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Sociodemographic and Lifestyle Factors, and Health Conditions of Dominican Adults Living in Puerto Rico

Martha Tamez¹, Carlos F. Ríos-Bedoya^{2,3}, José F. Rodríguez-Orengo^{2,4}, Katherine L. Tucker⁵, and Josiemer Mattei¹

¹Department of Nutrition, Harvard T.H. Chan School of Public Health, 665 Huntington Ave, Bldg. 2, Boston, MA 02115, USA

²Fundación de Investigación de Puerto Rico, San Juan, PR, USA

³Department of Internal Medicine, Hurley Medical Center, Flint, MI, USA

⁴Department of Biochemistry, School of Medicine, University of Puerto Rico, Río Piedras, PR, USA

⁵Department of Biomedical & Nutritional Sciences, University of Massachusetts Lowell, Lowell, MA, USA

Abstract

Dominicans are the largest migrant community in Puerto Rico, yet understudied. We compared risk factors and health conditions of Dominicans versus Puerto Ricans (PRs). Cross-sectional survey of Dominicans (n = 55) and PRs (n = 310) aged 30–75 years, assessed with validated questionnaires and standardized anthropometric measurements. Significantly, more Dominicans than PRs had attained <8th grade education (37.7 vs. 8.0%), reported household income \$10,000 (76.1 vs. 56.9%), lacked health insurance (19.6 vs. 5.5%), and reported food insecurity (24.5 vs. 12.1%). They spent fewer hours/day watching television (2.9 vs. 3.8), and were less likely to smoke (7.6 vs. 19.6%). Medically-diagnosed depression was lower among Dominicans than PRs (9.6 vs. 23.0%); questionnaire-based high depressive symptomatology was similar (47.9 vs. 52.8%). Dominicans living in Puerto Rico had more socioeconomic risk factors but healthier lifestyle behaviors and lower prevalence of medically-diagnosed depression than PRs. Tailored approaches are needed to ameliorate disparities in each ethnic group.

Keywords

Dominicans; Puerto Ricans; Health disparities; Chronic diseases; Minority health

[✉]Josiemer Mattei, jmattei@hsph.harvard.edu.

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Introduction

Recently, residents of the Dominican Republic have been increasingly migrating to North America and other Caribbean and Latin America countries [1]. Puerto Rico, a United States (U.S.) territory with a higher standard of living but a history, language, religion, and culture similar to the Dominican Republic, has the second largest concentration of Dominicans abroad, after the U.S. In 1960, 17.7% of all foreign-born individuals in Puerto Rico were Dominicans, and by 2000 this proportion had increased to 56.1% [2, 3]. Dominicans are now the largest ethnic immigrant group on the island.

Dominicans that migrate to Puerto Rico differ from those on the U.S. mainland. A larger proportion of Dominicans that migrate to Puerto Rico is undocumented, and tend to have lower educational attainment and live in smaller house-holds than Dominicans on the U.S. mainland [4]. Compared to the continental U.S., Puerto Rico provides more opportunities to Dominican immigrants for unskilled employment. However, these jobs are characterized by low wages, poor working conditions, job instability, and limited opportunities for upward mobility, particularly in the service, construction, and agricultural industries [4].

These socioeconomic disadvantages may impact lifestyle behaviors, which may then translate into risk for chronic diseases in this population. In the Hispanic Community Health Study/Study of Latinos (HCHS/SOL), U.S. Hispanic/Latino adults of low socioeconomic status were more likely to smoke, and less likely to have quit smoking, compared to those with higher income and education levels [5]. In the same cohort, household income was positively associated with sedentary time, whereas employment was inversely associated with sedentary behaviors [6]. A study among Hispanic/Latino adults using National Health and Nutrition Examination Survey (NHANES) data found a strong inverse association between socioeconomic status and cardiovascular disease risk in all ethnic groups except in Mexican-American men [7]. Similarly, the prevalence of diabetes was inversely related to education and household income [8].

