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DRIVE for Health Equity: Tailoring Quality Improvement, Clinical Education, and Community Engagement to Improve Type 2 Diabetes (T2DM) Outcomes for Minoritized Communities in Oakland, California

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ABSTRACT

Background: Type 2 Diabetes Mellitus (T2DM) is influenced by various factors, with racial and ethnic minorities experiencing higher prevalence. Existing diabetes management programs focus on primary prevention, often neglecting optimal hemoglobin A1C (HbA1c) management for individuals with prediabetes. Consistent HbA1c monitoring is crucial for comprehensive care. This study highlighted the need for secondary prevention and community collaboration to enhance health equity for individuals with T2DM.

The DRIVE program, conducted by the National Minority Quality Forum's (NMQF) Center for Sustainable Health Care Quality and Equity (SHC), aimed to improve health outcomes for individuals with Type 2 Diabetes Mellitus (T2DM) in Oakland, CA. Building on prior successes in New Orleans, Los Angeles, and Queens, NY, DRIVE employs a flexible and sustainable approach that integrates quality improvement strategies at clinic sites, focusing on patient and community engagement. The study addressed barriers to medication adherence, provided Diabetes Self-Management Education and Support (DSMES), fostered community partnerships, and utilized culturally appropriate resources. The program's impact was evaluated through changes in HbA1c levels and community participation.

Methods: A pre-and post-test design was used, targeting patients of Baywell Health, Oakland, CA, aged 18 and older with initial HbA1c levels greater than 9%. The intervention, developed using SHC's DRIVE program, included components such as food distribution events, workflow enhancements, identification and mitigation of medication adherence barriers, rapid cycle improvement processes, community educational sessions, and the creation of patient resources. This two-year study implemented four Plan-Do-Study-Act (PDSA) cycles, each lasting 2-4 months, following a three-month planning phase. HbA1c levels were measured at baseline, six months after implementation, and again at 18-month follow-up.

Statistical Analysis

Univariate analyses described demographic data, while paired sample t-tests assessed changes in HbA1c levels. Independent sample t-tests and ANOVA with pairwise comparisons were used to determine group differences.

Results: Among the 255 participants, 58% identified as female and 42% as male. The majority were Black/African American (64%) and 73% were Non-Hispanic/Latino/a, with a mean age of 55.4 years. HbA1c levels were significantly reduced from an average of 10.3±1.4 to 9.4±2.1 at follow-up. Participants who enrolled the longest showed greater reductions. Community initiatives reached over 600 individuals, demonstrating the program's effectiveness in building partnerships and sustainability.

Conclusion: SHC's DRIVE program improved T2DM outcomes through community involvement, quality improvement, and culturally tailored education. This initiative highlighted the importance of addressing health inequities and barriers in diabetes care through culturally sensitive techniques and sustained interventions. DRIVE effectively reduced disparities and promoted sustainable health outcomes among minority groups. Collaborative efforts enhanced trust and demonstrated the advancement of health equity through tailored interventions, with DRIVE providing a flexible and sustainable framework for tailoring interventions to community needs. These findings underscored the need for individualized, culturally competent diabetes care, continuous education, community engagement, and equitable resource access to support communities of color and ethnic minorities in managing T2DM effectively.

Keywords: Type 2 Diabetes Mellitus (T2DM), Quality Improvement, Community Partnerships, Health Equity, Minority, Barriers, Nutrition, Diabetes Self-Management Education and Support (DSMES), Sustainability

Introduction:

Diabetes is a significant medical condition that affects both physical and economic health worldwide, with the prevalence of T2DM continuously increasing.[1] Currently, T2DM affects approximately 10.5% of the population and is the seventh leading cause of death. Diabetes mellitus (DM) is one of the oldest known diseases, tracing back to Egyptian history approximately 3,000 years ago.[2] The distinction between type 1 and T2DM was established in 1936, and 1988, T2DM was identified as a part of metabolic syndrome.[4]

T2DM, or non-insulin-dependent diabetes, is characterized by hyperglycemia, insulin resistance, and a relative lack of insulin.[5] It results from interactions among genetic, environmental, and behavioral risk factors.[3,6] Insulin resistance in target organs and relative insulin insufficiency resulting from pancreatic β-cell dysfunction are the hallmarks of T2DM. From 1980 to 2004, the incidence and prevalence of T2DM increased significantly, driven by an aging population, sedentary lifestyles, and rising obesity rates.[7,8] Cardiovascular disease is the leading cause of morbidity and mortality associated with T2DM,[9] necessitating strict control of blood pressure, glucose, and lipid levels to reduce complications and disease progression.[10]

Young patients under 25 with T2DM face particular challenges and require decades of rigorous therapy to minimize the development and progression of microvascular and macrovascular complications. [11] For older adults (65 years or older), the risk of hypoglycemia and other comorbidities must be carefully considered in addition to the intensive diabetes treatment. The incidence and prevalence of T2DM vary by country, with over 80% of patients residing in low- to middle-income nations. Since 1980, the global prevalence of the disease has risen dramatically, driven by increasing obesity, physical inactivity, and energy-dense diets.[12] In 2015, an estimated 415 million individuals worldwide had diabetes, with T2DM accounting for over 90% of cases. This number is expected to rise to 642 million by 2040.

