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Experiences of Hispanic safety net clinic patients with diabetes during the COVID-19 pandemic

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Abstract

Purpose: The purpose of this study was to characterize the material, health (general and diabetes-specific), and social impacts of the COVID-19 pandemic on Hispanic adults with type 2 diabetes who did not experience COVID-19 infection.

Methods: This cross-sectional and longitudinal study used surveys within a clinical trial of 79 Hispanic adult clinic patients with type 2 diabetes. Cross-sectional measures included the Coronavirus Anxiety Scale, items from the Coronavirus Impact Scale, and the Pandemic Impacts Inventory. Longitudinal measures included the Summary of Diabetes Self-Care, health care utilization, and measures of diabetes self-efficacy, social support, and quality of life.

Results: Participants were majority low income, Spanish-speaking females with poor diabetes control. Coronavirus anxiety was low despite majority of participants having an affected family member and frequent access barriers. More than half of participants reported moderate/severe pandemic impact on their income. Diabetes self-care behaviors did not change between pre- and pandemic measures. Diabetes self-efficacy and quality of life improved despite fewer diabetes-related health care visits.

Conclusions: Despite high levels of access barriers, financial strain, and COVID-19 infection of family members, Hispanic adults with type 2 diabetes continued to prioritize their diabetes self-management and demonstrated substantial resilience by improving their self-efficacy and quality of life.

The inequitable impact of the Coronavirus Disease 2019 (COVID-19) pandemic in the United States (US) resulted in substantial loss of life in Hispanic communities. Life

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expectancy among U.S. Hispanics declined 3 years, the most of any race/ethnicity subgroup, from 2019 to 2020. While COVID-19 led to majority of this decline (90%), diabetes was noted as the third leading cause of increased deaths behind unintentional injuries.[1] This combination of disproportionate deaths from COVID-19 and diabetes stem from long-standing racial/ethnic health and social inequities dating back centuries and driven by structural racism and discrimination.[2–4] These health and social inequities produce barriers at multiple levels which contribute to increased death from both COVID-19 and diabetes in the Hispanic community.

At the system-level, Hispanics have the highest rates of un- and underinsurance of any racial/ethnic group in the U.S.. They often fear using health and social services due to their immigration status. Non-English language fluency creates further barriers to accessing medical care and can limit understanding of available educational materials. Hispanics have higher exposure to and infection with COVID-19 due to numerous factors including disproportionately low incomes, overcrowded living situations, disproportionate representation among homeless, detained, and incarcerated populations, and disproportionate employment in essential, frontline service jobs without work-from-home options.[5,6] These system level factors also complicate diabetes management which is more difficult in low-income areas with barriers to accessing quality health care, adequate food, and challenges affording medication and diabetes supplies.[7] This is even more difficult for groups with limited English proficiency and people who are not U.S. citizens.[7,8] Ogunwole and Golden detailed how racism leads to discrimination which drives socioeconomic deprivation and residential segregation perpetuating diabetes-related health disparities.[4] Furthermore, Hispanic adults are known to receive lower quality of diabetes health care compared to non-Hispanic Whites, for example with less frequent measurement of A1C.[9] The compounding of societal influences and poor care quality likely drives higher rates of diabetes complications and diabetes-related deaths among Hispanic people compared to non-Hispanic Whites.[10]

At the individual level, biologic interactions between type 2 diabetes, obesity, and severe COVID-19 infection further contribute to disproportionate deaths among Hispanic communities.[11,12] Both type 2 diabetes and obesity are more prevalent in the Hispanic community than the non-Hispanic White community.[13–15] Diabetes increases the risk of severe COVID-19 outcomes likely due, in part, to exacerbation of underlying COVID-19-related hyperglycemia which worsens cardiovascular and thromboembolic complications.[16] Furthermore, individual stress is associated with diabetes diagnosis[17] as well as hyperglycemia.[18] Such stress and related trauma increased during the COVID-19 pandemic.[19] These individual factors combined with increased system-level barriers to mental health resources in Hispanic communities during the pandemic.[20,21] The combination of these individual and system-level factors increased the odds of more severe COVID-19 infection.[12]

