households and 46,277 adults aged 20 years and older. Participants were surveyed throughout all Mexico's 32 states. The questionnaires include information about participant's demographic information, health care utilization, health, anthropometry and general household characteristics. More detailed information about the design and data collection methods can be found elsewhere [29]. Of the 46,277 adults who participated in the ENSANUT, 3,251 individuals 50 years and above had been diagnosed with diabetes by a physician. Of those, there were 1274 individual who had complete information regarding depression, self-esteem, and other health and sociodemographic conditions of interest.

Those with complete data were more likely to be older (M/SD 68.7/6.4 vs. 60.6/9.6 years, $p < .001$), to be unemployed or stayed-at-home person (61.0% vs. 54.8% $p < .001$), less likely to be educated (14.8% have education beyond high school compared to 30.4%) and to be married (57.5% vs. 67.5% $p < .001$) than those with missing data. People with missing data had diabetes for longer time (M/SD 133.1/121.2 vs. 119.7/130.0 months $p < .001$), more likely to have hypertension (53.8% vs. 49.7% $p = .02$), and to take oral agents (81.9% vs. 76.2% $p < .01$) than those without complete data.

2.2. Study measures

2.2.1. Outcome variables—According to the guidelines of the American Diabetes Association [30], patients with diabetes should visit their physician at least 4 times per year. Doctors should determine if blood sugar is under control, preferably through glycosylated hemoglobin (HbA1c) tests. Other blood or urine glucose tests provide useful information for

diabetes self-management, but contrary to the HbA1c, these exams cannot provide a quantitative measure of blood sugars over an extended period of time. At least once a year, people with diabetes should have comprehensive foot and eye examinations, and should have a microalbumin test to check levels of blood protein in their urine. In addition, people with diabetes should follow a diet and exercise plan. Although the effects of blood sugar self-monitoring for non-insulin-dependent diabetes patients is still debated, self-monitoring continuous to be widely encouraged for patients with diabetes[31].

Nine domains were considered regarding diabetes self-care activities and care (similar items have been used in prior studies by Bell et al. [27] and Egede et al. [10], including the following).

2.2.1.1. Doctor visits: Participants were asked how many times they saw the doctor about their diabetes in the past year. Two categories were created to distinguish those with at least four physician visits in the past year vs. less than four visits in the past year.

2.2.1.2. Urine testing: Respondents were asked whether their physician has ordered urine testing during the last 12 months. This variable was dichotomized as 0 days vs. one or more days.

2.2.1.3. Glycosylated HbA1c testing: Respondents were also asked whether the physician has ordered Hb1Ac tests and how often HbA1c tests were performed. This variable was coded as having at least one Hb1Ac tests in the past 12 months vs. none.

2.2.1.4. Foot examination: This variable was dichotomized into having no foot examination vs. having at least one annual foot exam.

2.2.1.5. Eye examination: This variable was dichotomized as 0 vs. 1 or more eye exam during the past 12 months.

2.2.1.6. Urine or blood glucose self-monitoring: Participants were asked whether they used urine and/or blood test strips to measure their own blood sugar during the past 12 months. This variable was dichotomized as 0 days vs. one or more days.

2.2.1.7. Exercise: Respondents were asked whether they follow an exercise program to control their diabetes. This is a dichotomous variable indicating whether or not the respondent follows an exercise program.

2.2.1.8. Diet: This is a dummy variable indicating whether respondents are on a special diet to control their diabetes.

2.2.1.9. Smoking: A dummy variable was created to indicate whether the participant was a smoker or whether vs. former smokers or nonsmokers.

2.2.2. Independent variables

2.2.2.1. Depressive symptoms: The short (7-item) version of the Center for Epidemiological Studies Depression (CES-D) scale was used to assess the presence of depressive symptoms within the last week (Cronbach's $\alpha = .89$). The 7-item short version of the CES-D scale provided by the ENSANUT includes the items: (1) I could not shake off the blues, (2) I had trouble keeping my mind on what I was doing, (3) I felt depressed, (4) I felt that everything was an effort, (5) My sleep was restless, (6) I enjoyed life, and (7) I felt sad. Item 6 was reverse coded to be consistent with the direction of the other items. Each item was score 0–3, for a maximum of 21 points. Higher symptoms indicate higher depressive symptoms. The CES-D is not intended as an assessment of clinical depression, but scores of 8 or greater are considered indicative of depression [32]. Accordingly, CES-D scores were dichotomized using a cut-off of 8 or higher.