Studies among Dominicans in the U.S. have also shed insights into the prevalence of lifestyle risk factors and chronic health conditions in this group, and differences with their Puerto Rican counterparts. For example, U.S. Dominicans from the HCHS/SOL study tended to sleep more hours [9], were more sedentary [6], had lower smoking prevalence [5], and lower intakes of total energy, macronutrients, folate, iron, and calcium [10], as well as a higher diet quality [11] than PRs. Despite this, Dominicans had lower prevalence of hypercholesterolemia [12] and metabolic syndrome [13] than PRs. In contrast, several studies have shown that Dominicans have a greater prevalence and risk for hypertension than PRs [12, 14–16], and a cross-sectional survey conducted in Northern Manhattan showed that Dominicans had a higher prevalence of cardiovascular risk conditions compared to other U.S. Latinos [17]. Among females, obesity was associated with greater psychological distress for those of Dominican background compared to other Hispanic/Latino groups [18].

Whereas several studies have contrasted the characteristics of Hispanic/Latino ethnicities living in the U.S., we know of no published studies that report the lifestyle risk factors and chronic health conditions of the Dominican migrant community in Puerto Rico. Given the

fast growth of the Dominican population in Puerto Rico and the differences in risk profile among Dominicans living in the US, it is important to explore sociodemographic and lifestyle risk factors for chronic diseases in the island that would inform researchers and public health officials about the health needs of each group. Therefore, the current study examined the difference in sociodemographic characteristics, lifestyle risk factors for chronic diseases, and prevalence of health conditions between Dominicans and PRs living in Puerto Rico.

Methods

Participants

The Puerto Rico Assessment of Diet, Lifestyle, and Diseases study is a cross-sectional survey of a convenience sample of 380 adults ages 30–75 living in Puerto Rico at the time of the study and for at least 10 months of the previous year, and able to answer questions without assistance. The study was conducted in 2015 in three primary care clinics in the San Juan metropolitan area. All study protocols have been described in detail previously [19] and were approved by the Institutional Review Board at Harvard T.H. Chan School of Public Health, Ponce Health Sciences University, University of Massachusetts, and Northeastern University. Written informed consent was obtained from all participants.

We excluded from the current analysis participants of ethnic heritages other than Dominican or Puerto Rican ($n = 15$), resulting in the inclusion of 365 adults. For dietary analyses, we analyzed data from 240 participants with available and valid dietary data (< 600 or > 4800 kcal/day, and > 2 sections of the food frequency questionnaire (FFQ) left in blank).

Data Collection

Trained, Spanish-speaking interviewers administered the questionnaires in a private room at the clinics. Data were recorded electronically using the secure, web-based application ‘Research Electronic Data Capture’ (REDCap) [20]. Questionnaires were based on instruments used by NHANES [21] and the Boston Puerto Rican Health Study [22].

Participants reported demographic and socioeconomic characteristics, and health insurance status. We asked participants whether they had ever received a diagnosis by a doctor or health professional of a list of chronic conditions, and for family history of chronic disease.

We assessed detailed information on smoking and alcohol use. Physical activity was captured using a modified Paffenbarger questionnaire [23]. A physical activity score was calculated from the reported hours spent on regular 24-h activities and weighing factors for each activity [22]. Participants provided information on the total hours of sleep over a 24-h period and difficulty falling asleep [24]. We assessed dietary intake using a semi-quantitative FFQ adapted and validated for this population [25, 26]. The FFQ file was linked with the Minnesota Nutrient Data System (version 5.0_35) for food and nutrient analyses.

Depressive symptomatology was assessed using the Center for Epidemiology Studies Depression Scale, and defined as a score ≥ 16 [27–29]. We measured perception of life as stressful using the 14-item Perceived Stress Scale [30, 31]. The 12-item Interpersonal

Support Evaluation List was used to measure perceived social support [32, 33]. Participants with a diagnosis of diabetes were asked the Diabetes Social Support Questionnaire-Family Version [34] to assess perceived family support for diabetes management.

Measures

Interviewers measured waist and hip circumferences in 316 participants who provided consent for such and were physically able to do so. Duplicate measures (a third for 1 cm difference between measurements) were taken using standardized protocols [21, 35]; the average was used. Abdominal obesity was defined as waist circumference >102 cm in men or >88 cm in women recommended by US guidelines [36]. We calculated the waist-to-hip ratio by dividing the waist by the hip measurement; a waist-to-hip ratio of 0.90 in men or 0.85 in women was considered as elevated [36].