The 2020 National Diabetes Statistics Report from the Centers for Disease Control and Prevention (CDC) states that 34.2 million Americans, or 10.5% of the population, were estimated to have diabetes in 2018, with 7.3 million of these cases undiagnosed.[13] The prevalence of diabetes was 7.5% among non-Hispanic White Americans, 11.7% among non-Hispanic Black Americans, and 12.5% among Hispanic Americans,[14] highlighting significant differences among racial and ethnic groups.

Improving health outcomes for people of color and Indigenous people with diabetes requires high-quality healthcare resources tailored to their unique sociocultural circumstances and needs.[15] These groups often experience complex, socially mediated forms of the disease.[16] Studies indicate that patients feel doctors know too little about the socioeconomic determinants of health, while physicians cite systemic and individual obstacles to addressing these issues.[17] Focusing on culture as a resource is essential for clarifying the relational and culturally aware aspects of care that can improve diabetes outcomes. Healthcare professionals should support individuals who wish to engage in cultural traditions, as traditional lifestyles and worldviews may be protective.[18]

In the U.S., T2DM is a leading cause of illness and death,[19] disproportionately affecting Hispanics, non-Hispanic Black Americans, American Indians, Alaska Natives, and some Asian and Pacific Islander communities. Racial and ethnic minority groups in the US have about twice the risk of developing T2DM compared to non-Hispanic Whites.[20,21] There are notable disparities in the prevalence of diabetes-related preventive services, the standard of care, and disease outcomes.[22] Complications such as myocardial infarctions, strokes, lower limb amputations, and end-stage renal disease are more common among Black and Hispanic populations, who also have higher rates of hospitalization and emergency room visits for diabetes-related comorbidities.[23]

The greater prevalence of diabetes among racial/ethnic minorities worldwide has been attributed to clinical, social, biological, and health system issues.[24,25] Healthcare systems are becoming more adept at identifying and meeting their patients' unmet material and emotional needs.[26] Improving healthcare delivery and patient outcomes requires integrating medical and social services,[27] including understanding the level of care patients need to fulfill their combined medical and social needs, how this level of support varies depending on their circumstances, and the variables that influence this variance.[28] Healthcare organizations need this information to efficiently and effectively build staffing models, freeing up more resources for patients with complex medical and social demands.[29]

The Chronic Care Model (CCM), which emphasizes patient participation and illness self-management, has significantly transformed the traditional healthcare system.[30] This approach is particularly relevant to T2DM management. Patient activation, a cognitive process encouraging healthy behaviors, involves four steps: recognizing patients' involvement in their treatment, implementing patient-centered health behaviors, helping patients become self-sufficient in managing their health, and maintaining lifestyle changes. For T2DM patients, this means actively monitoring blood glucose levels, adhering to medication regimens, making informed dietary choices, and incorporating regular physical activity into their routines. This approach allows patients to manage their diabetes with minimal disruption to their daily activities, thereby gaining greater confidence in their self-management abilities. The CCM prioritizes active engagement and informed healthcare consumption, empowering T2DM patients to take control of their health and improve their overall outcomes.[31]

In addition to the CCM, effective diabetes prevention strategies are crucial. Weight loss and increased physical activity are among the most effective and well-supported diabetes prevention interventions for overweight adults with prediabetes.[32] Numerous studies demonstrate that modest weight loss or increased physical activity can prevent or delay diabetes by 33% to 68%.[33] However, these methods are often individualized and unaffordable for communities most impacted by prediabetes.[33] Community-based interventions have shown promise in

addressing this. For instance, research on a program called Diabetes Prevention in East Harlem, New York City, highlights the effectiveness of a community-based participatory research approach used in 2005.[34] Individuals with prediabetes who participated in this partnership lost a considerable amount of weight, demonstrating the potential of such interventions.[35]

In line with the same initiative, the National Minority Quality Forum's (NMQF) Center for Sustainable Health Care Quality and Equity (SHC) launched the DRIVE diabetes program, entitled "DRIVE for Sustained and Equitable Diabetes Outcomes through Quality Improvement and Community-Led Intervention." This program sought to improve health outcomes for individuals with T2DM among minority communities in Oakland, California. Building on the success of prior DRIVE programs in New Orleans, LA, and Queens, NY, this study leverages methodologies that have demonstrated increased diabetes knowledge, enhanced patient activation, and correlated reductions in HbA1c levels and blood pressure. These previous initiatives effectively engaged patients through both in-person and virtual educational activities, using incentives such as access to healthy foods, provision of nutritious meals during learning sessions, and gift cards for health-conscious food purchases from local grocery stores.