2.2.2.2. Self-esteem: The ENSANUT measure self-esteem with a single-item modified from the Rosenberg's Self-Esteem Scale. This item has been used to measure self-esteem in Mexican adults previously by the Mexican National Institute of Health [33]. Longer-duration surveys may have poor response rates due to survey fatigue. Using a single-item eliminates redundant items and decrease survey fatigue while increasing response rates. Prior research has demonstrated that a single-item is as effective, reliable and valid as screening for low self-esteem in adults as the Rosenberg Self-Esteem Scale [34]. Similar single-items have been used to measure global self-esteem among participants [35]. Participants in the ENSANUT were asked whether they felt they were a person of worth (“yes”, “no”, or “sometimes”). Approximately 3.7% of the respondents answered sometimes. Therefore, this variable was dichotomized into yes, and no/sometimes.

2.2.3. Model covariates

2.2.3.1. Health: Participants reported time to diabetes diagnosis, and medications they have been prescribed. Time of diabetes diagnosis was calculated in months. The variable for medication was coded into three categories, including oral agents, insulin with or without oral agents and none. Participants also provided information on health conditions such as self-report chronic conditions including hypertension and cardiovascular disease. Questionnaires inquired about physician-diagnosed hypertension and whether they have felt strong pain in the chest area. Weight and height were directly measured and body mass index (BMI) was calculated with weight (kg)/height (m²). Further, this variable was recoded into underweight/normal weight (BMI < 25), overweight (25 < BMI < 30) and obese (BMI ≥ 30).

2.2.3.2. Demographic: The ENSANUT collected information on different sociodemographic factors, such as age, sex, marital status, education, socioeconomic status, employment status, health insurance, and urban-rural residence. Age was continuous and measured in years. Sex was a dummy variable taking the value of 1 for female. Marital status was dichotomized into married or not married. The level of education was categorized as none, primary school, and secondary education or more. The ENSANUT computed socioeconomic status for participants and recode into tertiles [36]. Employment status was coded into unemployed, employed, retiree, and keeping house full-time. Health insurance

was categorized as uninsured, *seguro popular* (people's insurance), and other insurance programs. Rural areas in Mexico are defined by the Mexican Census as those with fewer than 2500 inhabitants.

3. Statistical analysis

Health and sociodemographic conditions, as well as self-care activities and diabetes care outcomes of people with diabetes, were summarized using frequencies and percentages for categorical variables and measures of central tendency for numerical variables. First, bivariate associations between depression and self-esteem, health outcomes and socio-demographic factors were evaluated using chi-square or *t*-test as appropriate. Diabetes self-care activities and diabetes care indicators, and self-esteem and depression were compared with chi-square tests. Then, separate logistic regression models were fit to test the associations between each self-care activity and diabetes care, and self-esteem and depression. In each model, the dependent variable was one of the nine domains (doctor visits, urine testing, HbA1c testing, foot examination, eye examination, urine or blood glucose self-monitoring, exercise, diet, smoking); depression and self-esteem were the main independent variables of interest; and age, sex, marital status, education, socioeconomic status, employment status, health insurance, urban-rural residence, medications, time to diabetes diagnosis, hypertension, cardiovascular disease, and BMI were used as covariates. These demographic variables and health indicators were associated with depression and/or self-esteem or were conceptually related to self-care behaviors and/or diabetes outcomes. Bonferroni corrections were applied to adjust for multiple comparisons. All analyses were conducted on SAS software version 9.4 (SAS Institute, Cary, NC).

4. Results

Of those 1,274 adults with diabetes, approximately 25.5% had CES-D scores ≥ 8 and approximately 11.5% had low self-esteem. The majority was women (60.7%), married (57.4%) and they worked in the house (47.4%). Overall, they had lower levels of education. Approximately, 23.9% had no education and 61.2% had only some primary education. Nearly 90.0% had health insurance; 35.7% had coverage through *Seguro Popular* and 53.9% were insured through other programs.