Analysis

Descriptive characteristics for all participants and by ethnicity were assessed using SAS software version 9.4 (SAS Institute Inc; Cary, NC). Differences by ethnicity were tested using Fisher's exact test for categorical variables or t test for continuous variables. In exploratory analysis, we tested differences of selected characteristics by country of longest residency to evaluate the potential effects of migration among Dominican participants using Fisher's exact test for categorical variables or t test for continuous variables. Significant differences were considered at a two-tailed alpha <0.05. For dietary intake analysis, we adjusted micronutrient intakes for energy by computing the residuals from a linear regression model. Carbohydrate, fats, and protein intakes are expressed as a percentage of total energy intake.

Results

The mean age of the study population was 51.4 years (SD $\pm$ 11.4), and most were women. All Dominican participants were recruited from only one of the three clinics, a nonprofit federally-funded primary community health care center that is located near a mostly Dominican neighborhood. Table 1 shows a comparison of the main sociodemographic characteristics between Dominican and Puerto Rican participants. Fewer Dominicans had lived in Puerto Rico (43.4%) most of their life, compared to 97.7% of PRs; most had lived in their native Dominican Republic. More Dominicans than PRs significantly attained <8th grade education, reported a household income of \$10,000, and had no health insurance coverage. Nearly 24.5% of Dominicans reported limiting their food consumption very often due to financial constraints, compared to 12.1% of PRs. While cell phone use was very common in both groups, a smaller proportion of Dominicans used a computer or tablet compared to PRs.

Lifestyle, psychosocial, and family risk factors for chronic diseases in Dominican and Puerto Rican participants are presented in Table 2. On average, Dominicans spent fewer hours per day watching TV and were less likely to smoke than PRs. Energy intake and macro- and micronutrient intakes were similar in both groups. Psychosocial risk factors, including depressive symptomatology, perceived stress, and social support, were also similar.

Compared to PRs, fewer Dominicans had family history of diabetes. The prevalence of self-reported diabetes, as ever diagnosed by a healthcare professional, in the full sample was 21.3%, while 39.0% reported ever been diagnosed with hypertension, and 21.0% with depression. Self-reported high-risk factors for fatty liver disease, high waist circumference, and high waist-to-hip ratio were common in this population (69.6, 61.1, 77.5%, respectively). In general, prevalence of health conditions was lower in Dominicans (Fig. 1), but only self-reported medically-diagnosed depression was significantly lower in Dominicans compared to PRs (9.6 vs. 23.0%; $p = 0.027$).

We did not find statistically significant differences among Dominicans by country of longest residency (Dominican Republic vs. Puerto Rico only; Supplementary Table 1). Although not significant, Dominicans who have lived most of their life in the Dominican Republic tended to have lower college or higher education, more food insecurity due to financial constraints, lower health insurance, higher sedentary physical activity, higher energy intake, higher depressive scores, and higher waist circumference than those who have lived most of their life in Puerto Rico.

Discussion

We found substantial differences in socioeconomic characteristics, risk factors for chronic diseases, and health conditions between Dominicans and PRs living in Puerto Rico. Dominicans exhibited lower socioeconomic status but had generally healthier lifestyle behaviors, lower prevalence of family history of diabetes, and lower prevalence of self-reported medically-diagnosed depression than PRs, with a generally healthier profile of the assessed chronic conditions.

There is a scarcity of literature on the characteristics of Dominicans living in Puerto Rico. Thus, we cannot compare our results with published data. Our findings of low educational attainment and income among Dominicans support the few studies that have reported this [4]. Given the low socioeconomic status, it was expected to observe a lower percent of Dominicans using a computer, as well as lacking health insurance. Lack of health insurance may also be influenced by immigration status, as those without legal documentation may be less likely to apply or qualify for insurance. Interestingly, employment levels were similar between groups, suggesting that Dominicans may hold jobs with lower wages or fewer benefits such as private health insurance. Similar differences by Hispanic/Latino background from HCHS/SOL have been described in the U.S. mainland [37].