The current study aimed to improve Type 2 Diabetes Mellitus (T2DM) outcomes in minoritized communities by partnering with a local health system and trusted community leaders. The objectives included evaluating reductions in A1C levels, the dose dependency of the program, and the influence of community partnerships. The evaluation contributes to understanding the effectiveness of SHC's DRIVE toolkit in creating tailored, sustainable quality improvement programs. It also examines how the DRIVE program enhances health outcomes and promotes health equity among minority communities affected by T2DM. The study emphasized culturally relevant approaches, including clinical education, access to nutrient-dense food, and Diabetes Self-Management Education and Support (DSMES), to address specific needs within the community. Key partners included the National Minority Quality Forum's (NMQF) Center for Sustainable Health Care Quality and Equity (SHC), Baywell Health (formerly known as West Oakland Health Council), SHC's Faith Health Alliance local member (Hope Center Church), and a local stylist from SHC's HAIR Wellness Warriors program. These partners collaborated to bring improvements in health outcomes and implement culturally relevant interventions to their community.

SHC's HAIR Wellness Warriors program provides education and outreach through barbershops and salons, where barbers and stylists have played a vital role in the dispersion of health information within their communities. The Faith Health Alliance is a network of pastors and churches working to increase awareness of various health topics in underserved communities throughout the United States. These collaborative efforts leverage the strengths and trust of these community-based organizations to effectively address the specific health needs of minoritized populations and promote sustainable health improvements.

This study aimed to achieve a 1% reduction in HbA1c levels among the study population by addressing barriers to medication adherence, providing comprehensive Diabetes Self-Management Education and Support (DSMES), increasing access to nutrient-dense food options, and fostering community collaboration to support diabetes management efforts. These interventions sought to enhance overall diabetes management and improve health outcomes in the targeted population.

Building on the study's aim, this research assesses the effectiveness and impact of the DRIVE program through pre- and post-PDSA (Plan-Do-Study-Act) cycle analyses of T2DM metrics. The intervention was structured around SHC's DRIVE program, which adapts the rapid cycle improvement or PDSA approach to quality improvement (QI). This adaptation enhances the focus on the patient and community, engages the entire clinical team, and celebrates the clinicians who work diligently to care for their patients. These evaluations contribute to understanding how DRIVE enhances health outcomes and promotes health equity among minoritized communities affected by T2DM.

DRIVE stands for Demonstrating Real Improvement in Value and Equity and is comprised of six practical steps:

1. **Identifying Your Team Champions:** A health system leader champions the DRIVE program by selecting practice sites and connecting various resources, such as educational, IT, nursing, equity, specialty care, research, and communication. At the practice level, champions are recruited to develop and implement the QI strategy, including a physician or advanced practice clinician, nurse, practice manager, patient navigator, pharmacist, and/or resident.
2. **Practice Assessment:** A brief online survey assesses the practice, patients, current healthcare approaches, provider and patient barriers, and desired QI activities. This information guides the QI program design.
3. **Learn More About Your Community:** Community health assessments help tailor the DRIVE program by providing data on demographics, health status, socioeconomic factors, available health services, and community resources. This information is available through hospitals, FQHCs, local foundations, health departments, and national surveys.
4. **Design Your Activity Plan:** The Plan-Do-Study-Act (PDSA) approach implements quality improvement projects adaptable to any practice size or change type. Start small with specific timelines, improvement levels, and individual roles. Share the plan with staff and leadership for input and resource suggestions to ensure successful implementation and buy-in.
5. **Put the Plan into Action:** Train participating staff, track efforts and results with a run chart, and assess the QI cycle's impact. Expand if successful, adjust if uneven, and explore a new approach if ineffective.
6. **Communicate, Celebrate, Continue:** Share results and successes with leadership, the practice team, patients, and the community. Celebrate contributors to the program. Inform patients and the community about the clinic's commitment to improving quality care. Maintain ongoing cycles of healthcare quality and equity.

These steps enable the creation of a flexible program by fostering collaboration and adapting to community needs. By acknowledging and leveraging insights from the communities it serves, the DRIVE program exemplifies a sustainable framework for promoting health equity.