International studies also demonstrate mixed results about the impact of the pandemic on the diabetes self-management. Some studies reported worsening of glycemic control after the onset of the COVID-19 pandemic often related to increasing body mass index (BMI).[22–25] However, other studies found no difference in BMI or glycemic control

during the pandemic.[26,27] Several studies examined stress and wellbeing of people with diabetes during the pandemic: D'Onofrio et al. found that patients in Italy with increases in A1C and BMI during panemic-related lockdown were more likely to have lower scores on a Pscyhological General Well-Being Index.[26] Ruissen et al. found that clinic patients with diabetes in the Netherlands with higher elevated generalized stress had poorer glycemic control; however, they found no connection between COVID-19-related anxiety and glycemic control.[28] Several other studies focused on lifestyle behaviors among people with type 2 diabetes during the pandemic: Ruiz-Roso et al. found statistically significant increases in consumption of vegetables, sugary foods, and snacks among patients in Spain with well-controlled type 2 diabetes from one hospital in Madrid during the COVID-19 lockdown.[29] Tao et al. found 74.5% of patients with type 2 diabetes in Wuhan, China had poor glycemic control during home quarantine. However, they found no differences between people with diabetes that was well versus poorly controlled in vegetable intake, exercise, sleep or anxiety.[30] We found no studies focused on Hispanic adults living in the U.S.

Safety net clinic settings across the U.S. attempt to offer targeted support to Hispanic people living with type 2 diabetes to assist them to overcome barriers during the COVID-19 pandemic. For example, some clinics implemented outreach programs to ensure care continuity via telehealth.[31,32] Such virtual care efforts have shown promise before the pandemic in the management of veterans with diabetes with improved A1C, prescription of appropriate medications, and completion of microalbuminuria testing.[33] However, little is known about if/how such virtual support was able to overcome the pandemic-related challenges of Hispanic adults living with type 2 diabetes. Therefore, the objective of this study was to characterize the material, health, and social impacts of the COVID-19 pandemic on a longitudinal cohort of Hispanic adults with type 2 diabetes using clinic services at two safety net health systems. Participants were enrolled in a longitudinal clinical trial which began before the pandemic. This study documents COVID-19 stress and general impact as well as changes between pre-pandemic and pandemic time points in diabetes self-management behaviors, diabetes self-efficacy, diabetes social support, diabetes-related quality of life, and diabetes-related health care utilization.

Methods

Research Design

This exploratory study embedded a cross-sectional survey about COVID-19 into an ongoing longitudinal randomized control trial. This involved collection of new, COVID-19-specific cross-sectional survey questions and analysis of previously planned longitudinal survey questions. The trial tests the impact on glycemic control (A1C) and diabetes self-care of a digital storytelling intervention for Hispanic adults with type 2 diabetes developed by a community-engaged research partnership using a community-based participatory research (CBPR) approach.[34–36]

Setting and Participants

The setting of this study was safety net primary care clinics in one Southwest and one Midwest state. Participants were drawn from patient diabetes registries and invited to

enroll at regularly scheduled clinic visits. Eligible participants included patients who 1) self-identified as Hispanic or Latino, 2) had age between 18 and 70 years, 3) received primary care at one of the participating clinical sites, 4) attended at least one office visit within the previous 12 months to the primary care site, 5) had a diagnosis of type 2 diabetes in the medical record, 6) had type 2 diabetes diagnosis for six months or longer, 7) had a most recent A1C≥8%, and 8) intended to continue to receive medical care at the recruitment clinic for the next six months. Patients who tested positive for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) were excluded. This aligned with the study objective to assess the impact of COVID-19 on diabetes management and to focus on socioeconomic and healthcare access/utilization impacts from the pandemic rather than medical/physiologic impact of COVID-19 itself. Eligible patients were stratified by site and sex. To document changes in diabetes management due to the COVID-19 pandemic, participants who completed the parent study were contacted.

Data Collection

The trial protocol included collection of longitudinal survey data from study participants at baseline (in-person), 6-weeks (by telephone), and 3 month (in-person). In-person data collection occurred before or after clinic visits whenever possible. COVID-19-related research restrictions required some conversion to telephone collection of survey data in 2020. Longitudinal data was collected from 2/13/2019 to 9/21/2020. Cross-sectional, COVID-19 survey data were added via an additional telephone survey conducted from 2/12/2021 to 4/9/2021.

Outcome Measures

The pre-pandemic time point included baseline data from trial enrollment, all conducted before 3/9/2020. The pandemic time point included data collected after 2/12/2021.

The following longitudinal trial survey measures were used: self-management behaviors as measured by the Summary of Diabetes Self-Care Activities Measure,[40] diabetes self-efficacy,[41] diabetes social support,[42] diabetes-related quality of life,[43] and diabetes-related health care utilization (abstracted from electronic health records). All instruments have been previously developed and implemented in English and Spanish.