In agreement with prior research conducted on the U.S. mainland [5], Dominicans in Puerto Rico were less likely to smoke than PRs. The prevalence of smoking among Dominicans and PRs in our study (7.6 and 19.6%, respectively) was lower than that reported in HCHS/SOL (Dominican men: 11.0%; women: 11.7%, and Puerto Rican men: 35.0%; women: 32.6%) [5], or for Dominicans in their native country as reported by the World Health Organization (14.5%) [38]. In contrast to previous results from HCHS/SOL [39], Dominicans in our study were less sedentary than PRs. In HCHS/SOL, sedentary time was measured objectively via accelerometers for 7 days, whereas we measured sedentarism by asking participants the average hours per day they spent watching television, which may carry some measurement

error. Still, Dominicans also reported spending less time seated, and fewer were classified as having sedentary physical level activity using a modified Paffenbarger questionnaire that was effectively tested in a similar population [40], but these did not reach statistical significance. Although other lifestyle risk factors were not statistically different, Dominicans tended to overall have healthier lifestyle behaviors than PRs.

In the HCHS/SOL, Dominicans had lower intake of some micronutrients [10], but higher diet quality [11] than other Hispanic/Latino adults in the U.S. Our results showed that dietary intake did not differ by ethnicity, although fiber and folate intake tended to be higher among Dominicans, as observed in their U.S. counterparts [10]. Nonetheless, more Dominicans reported food insecurity than PRs despite similar participation in the Supplemental Nutrition Assistance Program, warranting further examination.

Acculturation has been shown to play a role in health behaviors. Individuals who migrate to the U.S. are more likely to adopt the lifestyle and health patterns of their host country [41]. For example, Hispanic immigrant adults born in the U.S. are more likely to be current smokers than those who were foreign-born [42–46]. In our study, almost all Dominicans were born in the Dominican Republic, and we did not have information on their migration history (i.e. length of residency) or citizenship status, which could influence the observed characteristics. However, upon comparing selected characteristics of Dominicans by country of longest residency, we observed non-significant tendencies for Dominicans who have lived most of their life in the Dominican Republic to have poorer sociodemographic characteristics, higher energy intake, and depression and abdominal adiposity. The exploratory nature of these results are a limitation, but they merit further examination of the dynamics of acculturation and migration patterns on health behaviors and access to care within the context of this immigrant group.

In our study, the prevalence of measured high waist circumference and high waist-to-hip ratio, as well as the prevalence of self-reported chronic conditions did not differ significantly between groups, except for diagnosed depression. Nonetheless, the prevalence of these diseases tended to be lower among Dominicans than PRs. The most frequent self-reported conditions were high-risk for fatty liver disease, hypertension, and diabetes. These are generally consistent with differences reported for the two ethnicities in the continental U.S. [47, 48], although there are conflicting results on hypertension prevalence [12, 14–16]. It is possible that Dominicans have not received a formal diagnosis for several of these conditions but may indeed have them, especially given the lack of health insurance among the group. Government-assisted insurance may also not cover the appropriate preventive visits or diagnostics tests for some of these conditions. A previous study of these two ethnic groups in Massachusetts showed that self-reported diabetes was lower in Dominicans, but when diabetes was defined based on fasting blood glucose, more Dominicans who did not self-report it were classified with diabetes [49]. In the same study, use of medication and insulin was also lower among Dominicans with diabetes, and they tended to be diagnosed at an older age but had fewer diabetes complications than PRs. Notably, Dominicans reported less family history of diabetes, which is consistent with the observed lower prevalence. It is also possible that some immigrants may not be aware of their family history.

The prevalence of self-reported medically-diagnosed depression was significantly lower in Dominicans relative to PRs; however, a similar percent of Dominicans than PRs reported high depressive symptomatology as measured with a validated scale. In the U.S. mainland, among Hispanic/Latino adults, PRs experienced the highest levels of depressive symptoms (38.0%), compared to 27.4% of U.S. Dominicans [50]. Similar differences in depressive symptomatology were reported in a representative sample of Hispanic elders in Massachusetts (PRs = 44.4%; Dominicans = 31.6%) [27]. Another study corroborates high prevalence of depression among PRs in the U.S, as well in Puerto Rico [51].

In our study, the lower prevalence of medical diagnosis of depression but higher depressive symptomatology suggests that depression may go underdiagnosed in Dominican immigrants. This may be due to lack of health insurance or access to health services, or to cultural differences in the perception or self-management of depressive symptoms and in seeking help. Problems obtaining medical care have been reported among Dominican elders in Massachusetts [52]. In HCHS/SOL, being born in the U.S., second-generation immigrants or later, and living longer in the U.S. relative to foreign-born, were all associated with higher levels of depression [50]. Other studies showed similar results [53, 54]. The factors associated with depressive symptomatology varied between Puerto Rican and Dominican older adults in Massachusetts; acculturation (as measured by years living in the U.S. and language use) was associated with depressive symptomatology only in Dominicans [27]. Future studies should examine the association between use of health services or sociocultural factors and health conditions in this population, especially for depression.