Methods

STUDY DESIGN

This study employed a pre-and post-test design and focused on the Baywell Health patient population, primarily comprised of minoritized groups. For the purposes of this study, only participants aged 18 years and older of any race/ethnicity or gender, with a baseline HbA1c of > 9.0 and those who had HbA1c data for at least two-time points so that comparisons could be made, receiving standard-of-care (SOC) treatment for T2DM from Baywell Health were included. Exclusion criteria included patients with an HbA1c level below 9% and those with gestational diabetes or type 1 diabetes. Patients participating in the QIE intervention were informed by clinicians and registered dietitians at Baywell Health. A non-probability sampling technique was used to select patients from the Baywell Health patient population. The study received an IRB exemption under 45 CFR 46.102(l). De-identified data, including demographics and HbA1c levels, were collected before and after the intervention to assess the effectiveness of SHC's DRIVE program.

DATA COLLECTION

The study combined a quality improvement and education (QIE) strategy with community involvement. The data was collected through Electronic Health Records (EHR) and community event attendance was tracked by Baywell Health Staff. The goals included expanding access to nutrient-dense food, building and strengthening community partnerships, and incorporating DSMES sessions by the nursing staff for patients. QIE activities included food distribution events, workflow improvements, addressing barriers to medication adherence habits, implementing rapid cycle improvement processes, educational sessions for community members, and developing bilingual patient educational materials. The study was conducted over two years and implemented four Plan-Do-Study-Act (PDSA) cycles, each lasting 2-4 months. The planning phase spanned two months. Following this, the study commenced, with initial metrics measured six months after the implementation (baseline) and again twelve months after the baseline (follow-up).

Study Design:

- **Understanding Populations:** A practice assessment was conducted to analyze the demographics of the Baywell Health patient population. This assessment aimed to identify specific patient and clinic barriers to effective T2DM care. Data were collected on patient demographics, health behaviors, and access to care, which informed the development of tailored interventions.
- **Quality Improvement Development:** In collaboration with SHC's DRIVE program, Baywell Health co-developed strategies to implement sustainable and equitable care activities. This included training key staff members, known as "champions," who would lead the initiative. The training focused on quality improvement principles, expanding culturally competent resources, and patient engagement techniques. This process took place from August 2022 to October 2022.
- **PDSA and Community Activities:**
  - **1st PDSA Cycle [November 2022 - April 2023]:** Baywell Health implemented a new workflow incorporating Diabetes Self-Management Education and Support (DSMES) and dietitian consultations. Patients who met the study criteria (18 years and older with HbA1c levels >9%) were integrated into this workflow, with appointments scheduled at 30, 60, and 90-day intervals. The DSMES curriculum, developed by Baywell Health, emphasized nutrition and medication adherence. Appointment reminders were provided, and T2DM standard-of-care (SOC) was maintained throughout. Barriers to medication adherence were identified and addressed, including financial, physical/logistic (access), knowledge, and perception/adherence barriers. Patient navigators assisted patients in overcoming these barriers by connecting them with resources or services. Additionally, Baywell Health organized a bi-monthly food pharmacy, providing farmers market-style food to all patients.
  - **2nd PDSA Cycle [April 2023 - September 2023]:** The medication barrier survey and the updated workflow, with the above changes, continued. Baywell Health and SHC developed infographics on medication adherence and DSMES. Patient resources on nutrition and diabetes, sourced from government and advocacy organizations, were distributed to the study population and community. These materials, including culturally diverse cookbooks, were integrated into DSMES and dietitian appointments. Resources were available in English and Spanish, ensuring accessibility for individuals with low literacy levels.
  - **3rd PDSA Cycle [September 2023 - December 2023]:** The workflow was maintained, and SHC's community partners were activated. The local Faith Health Alliance member, Hope Center Church, hosted a medication and nutrition-focused diabetes learning session. Baywell Health collaborated with Hope Center Church to organize food distribution events. Additionally, SHC's HAIR Wellness Warrior initiated community outreach efforts to raise awareness about T2DM. The community partners distributed resources and educational materials co-developed by SHC and Baywell Health to community members during these events. Various vendors participated in the events, offering health services and resources.
  - **4th PDSA Cycle [November 2023 - April 2024]:** The workflow and community activities continued. Physical activity resources were developed and made available to all patients and community partners at Baywell Health. These resources encompassed a comprehensive list of local low-cost and free gym memberships, walking groups,