Modified survey instruments were used from the National Institutes of Health (NIH) Repository of COVID-19 Research Tools to assess COVID-19 impact on material, health, and social factors relating to type 2 diabetes self-management. This included the Coronavirus Anxiety Scale,[37] a 5 question instrument rating frequency of anxiety symptoms in the past 2 weeks with a sum score as previously reported in the literature.[37] To minimize reporting burden, we chose a subset of the the material and social factors from the Coronavirus Impact Scale[38] and the Pandemic Impacts Inventory[39] authors deemed relevant to Hispanic adults. Chosen items assessed the pandemic's impact on family income/employment, food access, medical care access using likert like scales, and infected family members using counts and severity ratings. An open-ended question asked participants to describe any other ways the pandemic has impacted their diabetes management.

Data Analysis

Cross sectional data were summarized using means and standard deviations for continuous variables and proportions for categorical variables. Differences between pre-pandemic and pandemic time points were compared using two-sided, two-sample t-tests for continuous variables and chi-square tests for categorical variables. As a sensitivity analysis, we completed longitudinal modeling using repeated measures mixed models using each subject's baseline value as their own control value.

Results

We surveyed 79 Hispanic adults with type 2 diabetes; two were excluded after their free text responses confirmed they had tested positive for Sars-CoV-2. Our total sample was 77 participants: 55% from clinics in the Southwest US and 45% from clinics in the Midwest. At the Midwest site, we approached 58 people. Thirty-six (62%) completed the COVID-19 and related survey instruments; 3 (5%) declined explicitly; 10 (17%) were unable to be reached for a final participation decision; and 8 (14%) were ineligible as they reported positive SARS-CoV-2. These data were not collected at the Southwest site. At both sites, the majority of respondents were Spanish-speaking females with low income and some high school education. Table 1 summarizes the demographic characteristics of surveyed Hispanic adults with type 2 diabetes.

Respondents demonstrated minimal COVID-19-related anxiety symptoms (e.g. dizziness, sleep troubles, low appetite). The mean score of 1.6 (SD 3.8, median 0.0) out of 20 possible points reflects low endorsement and low frequency of anxiety symptoms when thinking about COVID-19. However, majority of respondents had an immediate family member and even more members of their extended family who contracted COVID-19. Table 2 describes further COVID-19 related stress and general impact among Hispanic adults with diabetes during the COVID-19 pandemic. Free text comments (n=32) to the open-ended question about other ways the pandemic has impacted diabetes management included frequent mention of the financial impact of the pandemic on respondents. They cited job loss, insurance loss (sometimes related to job loss), and subsequent difficulties affording food and medication. Respondents also shared anxiety and fear related to the pandemic overall and specifically about going to clinic appointments or the hospital. Mask-wearing, going to the store to buy food, and high rates of infection among co-workers also caused anxiety. Respondents shared isolation from family members but several also mentioned trying to stay positive.

The COVID-19 pandemic impacted numerous aspects of diabetes care for most survey respondents. Most commonly, participants reported less access to their diabetes health care providers, engaging in less physical activity, more overeating, and more frequent hyperglycemia. Some respondents also described difficulty getting diabetes pills, testing supplies, and insulin. Table 3 summarizes the reported impacts on diabetes of the COVID-19 pandemic among Hispanic adults. Free text comments (n=32) to the open-ended question reinforce these findings with respondents endorsing difficulty affording insulin and diabetes medications/supplies. They also noted stress-eating due to isolation and anxiety. Numerous participants described dislike of or difficulties using telehealth and accessing the pharmacy

by phone. One told us simply “I want everything to be over so we could go back to regular doctor visits” and another, “I miss see[ing] my doctor.”

In contrast to these cross-sectional reports of negative pandemic impact on diabetes management, bivariate analyses of longitudinal data comparing pre-pandemic vs. pandemic time points on a variety of diabetes measures demonstrate varied differences that meet statistical significance. No significant change was seen in measured diabetes self-management behaviors. Diabetes social support also did not demonstrate significant change. However, diabetes self-efficacy improved significantly (+0.5, P=0.003) among respondents from pre-pandemic to pandemic time points. Diabetes-related quality of life overall also improved significantly (+0.5, P<0.001). This was driven by improvements in both physical (+0.5, P= 0.006) and emotional (+0.6, P= 0.006) well-being reported during the pandemic. Diabetes-related health care utilization of outpatient visits also demonstrated significant change confirming cross-sectional findings. Overall outpatient diabetes visits with all provider types decreased (−0.6 visits per in the past 12 mo. P=0.003) driven by significant reductions in the mean reported primary care (−0.2, P=0.003) and behavioral health (−0.1, P=0.01) care visits in the past 12 months. In spite of cross-sectional and free text reports about financial and logistical barriers, a single question 7-day adherence measure of diabetes medication adherence for pills and insulin did not change. Table 4 summarizes the data comparing change in diabetes measures among Hispanic adults before and after the COVID-19 pandemic.