There was a significant relationship between self-esteem and depressive symptoms in this sample ($p = .003$). Approximately 35.6% of people with diabetes had both low self-esteem and depressive symptoms. Table 1 shows the sociodemographic characteristics and health conditions of adults by self-esteem and depressive symptoms. Bivariate analysis showed that sex, socioeconomic status, education, employment status, marital status, insurance, cardiovascular disease, hypertension, and diabetes medication differ significantly between people with symptoms of depression and low symptoms of depression. In addition, significant differences were found between self-esteem and age, education, and marital status. For descriptive purposes, bivariate associations between participant characteristics and all diabetes self-care and care outcomes are shown in Appendix (see Tables S1–S4). Individuals who exercised were more likely to have higher levels of education, medium/high income, and more likely to have hypertension. Those who followed a diet were more likely

to have higher levels of education, medium/high income, to be retiree, have other insurance than *seguro popular*, and were more likely to take insulin. There were significant relationships between doctor visits and marital status, insurance, hypertension, diabetes duration and type of diabetes medication taken. Similarly, there were associations between urine testing and income, employment status, type of insurance, hypertension, diabetes duration, BMI, and rural residence.

Table 2 shows these associations between diabetes self-care activities and diabetes care by depression status and self-esteem. There were significant relationships between self-esteem and exercise, diet, doctor visits, HbA1c testing, foot examination and eye examination. But no significant differences were found between self-esteem and self-monitoring of blood glucose or urine testing, smoking and having urine test done. In terms of depressive symptoms, no associations were observed relating to self-care activities and/or diabetes care received.

Table 3 presents a summary of the results of the binary logistic regression models testing the associations between self-esteem on diabetes self-care activities and quality of diabetes care (see Tables S5 and S6 in the Supplementary Appendix for all model covariates). After controlling for depression, sociodemographic and health characteristics, the associations of self-esteem with diet and exercise remained significant. Individuals with lower self-esteem were less likely to follow an exercise plan (OR .36, 95% CI .14–.95) or diet (OR .46 95% CI .27–.76) compared to those with higher self-esteem. However, after Bonferroni corrections, significant differences remained only for diet. No other statistically significant group differences were found between self-esteem, quality of care indicators and self-care activities.

5. Discussion

This study assessed the association between self-esteem, depression, and self-care behaviors and quality of care for older adults with diabetes. To the best of the author's knowledge, this is one of the first studies to examine these relationships in older Mexicans. Findings suggest that low self-esteem was associated with poor self-care behaviors such as following an exercise program and diet, but no other associations were found. Contrary to what was expected, there were no relationships between depression and quality of care received or self-care behaviors.

Previous studies have demonstrated that depressive symptoms and low self-esteem are not uncommon in older Mexicans with diabetes [13]. The current results showed approximately 25.5% of people in the sample had symptoms of depression and 11.5% had low self-esteem. A significant overlap among those with depressive symptoms and low self-esteem was also found; approximately 35.6% of those with low self-esteem have symptoms of depression. In the present study, significant relationships between self-esteem and exercise, diet, physician visits, HbA1c testing, foot and eye examinations were found. However, most relationships disappeared after controlling for sociodemographic and health characteristics. Only diet and exercise were associated with self-esteem after adjusting for model covariates. Variables such as insurance, diabetes duration and type of medication taken, and other health

conditions appear to modulate these associations. For example, compared to the uninsured, individuals with insurance (*Seguro Popular* or IMSS/ISSSTE) were more likely to go to the doctor, which suggest that Mexican adults with diabetes are partially benefiting by the Mexican social insurance scheme. People with longer diabetes duration were more likely to receive a foot examination or eye examination. It appears that health care provider recommendations reflects severity of the disease and patient care [37]. Those suspected or more likely to have retinopathy or foot ulcer may have been referred to ophthalmology services or foot clinic.

Furthermore, after Bonferroni adjustment, self-esteem was significantly associated with healthy diet, but was no longer associated with exercise. Prior studies have discussed how negative psychological consequences of diabetes which include self-esteem may hinder successful diabetes management [23]. It may be the case that people with higher self-esteem feel more motivated and have adjusted and coped better with their diabetes. They may feel empowered to make changes in their eating behaviors. Diabetes empowerment has shown to be positively related to self-care behaviors, including diet and exercise [12]. The current findings are also consistent with Jessor et al. [19], whose results showed that self-esteem was an important predictor of health-enhancing behavior. Similarly, Johnston-brooks [21] found that self-esteem was related to diabetes self-care behaviors including diet and exercise self-care among insulin-dependent individuals. However, associations between self-esteem and other self-care activities (such as self-glucose monitoring) were not significant. One plausible explanation for these findings is that self-esteem among people in this sample is related to body image. Body image literature has shown that weight-loss has been associated with psychological well-being, including self-esteem [38]. Perhaps people in this sample had undergone diet to lose weight, which as a result had increased their self-esteem. However, when the interaction between BMI and self-esteem was added into the model it was not significant (results not shown). Yet, other studies have discussed that body dissatisfaction is more associated with perceive overweight than actual BMI, which may explain why BMI and diet did not interact [39].