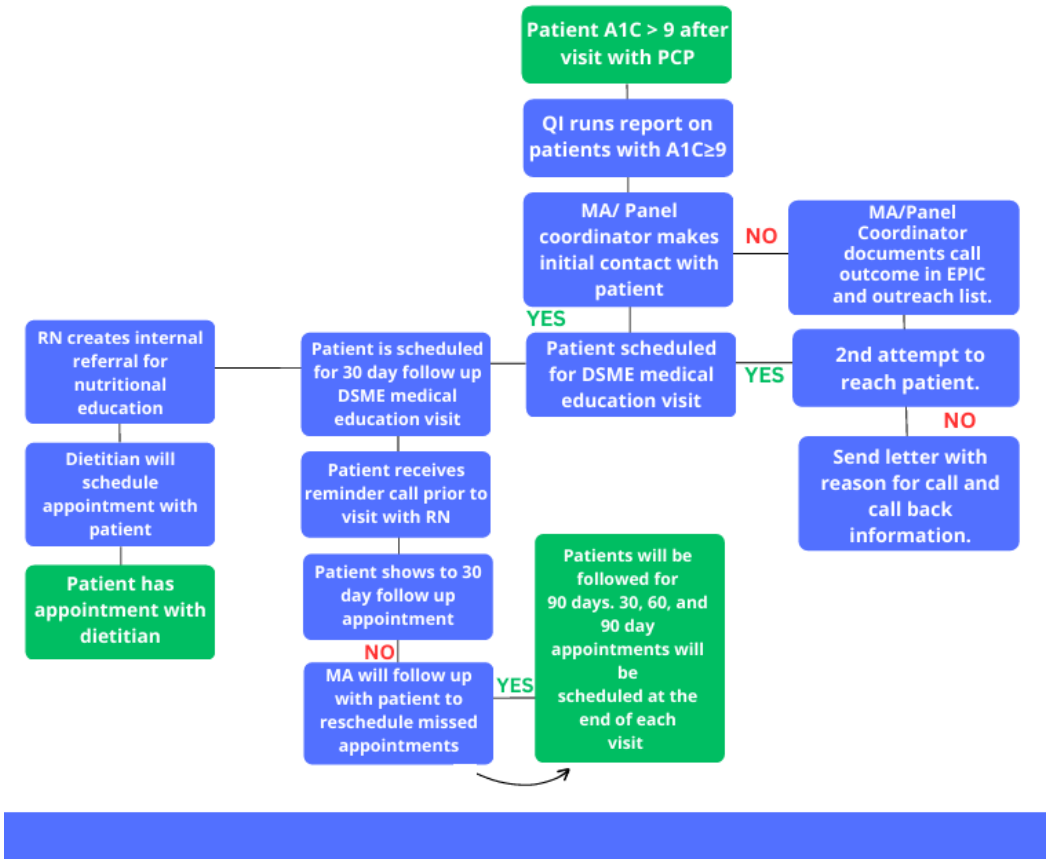
and various exercise classes. Additionally, an infographic highlighting free low-impact exercises, culturally competent recipes, and cooking guides was created and integrated into Baywell Health's Diabetes Self-Management Education and Support (DSMES) curriculum. SHC's HAIR Wellness Warrior hosted a Health and Hair-Diabetes Day at her salon. Baywell Health supported the event by providing resources and educational materials to the community.

- **Evaluation:** All metrics collected by Baywell Health were reviewed and analyzed by a third-party evaluator. Demographic data and HbA1c levels were assessed at various points throughout the study. The baseline included patients fitting the study criteria with a recent HbA1c level [within the past 12 months before the start of the study], compared to levels at the subsequent study time points. Community partner event attendance was measured throughout each event.

WORKFLOW

Workflow Implemented by Baywell Health

Figure 1: Baywell Health Workflow



Note. This workflow illustrates the implementation of the study. Upon identifying a patient as a study participant, they are scheduled for DSMES visits and an appointment with a dietitian. The DSMES appointments are scheduled at 30, 60, and 90-day intervals. Patients receive appointment reminders. Those who do not schedule appointments are sent reminders, outreach by staff, and a letter prompting them to schedule their appointments.

STATISTICAL ANALYSIS

All metrics collected by Baywell Health were reviewed and analyzed by a third-party evaluator. Demographic data and HbA1c levels were evaluated at baseline, six months after the implementation of quality improvement and community partner activities (at the end of the first PDSA cycle), and again twelve months after (at the end of the fourth PDSA cycle). Univariate analyses were conducted to describe the demographic characteristics of the study sample, including calculating frequencies and percentages for categorical variables (race, ethnicity, and gender identity) and mean standard deviations for continuous variables (age). To assess changes in HbA1c levels from baseline to follow-up, paired sample t-tests were employed. These tests were performed both for the entire sample and within specific demographic subgroups to evaluate the intervention's overall impact and its differential effects across various groups. Independent sample t-tests were utilized to compare HbA1c levels between two distinct groups, such as male versus female participants at baseline and follow-up. When comparisons involved more than two groups, such as racial or ethnic subgroups, Analysis of Variance (ANOVA) was used, followed by pairwise comparisons to identify specific group differences. All statistical analyses were performed using SPSS version 25, with a significance level set at $p < 0.05$.