Our sensitivity analysis from our longitudinal mixed model confirmed all of the original conclusions did not change after adjusting for confounding factors (Table 5).

Discussion

Our longitudinal sample of Hispanic adults with type 2 diabetes representing two regions of the US uniquely describes the impact of COVID-19 pandemic on overall wellbeing and diabetes management. Despite high reports in our cross-sectional data of negative pandemic impacts on their families’ financial stability, food and health care access, as well as less physical activity, more hyperglycemia, and more overeating/eating junk food, longitudinal data do not show significant changes in diabetes self-care behaviors. Fruit/vegetable intake, eating high fat foods, and doing 30 min. of continuous physical activity did not demonstrate significant change from pre-pandemic measures. Reports of COVID-19-related anxiety were low, and no changes were seen in diabetes-related social spport. Improvements were observed in diabetes self efficacy and diabetes related quality of life. Hispanic adults with type 2 diabetes surveyed in this study demonstrated substantial resilience in their diabetes self-care and wellness despite facing numerous challenges during the pandemic.

These results reinforce many findings from the literature. Cross-sectional data demonstrating high rates of COVID-19 infection among immediate and extended family members reinforce epidemiologic studies documenting high rates of COVID-19 infection, hospitalization, and death in the Hispanic community.[44–46] Similar to studies of clinic patients in the Netherlands and Italy, the impact of the pandemic on diabetes self-management behaviors was minimal.[26–28] This may be due to ongoing clinic support via phone or video, access

to needed prescription and supply refills, support from family/household members, or other factors. Ruissen et al. note that majority of patients with type 2 diabetes deny increased levels of stress or anxiety (>50% report no change or less stress or anxiety) which aligns with our findings of improved emotional wellbeing.

This study underscores prior research by members of the study team about diabetes management among immigrants, specifically the Hispanic community. Njeru et al. previously documented that patients with diabetes using interpreter services were more likely to have A1C and LDL measured within 6 mo. but less likely to reach target management goals for these measures.[47] This pattern is reinforced by study findings of high baseline A1C (Table 1) and consistent use of health care for diabetes management (Table 4) as well as free text responses expressing dismay of the interruption of the patient-provider relationship and decrease clinic access during the pandemic. Furthermore, diabetes social support remained steady before and during the pandemic which supports self-care behaviors and overall resilience (Table 4). Our results reinforce that Hipsanic adults with type 2 diabetes engaged in clinical care have high motivation and interest in maintaining good diabetes health. In spite of access barriers and substantial economic and family strain due to the pandemic, diabetes self-management behaviors and social support remained steady, health care seeking behaviors continued, and wellness overall improved.

This study was subject to a number of limitations. First, this clinic-connected sample is not generalizable to the entire Hispanic population as it does not include those with highest barriers to healthcare. We expect the overall experience of the Hispanic population to reflect more difficulties with diabetes self-management and health care access. Second, there was a relatively small sample of trial participants, leaving the study under-powered to detect subtle changes in self-reported measures. Third, due to conversion to remote study procedures during the pandemic without consistent measurement of height, weight, A1C, there was too much missing data to compare pre-pandemic to pandemic changes in these outcomes. Fourth, we enrolled a minority of patients who received the trial intervention (a digital storytelling support video) which may have influenced their diabetes care, although is unlikely to have impacted their experiences of COVID-19.[35] Despite these limitations, this study presents important early data on the experience of Hispanic adults in the US with type 2 diabetes – a critically important population with substantial burden of COVID-19 and ongoing diabetes management risk.

Conclusion

In conclusion, this study is among the first to document the experience of Hispanic adults with diabetes in two US regions during the COVID-19 pandemic. Despite high levels of access barriers, financial strain, and infection of family members with COVID-19, survey respondents continued to prioritize their diabetes self-management and demonstrated substantial resilience by improving their self-efficacy and quality of life (both physical and emotional well-being).