While not the case in the present study, depression has been associated with poor disease management and negative outcomes among people with diabetes [15]. However, these studies have had mixed results. In a study done with older African Americans with diabetes [27], depressive symptoms were associated to physical activity and foot examination. But depression was not associated with self-monitoring of blood glucose, following a diet or compliance with diabetes medications. Similarly, Lin et al. [40] found that people with depression were less likely to perform physical activity and follow a healthy diet. However, they found no associations between depressive symptoms and self-monitoring of blood glucose or foot examination. In addition, depression was not associated with physician services, such as HbA1c tests, microalbuminuria, and eye examination.

Also looking at both, the relationships between depression and self-care behaviors and quality of care, Egede et al. [10] found that non-depressed diabetes individuals were more likely to exercise than depressed individuals with diabetes. Depressed individuals were more likely to smoke than non-depressed people. In terms of quality of care received, they found that people with depression were less likely to receive eye examinations in the past year.

However, they found no relationships between self-monitoring of blood glucose, self-foot checks, doctor visits, HbA1c tests or provider foot examination. Conversely, these associations require further examination to understand how does depression influences self-care behaviors and health care quality for people with diabetes? And what are the mechanisms that cause such changes? In addition, more knowledge is needed understanding how these relationships may be different for Hispanic populations, especially for older adults.

In the present study, depression was not assessed using a clinical diagnosis. It utilized self-reported measures of depressive symptoms (CES-D). It is possible that misreported data contributed to this finding, and the prevalence of depression may have been underestimated at the time of the interview. In their study Fisher et al. [41] found no association between clinical depression or depressive symptoms with glycemic control among middle age and older adults. In fact, they only found a relationship between diabetes related distress and HbA1c, which suggest that the association between diabetes management and depression is very complex and may be moderated or mediated by other factors that were not examined in the present study [42].

In addition, the lack of association between depression symptoms and diabetes care could also be partially influenced by the greater number of people in this sample with poor self-care practices. Approximately, three-quarters of participants did not follow an exercise plan, diet or self-monitoring of blood glucose, which may reflect poor disease outcomes. Unfortunately, diabetes education is not available in many areas in Mexico. Thus, knowledge about diabetes self-management is not uncommon. In a study done in both rural and urban areas in Mexico, older adults with diabetes did not respond properly to questions about diabetes management, including diet and exercise [43]. In a recent study Barquera et al. [44] discussed that poor treatment outcomes are not only associated with poor patient knowledge regarding the disease. Additional factors affecting the effectiveness of diabetes treatment include health care providers and the healthcare system. In fact, the Mexican National Institute of Health reported that the challenges Mexico faces regarding diabetes treatment and control are: shortfalls in prescription medications, lack of qualified health professionals, obsolete technology and medical equipment, and insufficient laboratory capacity [45]. This indicates that many people receive low quality health care and services which is likely to lead to poor self-management practices, regardless of depression status.

6. Limitations

This study has a number of limitations. First, the findings relied on cross-sectional data, which limited the ability to infer causality. Perhaps eating healthy produces positive effects on self-esteem [46]. A single-item was used to measure self-esteem and although prior studies have measured self-esteem with a single-item, there are other instruments that measure different domains of self-esteem [47]. Future studies should examine these relationships using longitudinal data and the self-esteem scale to better capture this construct. Moreover, CES-D scale assesses frequency of depressive symptoms during the preceding week. Thus, it was not possible to include onset and severity of depressive symptoms. A structured psychiatric diagnosis may have provided different results. In

addition, future studies should explore the relationships between self-efficacy, self-esteem, depressive symptoms and diabetes care and self-management behaviors in older adults living in Mexico.