ETHICAL CONSIDERATIONS

Implementing a study to improve T2DM outcomes in Oakland, California, a community predominantly composed of minoritized populations, demands a rigorous approach to ethical considerations. Informed consent was prioritized, with clear communication about the initiative's objectives, methods, risks, and benefits, while ensuring voluntary participation and maintaining

consent throughout the study. The study received an IRB exemption under 45 CFR 46.102(l). Privacy and confidentiality were paramount, necessitating robust data security measures and anonymizing sensitive health information. Cultural humility was followed by engaging with community leaders, understanding cultural norms, and implementing culturally appropriate interventions. Equity and fair representation ensured that all community members equally benefited from the program. Continuous monitoring was essential to uphold transparency and accountability, fostering community trust.

Results

Demographics. Due to data collection inconsistencies, we were not able to collect gender identity for all 255 participants. Of those for which we did have gender identity data, 58% reported as female and 42% as male (**Table 1**). The majority of the sample were Black/African American (64%), with approximately 73% who self-reported as Non-Hispanic or Latino/a. The mean age for the entire sample was 55.4±11.6 years.

Table 1. Descriptive statistics of sample (N=255).

	Frequency	%
Gender Identity*		
Female	94	57.7
Male	68	41.7
Race		
Asian	5	2.0
Black/African American	164	64.3
Native Hawaiian	3	1.2
Pacific Islander	1	.4
Unreported/Declined	34	13.3
White	48	18.8
Ethnicity		
Hispanic or Latino/a	54	21.2
Non-Hispanic or Latino/a	186	72.9
Unreported/Chose Not to Disclose Ethnicity	15	5.9
	Mean±SD**	**Range**
Age	55.4±11.6	24 - 75

*Gender identity data were missing for 92 individuals. Gender identity data here are presented for the 163 individuals for which we had the information.
**SD=Standard deviation.

Hemoglobin A1C. The average baseline HbA1c was 10.3±1.4 and significantly decreased to 9.4±2.1 at follow-up (**Table 2**). Mean HbA1c levels decreased significantly for participants who were enrolled in the intervention workflow at the start of the study compared to those who were enrolled after the first follow-up. However, HbA1c levels dropped more for participants who were enrolled at all three study milestones.

Table 2. Hemoglobin A1C levels were assessed at baseline, six months after the start of the study (end of 1st PDSA cycle), and at twelve months follow-up (end of 4th PDSA cycle). Comparisons were conducted between individuals who were enrolled in the program from the outset and those who were enrolled after the baseline evaluation.

	Baseline±SD	Follow-up±SD	Change
All (N=255)	10.3±1.4	9.4±2.1	-1.0±2.1*
Two-time points only (n=151)	10.3±1.4	9.6±2.0	-0.7±2.0*
All three-time points (n=104)	10.2±1.5	9.2±2.4	-1.4±2.3**

*Within groups, $p<0.001$.
**Between groups, significantly greater than those who participated in two of three study evaluation periods, $p<0.005$.

Females and males had similar HbA1c levels at baseline and follow-up, yet both gender groups experienced significant reductions at follow-up (**Table 3**). The White population had higher HbA1c levels than the Black/African American population both at baseline and follow-up ($p<0.001$), but not with overall change. Similarly, the Hispanic or Latino/a population had higher HbA1c levels at both baseline and follow-up, but not overall change.

Table 3. Hemoglobin A1C levels by demographic group levels at baseline and follow-up.

	Baseline±SD	Follow-up±SD	Change
Gender			
Female	10.2±1.4	9.3±2.1	-1.0±2.0[a]
Male	10.3±1.2	9.7±2.5	-1.0±2.6[a]
Race			
Asian	10.0±0.9	9.9±1.9	-0.1±1.7
Black/African American	10.0±1.4	9.1±2.3	-1.1±2.1
Native Hawaiian	9.2±0.3	9.5±2.4	0.2±2.2
Pacific Islander	-	-	-
Unreported/Declined	10.3±1.2	9.4±1.9	-0.9±2.4
White	11.0±1.5[b]	10.3±2.0[b]	-0.7±2.0
Ethnicity			
Hispanic or Latino/a	10.9±1.4[c]	10.1±2.0[c]	-0.9±1.8
Non-Hispanic or Latino/a	10.0±1.4	9.2±2.2	-1.0±2.1
Unreported/Chose Not to Disclose Ethnicity	10.3±1.2	9.4±2.3	-0.9±2.8

[a]Within gender groups, significant change from baseline.
[b]Between race groups, significantly higher than Black/African American at baseline and follow-up ($p>0.001$).
[c]Between ethnic groups, significantly higher than non-Hispanic or Latinos/Latinas at baseline and follow-up ($p<0.01$).

Community Event Outcomes. Both the Hope Center Church and the HAIR Wellness Warriors hosted educational events. SHC's HAIR Wellness Warrior organized a Health and Hair-Diabetes Day at their salon, with Baywell Health supporting the event by providing resources and educational materials to the community. These events were attended by church congregants, community members, and Baywell Health patients. Over 100 patients and community members actively engaged in educational sessions and received educational materials and resources.