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Implications/Relevance for Diabetes Educators

This study offers important conclusions for diabetes educators working with diverse populations. Despite substantial and disproportionate financial, social, and health impacts of the COVID-19 pandemic, Hispanic adults with type 2 diabetes who attended clinic maintained or imporved their diabetes self care, self-efficacy, and quality of life. This reinforces an asset-based approach familiar to diabetes educators that appreciates the resilience of their patients and families. In spite of this resilience, diabetes educators should assess and offer local resources to support the grief and healing of Spanish-speaking and other non-English-speaking families who have a higher likelihood of experiencing a COVID-19-related death in the family and/or financial strain related to the pandemic. Financial resources and support to reconnect with clinic, pharmacy, and diabetes supplies will be an important part of maintained diabetes wellness as the pandemic continues.

Table 1.

Demographic characteristics of Hispanic adults with type 2 diabetes

Respondents	**Percentage total unless noted (N=77)**
Control Group - Usual Clinical Care	84.4%
Intervention Group - Digital Storytelling Intervention	15.6%
Site	
Midwest urban safety net hospital	45.5%
Southwest community health center	54.5%
Sex	
Male	29.9%
Female	70.1%
Marital status *	
Never married	24.5%
Married	49.1%
Separated/Divorced/Widowed	26.4%
Education *	
8 grades or less	45.3%
Some high school	28.3%
High school graduate or GED	11.3%
Some college or technical school	11.3%
College graduate (bachelor's degree)	3.8%
Average yearly family income †	
$0 to $9,999	35.5%
$10,000 to $19,999	30.3%
$20,000 to $29,999	15.8%
$30,000 to $39,999	11.8%
$40,000 to $49,999	5.3%
$50,000 to $74,999	1.3%
Current employment †	
Working 35 hours or more a week	28.9%
Working less than 35 hours a week	26.3%
Unemployed, Retired, or Disabled	44.7%
US born	
Yes	11.7%
Preferred language	

Respondents	Percentage total unless noted (N=77)
English	7.8%
Spanish	92.2%
Housing type	
An apartment or mobile home/trailer	44.2%
A house/townhouse/condo	53.2%
Room/rented room	1.3%
Government housing (Military, etc.)	1.3%
Hemoglobin A1C	
Mean (SD)	9.0 (1.9)
LDL Cholesterol	
Mean (SD)	95.6 (37.1)
Systolic Blood Pressure	
Mean (SD)	127.7 (18.1)
Diastolic Blood Pressure	
Mean (SD)	81.3 (13.9)
BMI	
Mean (SD)	29.6 (5.4)

*24 respondents did not report this item. They were omitted from denominator for reported percentages.

†1 respondent did not report this item. They were omitted from denominator for reported percentages.

Table 2.

Covid-19 related stress and general impact among Hispanic adults with type 2 diabetes

Respondents	**Percentage total, unless noted (N=77)**
Coronavirus Anxiety Scale, summary score *	
Mean (SD)	1.6 (3.8)
Median	0.0
Range	0–20
Coronavirus Impact Scale, select items	
Impact of the pandemic on family income/employment	
No change	22.7%
Mild (Small change, able to meet all needs and pay bills.)	22.7%
Moderate (Having to make cuts but able to meet basic needs and pay bills.)	37.3%
Severe (Unable to meet basic needs and/or pay bills.)	17.3%
Missing	2
Impact of the pandemic on food access	
No change	53.3%
Mild (Enough food but difficulty getting to stores and/or finding needed items.)	21.3%
Moderate (Occasionally without enough food and/or good quality (e.g., healthy) foods.)	17.3%
Severe (Frequently without enough food and/or good quality (e.g., healthy) foods.)	8.0%
Missing	2
Impact of the pandemic on medical health care access	
No change	24.0%
Mild (Appointments moved to telehealth.)	38.7%
Moderate (Delays or cancellations in appointments and/or delays in getting prescriptions; changes have had minimal impact on health.)	29.3%
Severe (Unable to access needed care resulting in moderate to severe impact on health.)	8.0%
Missing	2
Number of immediate family members diagnosed with coronavirus	
Mean (SD)	0.5 (.8)
Range	0–4
Number of extended family members diagnosed with coronavirus	
Mean (SD)	1.7 (2.7)
Range	0–15
Most severe symptoms of affected family member†	
Mild	40.0%
Moderate	10.0%
Severe	26.0%
Extended	24.0%

Respondents	Percentage total, unless noted (N=77)
Missing	27

*3 respondents did not report this item.