Also, many observations were excluded due to missing values, and questions regarding frequency of examinations and self-management activities could not be used in this study. People without complete data differed from those with complete data on some demographic and health characteristics. For example, individuals without complete data were younger and married and have been diagnosed with diabetes for a shorter duration compared to those with complete data. Thus, individuals who were included in our analysis may have had worse physical health and well-being, as well, as worse self-care behaviors, which could have biased these results. In addition, in the present study, age was associated with low self-esteem; older adults age 60 and above were more likely to have low self-esteem than younger people. Although low levels of self-esteem are not uncommon in old age [48], the results of the present study should be interpreted with caution. There may be other factors that were not considered that could have affected the ability to perform exercise including physical ability, fear of falling, lack of transportation and time [49].

Nevertheless this study has provided useful insights. Prior research has looked at the effect of depression symptoms on diabetes health care behaviors, but there are a number of psychological processes and/or emotional states that may be related to diabetes self-management. Besides self-esteem other studies have found that diabetes self-care behaviors are associated with self-efficacy, resilience, coping and family support and involvement [50]. Future studies should explore the relationship between different psychological barriers to proper diabetes management and quality of care received. More studies should examine these psychological barriers and positive traits to diabetes management and outcomes in older Mexicans with diabetes.

7. Conclusions

Despite these limitations, current findings support the importance of looking at mental health and emotional state among older adults with diabetes. The results of the present study have implications for researchers, practitioners and policy makers. Based on the results and the current literature, diabetes education programs are needed in Mexico [43]. These programs may be able to help people with diabetes to make changes in their life style and improved their self-management. Also, the relationships between self-esteem and self-care behaviors bring attention to the need to evaluate personal motivation for behavior change and adherence to self-care activities among people with diabetes. Since psychological factors, including self-esteem, have shown to influence diabetes management, an overview of these concepts should be integrated in diabetes education in Mexico. More strategies using psychosocial factors to increase adherence to self-care activities among middle-age and older adults in Mexico are needed.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1

Demographic characteristics of Mexican adults 50 years and older with diabetes by depressive symptoms and self-esteem (n = 1274).

	CES-D 8 (n = 325) (25.51%)	CES-D < 8 (n = 949) (74.49%)	p Value	Low self-esteem (n = 146) (11.46%)	High self-esteem (n = 1128) (88.54%)	p Value
Female	216 (66.46)	558 (58.80)	.015	89 (60.96)	685 (60.73)	.960
Age (yrs)	68.76 (6.32)	68.66(6.48)	.820	70.49 (6.77)	68.46 (6.36)	<.001
Education			<.001			<.001
None	99 (30.46)	206 (21.71)		56 (38.36)	249 (22.07)	
Primary school	201 (61.85)	579 (61.01)		81 (55.48)	699 (61.97)	
At least secondary school	25 (7.69)	164 (17.28)		9 (6.16)	180 (15.95)	
Income			<.001			.250
Low	124 (38.15)	270 (28.45)		49 (33.56)	345 (30.59)	
Medium	129 (39.69)	370 (38.99)		62 (42.47)	437 (38.74)	
High	72 (22.15)	309 (32.56)		35 (23.97)	346 (30.67)	
Employed			.007			
Unemployed	44 (13.54)	129 (13.59)		22 (15.07)	151 (13.39)	.621
Employed	71 (21.85)	235 (24.76)		34 (23.29)	272 (24.11)	
Retiree	33 (10.15)	158 (16.55)		17 (11.64)	174 (15.43)	
Keeping house full time	177 (54.46)	427 (44.99)		73 (50.00)	531 (47.07)	
Married	167 (51.38)	565 (59.54)	.010	72 (49.32)	660 (58.51)	.044
Insured			.009			.114
Uninsured	29 (8.92)	103 (10.85)		17 (11.64)	115 (10.20)	
Seguro popular	139 (42.77)	316 (33.30)		62 (42.47)	393 (34.84)	
Other insurance programs	157 (48.31)	530 (55.85)		67 (45.89)	620 (54.96)	
Cardiovascular diseases	62 (19.08)	99 (10.43)	<.001	16 (10.96)	145 (12.85)	.516
Hypertension	199 (61.23)	487 (51.32)	.002	83 (56.85)	603 (53.46)	.439
Diabetes duration (months)	139.10 (131.67)	130.98(117.39)	.297	140.92 (137.10)	132.03 (119.01)	.404
Diabetes medication			.009			.250
No medication	25 (7.69)	71(7.48)		16 (10.96)	80 (7.09)	
Oral agent only	251 (77.23)	792 (83.46)		115 (78.77)	928 (82.27)	
Insulin with or without oral agents	49 (15.08)	86 (9.06)		15 (10.27)	120 (10.64)	
BMI			.886			.870
Underweight/normal	67 (20.62)	208 (21.92)		31 (21.23)	244 (21.63)	
Overweigh	145 (44.62)	416 (43.84)		62 (42.47)	499 (44.24)	
Obese	113 (34.77)	325 (34.25)		53 (36.30)	385 (34.13)	
Rural residence		284 (29.93)	.421	51 (34.93)	338 (29.96)	.220