Due to the cross-sectional nature of the study and the convenience sample, recruited from a primary care clinic source population, it is not possible to draw causal conclusions, and findings may not be generalized to the larger Dominican population in the island. However, this sample was obtained from the largest Dominican neighborhood in Puerto Rico. Although there was some evidence of statistically significant differences between ethnic groups, our study might have been underpowered to detect statistical differences. Because of the small sample size and because this is an exploratory study, we were not able to conduct adjusted analyses.

New Contribution to the Literature

Our report contributes knowledge on risk factors and health conditions among Dominicans living in Puerto Rico by showing that they have more socioeconomic risk factors than PRs yet healthier lifestyle factors and lower prevalence of diagnosed depression. The current study emphasizes the importance of identifying risk factors that influence chronic disease among specific ethnic minority groups, as these dynamics may differ within and across settings. Through these efforts, public health practitioners can design preventive interventions and programs that address the needs of each ethnic group.

The current study has documented important findings on health disparities that will help to generate hypotheses for future research studies, and inform the design and implementation of public health programs directed toward addressing the health needs of each ethnic group in the island. This area of research makes a valuable contribution because the Dominican population has been steadily increasing in Puerto Rico, as well as in other countries

including the continental U.S. This research advances our understanding of the factors that can affect the health status of an immigrant population. Given that acculturation has been associated with risk factors of chronic disease and health status in U.S. Hispanic/Latino adults, it is essential that researchers examine the extent to which this relationship exists for Dominican immigrants in Puerto Rico.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Fig. 1.

Prevalence of health conditions in Dominican and Puerto Rican adults living in Puerto Rico. Waist and hip circumference were measured by trained interviewers using standardized protocols. High waist circumference was defined as >102 cm in men or >88 cm in women. High waist-to-hip ratio was defined as 0.90 in men or 0.85 in women. Obesity, diabetes, hypertension, heart disease, cancer, depression and high risk for fatty liver disease were obtained by self-report as ever been diagnosed by a healthcare professional. ^ap value = 0.027, calculated using Fisher's exact test

Table 1

Sociodemographic characteristics of Dominican and Puerto Rican adults living in Puerto Rico

General characteristics	Dominicans (n = 55)	Puerto Ricans (n = 310)	P value ^a
Country lived in most of their life (%)			<0.001
Puerto Rico	43.4	97.7	
Unites States of America	3.8	2.3	
Dominican Republic	52.8	0	
Female (%)	67.3	65.5	0.878
Age, years	51.0 (10.4)	51.5 (11.5)	0.786
Educational attainment (%)			<0.001
No schooling or < 8th grade	37.7	8.0	
9–12th grade	26.4	30.9	
College degree or higher	35.9	61.1	
Living in rural area (%)	7.3	17.5	0.071
Employment status (%)			0.885
Unemployed (not retired)	16.4	14.8	
Retired/stay at home	45.4	48.4	
Employed	38.2	36.8	
Household income (%)			0.025
\$0–\$10,000	76.1	56.9	
\$10,001–\$20,000	17.4	22.0	
>\$20,000	6.5	21.2	
Computer use (%)	26.4	43.1	0.029
Cell phone use (%)	92.4	91.0	0.930
Marital status (%)			0.519
Married/living with a partner	47.2	41.2	
Divorced/separated/widowed	22.6	20.6	
Single	30.2	38.2	
Household members, number	2.4 (1.2)	2.6 (1.9)	0.254
Health insurance (%)			0.002
None	19.6	5.5	
Government-assisted	56.9	53.9	
Private	23.5	40.6	
Food security variables			
Limited food intake due to financial constraints (%)			0.004
Very often	24.5	12.1	
Often	47.2	37.1	
Never	28.3	50.8	
WIC (%)	5.7	7.3	0.888
SNAP (%)	52.8	49.3	0.658

Shown as mean (standard deviation) or % for all such values

WIC special supplemental nutrition program for women, infants, and children; SNAP supplemental nutrition assistance program