Baywell Health partnered with Hope Center Church to host food distribution events every six months. Farmers market-style food was made available to community and clinic participants. During these events, the clinic distributed DSMES educational materials and resources. Various vendors provided health services and resources, including self-sufficiency resources such as housing, and employment support. These collaborative efforts expanded access to nutrient-dense foods, benefiting over 500 patients and community members.

Discussion

The findings of this study underscore the factors that improve Type 2 Diabetes Mellitus (T2DM) outcomes within minoritized communities through SHC's DRIVE program. This program demonstrates flexibility, customization, and sustainable quality improvement, bolstered by community engagement. The study primarily included minoritized groups, predominantly from the Black/African American and/or Non-Hispanic or Latino/a populations. The mean age of the sample size was 55 years. These results highlight the effectiveness of the DRIVE program in addressing the unique needs of minoritized communities, emphasizing its adaptability and ability to foster sustainable improvements in diabetes management.

The analysis of hemoglobin A1c (HbA1c) levels among study participants revealed significant improvements throughout the intervention. The average baseline HbA1c was 10.3±1.4, which decreased significantly to 9.4±2.1 at follow-up (Table 2). This overall reduction indicates the effectiveness of the intervention in improving glycemic control among participants. Further examination of the data showed that mean HbA1c levels decreased significantly for participants who were enrolled in the intervention workflow at the start of the study compared to those who were enrolled after the first follow-up. This suggests that early enrollment and sustained participation in the intervention were associated with greater improvements in HbA1c levels. The results suggest that medication adherence could have improved as patient barriers were identified and addressed. Additionally, participants who were enrolled at all three study milestones experienced even more pronounced reductions in HbA1c levels. This finding underscores the importance of continuous engagement and adherence to the intervention protocol for achieving optimal glycemic control. The results underscore the efficacy of the intervention in reducing HbA1c levels among patients with T2DM, particularly for those who received the intervention at the study's commencement.

The analysis of HbA1c levels stratified by gender revealed that both females and males had similar levels at baseline and follow-up. However, both groups experienced significant reductions in HbA1c at follow-up, indicating that the intervention was effective across

genders (Table 3). Racial and ethnic differences in HbA1c levels were also observed. The White population had higher HbA1c levels than the Black/African American population at both baseline and follow-up, with the difference being statistically significant ($p<0.001$). Despite these differences in absolute HbA1c levels, the overall change in HbA1c did not differ significantly between these racial groups, suggesting that the intervention was equally effective in reducing HbA1c levels across these populations. Similarly, the Hispanic or Latino/a population exhibited higher HbA1c levels at both baseline and follow-up compared to other groups. However, like the White population, the overall change in HbA1c levels was not significantly different, indicating comparable efficacy of the intervention in this group as well. These findings underscore that while baseline and follow-up HbA1c levels may vary among different racial and ethnic groups, the overall effectiveness of the intervention in reducing HbA1c levels was consistent across these groups. This highlights the broad applicability of the intervention in improving glycemic control among diverse populations.

Community engagement and support initiatives were integral to the study, enhancing participant health and community visibility, and meeting people where they are. The Hope Center Church and the local HAIR Wellness Warriors hosted educational events that effectively reached the community. Baywell Health also partnered with Hope Center Church to host food distribution events. During these events, DSMES materials and resources were distributed, and various vendors offered health services and resources, including self-sufficiency, housing, and employment support. Over 600 patients and community members benefited from the education events and the food distribution events. These relationships foster trust within communities, ensuring continued engagement and support for diabetes management and overall health improvement. These initiatives highlight the importance of community partnerships and educational outreach in improving health outcomes and supporting sustainable lifestyle changes for people with diabetes.

This initiative centered on research data that indicates a greater incidence of diabetes-related complications in non-Hispanic Black, Hispanic, and Indigenous populations compared to non-Hispanic White populations, attributed to lower levels of diabetes self-management education and worse access to high-quality healthcare. Specifically, these populations exhibited significantly higher prevalence rates of hypertension, hyperlipidemia, and uncontrolled blood glucose levels, all of which elevated the risk of cardiovascular events.[37]

The results align with previous research demonstrating the benefits of patient-centered, culturally sensitive approaches to improving diabetes outcomes. Spencer et al. showed that culturally appropriate diabetes education programs significantly reduced HbA1c levels in African American and Latino communities.[37] In this study, initial HbA1c levels were similar between both populations. Research by Hill-Briggs et al. further supports these findings, indicating that individuals with higher baseline HbA1c levels often struggle with blood sugar control despite receiving treatment, possibly due to advanced disease or other complicating factors such as socioeconomic barriers and comorbidities.