Table 2

Diabetes self-care behaviors and quality of care by depressive symptoms and self-management.

	CES-D 8 (<i>n</i> = 325) (25.51%)	CES-D < 8 (<i>n</i> = 949) (74.49%)	<i>p</i> Value	Low self-esteem (<i>n</i> = 146) (11.46%)	High self-esteem (<i>n</i> = 1128) (88.54%)	<i>p</i> Value
Self-care behavior						
Urine or blood glucose self-monitoring			.113			.108
Yes	110 (33.85)	279 (29.40)		53 (36.30)	336 (29.79)	
No	215 (66.15)	670 (70.60)		93 (63.70)	792 (70.21)	
Exercise			.681			.010
Yes	28 (8.62)	89 (9.38)		5 (3.42)	112 (9.93)	
No	297 (91.38)	860 (90.62)		141 (96.58)	1016 (90.07)	
Diet			.641			<.001
Yes	84 (25.85)	233 (24.55)		20 (13.70)	297 (26.33)	
No	241 (74.15)	716 (75.45)		126 (86.30)	831 (73.67)	
Smoking (<i>n</i> = 1253)			.915			.061
Current smoker	24 (7.48)	68 (7.30)		5 (3.50)	87 (7.84)	
Never smoked or former smoker	297 (92.52)	864 (92.70)		138 (96.50)	1023 (92.16)	
Quality of care variables						
Doctor visits (<i>n</i> = 1269)			.156			.028
4	257 (79.32)	713 (75.45)		101 (69.18)	869 (77.38)	
Less than 4 office visits	67 (20.68)	232 (24.55)		45 (30.82)	254 (22.62)	
Urine testing			.475			.089
Yes	111 (34.15)	345 (36.35)		43 (29.45)	413 (36.61)	
No	214 (65.85)	604 (63.65)		103 (70.55)	715 (63.39)	
HbA1c testing			.148			.038
Yes	31 (9.54)	67 (7.06)		5 (3.42)	93 (8.24)	
No	294 (90.46)	882 (92.94)		141 (96.58)	1035 (91.76)	
Foot exam			.846			.043
Yes	48 (14.77)	136 (14.33)		13 (8.90)	171 (15.16)	
No	277 (85.23)	813 (85.67)		133 (91.10)	957 (84.84)	
Eye exam			.981			.030
Yes	32 (9.85)	93 (9.80)		7 (4.79)	118 (10.46)	
No	293 (90.15)	856 (90.20)		139 (95.21)	1010 (89.54)	

Table 3

Binary logistic regression results for associations between self-esteem and diabetes self-care behaviors and quality of care of Mexican adults.

	<i>n</i>	Odd ratio	95% CI
Self-care behaviors			
Urine or blood glucose self-monitoring	1274	1.31	(.89-1.91)
Exercise *	1274	.36	(.14-.95)
Diet *†	1274	.46	(.27-.76)
Smoking	1253	1.97	(.77-4.99)
Quality of care variables			
Doctor visits	1269	.68	(.44-1.04)
Urine testing	1274	.75	(.50-1.11)
HbA1c testing	1274	.43	(.17-1.10)
Foot exam	1274	.56	(.31-1.03)
Eye exam	1274	.45	(.20-1.03)

Adjusted for depressive symptoms, sex, age, education, income, employment status, marital status, insurance, cardiovascular disease, hypertension, time of diabetes diagnosis, diabetes medication, BMI and rural residence.

* Significant at $p = .05$ before Bonferroni correction (raw p -value).

† Significant at $p = .05$ after Bonferroni correction.