†27 respondents did not report this item. They were omitted from denominator for reported percentages.

Table 3.

Reported impacts on diabetes of the COVID-19 pandemic among Hispanic adults

Changes since the pandemic	**Reported change (affirmative response) N=77***
Got less medical care than usual	45.3%
More frequent hyperglycemia	37.3%
Less physical activity or exercise	34.7%
Overeating or eating more unhealthy/junk foods	30.7%
More sedentary time	28.0%
Unable to get diabetes medical care	24.0%
Unable to get testing supplies	16.0%
Unable to get diabetes pills	14.7%
Unable to get insulin *	14.7%
More frequent hypoglycemia	10.7%
Increase in health problems related to diabetes	9.3%

* 2 respondents did not report each of the items. They were omitted from denominator for reported percentages.

Table 4.

Changes in diabetes measures among Hispanic adults before and since the COVID-19 pandemic

	Pre-COVID, Mean (SD)	COVID-19, Mean (SD)	P-value
Diabetes Self Care Behaviors, days in the past 7 days with:			
Five or more servings of fruits, vegetables	4.1 (2.4)	3.9 (2.4)	0.65
High fat foods like red meat, fried food, cheese	3.0 (2.0)	2.6 (1.7)	0.12
30 minutes of continuous physical activity	4.3 (2.6)	3.6 (2.7)	0.06
Test blood sugar†	5.6 (2.5)	5.0 (2.7)	0.20
Diabetes medication adherence	6.6 (1.3)	6.5 (1.7)	0.56
Diabetes self-efficacy	7.5 (1.9)*	8.0 (1.6)	0.003
Diabetes social support	2.7 (1.2)	2.5 (1.4)	0.34
Diabetes-related quality of life	2.9 (1.0)*	3.4 (0.8)	P < 0.001
Satisfaction with current diabetes treatment plan	3.4 (1.0)	3.6 (0.9)	0.07
Physical well-being over the last week	2.8 (1.2)*	3.3 (1.1)	0.006
Emotional well-being over the last week	2.6 (1.5)*	3.2 (1.2)	0.006
Diabetes-related health care visits (outpatient)			
All providers‡	2.4 (1.2)*	1.8 (1.4)	P < 0.001
Visits with primary care provider (MD, DO, NP, PA)	1.0 (0.0)*	0.8 (0.4)	P < 0.001
Visits with behavioral health provider	0.3 (0.5)*	0.2 (0.4)	0.01
Smoked any cigarettes in the past 7 days, yes/no	16.9%	10.4%	0.06

*Indicates pairwise difference of p<0.05 between pre-COVID/COVID

†This item was asked only to the 72 people who reported access to a glucometer.

‡All providers included: Primary care provider, Endocrinology provider, Dietician, Diabetes Educator, Diabetes Education Class, Behavioral Health, Clinical Pharmacy, Other diabetes-related visits. Only provider types with significant difference pre-COVID/COVID are reported.

Table 5.

Repeated Measures Models Adjusted for Baseline Value, Sex, Site, Arm, and Baseline A1C

	COVID-19 Effect Estimate	P-value
Diabetes Self Care Behaviors, days in the past 7 days with:		
Five or more servings of fruits, vegetables	−0.17	0.65
High fat foods like red meat, fried food, cheese	−0.40	0.12
30 minutes of continuous physical activity	−0.68	0.06
Test blood sugar†	−0.51	0.19
Diabetes medication adherence	−0.13	0.56
Diabetes self-efficacy	0.62*	0.003
Diabetes social support	−0.14	0.34
Diabetes-related quality of life	0.46*	P < 0.001
Satisfaction with current diabetes treatment plan	0.27	0.07
Physical well-being over the last week	0.54*	0.005
Emotional well-being over the last week	0.59*	0.006
Diabetes-related health care visits (outpatient)		
All providers‡	−0.51*	P < 0.001
Visits with primary care provider (MD, DO, NP, PA)	−0.13*	0.001
Visits with behavioral health provider	−0.13*	0.01
Smoked any cigarettes in the past 7 days, yes/no	−0.07	0.06

*Indicates pairwise difference of p<0.05 between pre-COVID/COVID

†This item was asked only to the 72 people who reported access to a glucometer.

‡All providers included: Primary care provider, Endocrinology provider, Dietician, Diabetes Educator, Diabetes Education Class, Behavioral Health, Clinical Pharmacy, Other diabetes-related visits. Only provider types with significant difference pre-COVID/COVID are reported.