The Hill-Briggs et al. study on diabetes self-management education (DSME) programs that are community-based and culturally appropriate for rural African Americans with T2DM are both practical and may even be beneficial study.[38] Although preliminary, the results showed promise in improving diabetes-related outcomes and equipping participants with critical abilities for self-management. The result of this study is in agreement with earlier studies that have shown differences in the way that diabetes is managed in communities of color and ethnic minorities. Research continuously demonstrates that, in comparison to non-Hispanic White populations, these communities have lower rates of diabetes self-management education, less access to high-quality healthcare, and a higher prevalence of diabetes-related comorbidities.[39]

Analysis of this study underscores disparities between non-Hispanic White populations and those affected by diabetes, including lower levels of diabetes self-management education, reduced access to high-quality healthcare, and increased prevalence of diabetes-related complications. These findings underscore the urgent need for extensive public health initiatives in Mexico to address the escalating diabetes burden. Projected increases in diabetes incidence, potentially affecting up to 25 million adults by 2050, underscore the importance of ongoing efforts to mitigate risk factors such as obesity, sedentary lifestyles, and unhealthy dietary habits across diverse racial, ethnic, and gender groups.[40] Effective policies promoting healthier lifestyles and enhancing diabetes surveillance are essential to reversing the upward trend in diabetes. Evidence suggests that improved patient satisfaction, health outcomes, and adherence to diabetes management and treatment regimens can result from these efforts.

Comparing these results to research on minority-related diabetes management hurdles sheds light on the complex issues that need to be resolved to ensure equitable health outcomes. The effectiveness of interventions might be hampered by problems including socioeconomic inequality, restricted access to healthcare, and cultural views toward health and treatment. Communities of color and ethnic minorities are disproportionately affected by T2DM, and they frequently face higher prevalence rates, worse health outcomes, and more obstacles to receiving high-quality healthcare. These differences highlight the urgent need for focused interventions that consider the distinct social, cultural, and economic elements affecting health outcomes. Strategies for promoting health equity and increasing outcomes within historically marginalized communities can be informed by insights from new research on creative diabetic care models and technology-enabled interventions.

According to Gary et al., culturally appropriate diabetes self-management education programs for African Americans increased medication adherence, dietary practices, and physical activity levels, improving glycemic control and decreasing complications associated with diabetes.[41] Perez-Escamilla et al., in their comprehensive analysis of worldwide minority population-focused

therapies, emphasized the significance of culturally appropriate methods for enhancing diabetes outcomes.[42] The assessment emphasized several effective tactics, such as peer support groups, community health worker programs, and culturally sensitive teaching materials.

A study conducted by Addala et al. emphasized the importance of operationalizing and addressing racial equity in type 1 diabetes care.[43] Their findings indicate ongoing challenges such as perceived ineffective training and insufficient institutional support. While the study focuses on type 1 diabetes, the insights gained can apply to T2DM care as well. By sharing effective strategies to combat medical racism, organizations can work towards reducing disparities in T2DM among various racial and ethnic minority groups. [43] These conclusions align closely with the results of our study.

Several limitations exist in this study, including small sample size, limited long-term impact of interventions on T2DM outcomes, variability in participant adherence, complexity of interventions, resource availability, lack of a control group, clinic staff turnover, limited data collection via EHR's, and cultural gaps in addressing specific cultural needs. Further data collection is needed to obtain medication adherence metrics. The two-year duration may not adequately capture long-term effects, and the study's focus on the applicability of culturally relevant care to other regions needs consideration.

Conclusion

SHC's DRIVE program successfully created a framework that improved Type 2 Diabetes Mellitus (T2DM) outcomes through community participation, quality improvement (QI), and culturally tailored patient education for minoritized populations. These results underscore the critical importance of addressing health inequities and barriers while enhancing diabetes care using culturally sensitive techniques and sustained interventions. By integrating culturally appropriate therapies and QI measures, the initiative effectively reduces diabetes disparities and promotes enduring health outcomes among minority groups. Collaborative efforts with trusted community partners foster trust within communities and healthcare systems alike. This initiative exemplifies an effective collaborative approach that integrates QI strategies, community engagement, and culturally tailored interventions to mitigate diabetes disparities and promote sustainable health outcomes in minority communities. The DRIVE program serves as a flexible and sustainable framework for advancing health equity by incorporating insights from the communities it serves, tailored specifically to their needs. These insights emphasize the critical necessity for individualized and culturally competent diabetes care, continuous education, community engagement, and equitable resource access to overcome the challenges faced by communities of color and ethnic minorities in managing T2DM.

Conflict of Interest Statement

The authors declare that there are no conflicts of interest regarding the publication of this article. This study was supported by funding from Novo Nordisk. The authors confirm that Novo Nordisk had no role in the study design, data collection, analysis, interpretation, or decision to submit the manuscript for publication. All authors have reviewed and approved the manuscript and confirmed that they have no additional financial or personal relationships with any entities that could inappropriately influence or bias the paper's content.

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