^aCalculated using Fisher's exact test for categorical variables, and T tests for continuous variables

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Table 2

Lifestyle, psychosocial, and family risk factors for Dominican and Puerto Rican adults living in Puerto Rico

Lifestyle risk factors	Dominicans (n = 55)	Puerto Ricans (n = 310)	P value ^d
Physical activity (%) ^a			0.327
Sedentary	34.0	43.8	
Light	32.0	31.3	
Moderate/vigorous	34.0	24.9	
Sleep duration (%)			0.336
6 h/day	44.0	37.0	
7–8 h/day	42.0	52.3	
9 h/day	14.0	10.7	
Sleep difficulty (%)			0.130
Always	13.4	22.2	
Sometimes	23.1	29.5	
Almost never/never	63.5	48.3	
TV watching, hours/day	2.9 (2.1)	3.8 (2.8)	0.008
Time seated, hours/day	3.6 (2.4)	4.2 (3.3)	0.109
Smoking status (%)			0.033
Never/former smoker	92.5	80.4	
Current smoker	7.6	19.6	
Alcohol consumption (%)			0.409
Never/former drinker	77.4	71.2	
Current drinker	22.6	28.8	
Energy intake, kcal/day	2195 (862)	2151 (992)	0.795
Carbohydrate, % from total energy	53.6 (6.4)	53.1 (8.0)	0.616
Fat, % from total energy	30.5 (4.9)	31.2 (6.5)	0.423
Protein, % from total energy	15.5 (2.5)	15.1 (2.9)	0.361
Dietary fiber, g/day ^b	26.2 (7.0)	24.2 (7.9)	0.129
Omega-3 fatty acids, g/day ^b	1.8 (0.50)	1.8 (0.51)	0.343
Iron, mg ^b	17.1 (4.0)	16.2 (3.9)	0.215
Calcium, mg ^b	982 (206)	1018 (316)	0.371
Folate, µg ^b	492 (124)	463 (117)	0.141
Vitamin B6, µg ^b	2.6 (0.77)	2.5 (1.8)	0.349
Vitamin B12, µg ^b	13.9 (12.9)	11.8 (12.6)	0.333
Vitamin D, µg ^b	4.7 (2.0)	5.1 (2.7)	0.311
Psychosocial risk factors ^c			
Perceived stress score	21.3 (7.7)	21.7 (7.6)	0.710
Social support score	16.1 (4.9)	16.0 (3.9)	0.934
Depressive score	18.3 (9.3)	17.5 (8.7)	0.695
Depressive symptoms (score 16) (%)	47.9	52.8	0.536

Lifestyle risk factors	Dominicans (n = 55)	Puerto Ricans (n = 310)	P value ^d
Diabetes support score	13.9 (9.5)	14.2 (7.4)	0.903
Family history of disease (%)			
Diabetes	49.1	66.2	0.022
Hypercholesterolemia	29.4	44.1	0.054
Heart disease	50.9	53.9	0.770
Hypertension	79.3	72.4	0.399

Shown as mean (standard deviation) or % for all such values

^a Sedentary physical activity is defined as a score <30, light activity as 30 to <40, and moderate/vigorous activity as ≥ 40. Physical activity was captured using a modified Paffenbarger questionnaire. The score was calculated as the sum of hours spent on typical 24-hour activities (heavy, moderate, light, or sedentary activity, and sleeping) multiplied by weighing factors that parallel the rate of oxygen consumption associated with each activity

^b Energy-adjusted means (standard deviation), using residual method

^c Psychosocial risk factors are defined using scores; higher values of the score are indicative of higher psychosocial factors (i.e. higher perceived stress, higher social support, or higher depressive symptoms). Possible ranges for the perceived stress score are 0–56 (measured with 14-item Perceived Stress Scale), 0–36 for social support (measured with 12-item Interpersonal Support Evaluation List-12), and 0–60 for depressive symptoms (measured with Center for Epidemiology Studies Depression Scale). Depressive symptomatology is defined as a score ≥ 16 in the Center for Epidemiology Studies Depression Scale. Possible range for the diabetes support score is 0–25 (measured with Diabetes Social Support Questionnaire-Family); a higher score indicates higher diabetes support

^d Calculated using Fisher's exact test for categorical variables, and T tests for continuous variables