



# A Community Based Intervention Reduces Diabetes Risk in a Low-Income Community

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## ABSTRACT

CM:DPP is a partnership between Gleaners Community Food Bank (GCFB), National Kidney Foundation (NKF) of Michigan, and Wayne State University. We aim to measure the impact of pairing healthful food with the DPP curriculum. DPP is a validated intervention program that reduces progression to Type II diabetes 58%. However, there is outcome disparity for DPP workshops held in low-income communities. This project aims to determine whether improved outcomes result when food is provided for low-income DPP participants. The Food Insecurity (FI) rate in Wayne County is 19.5%, the highest in Michigan. As chronic disease and FI are known to be highly correlated, improving access to food and reducing FI are critical steps to reduce disproportionate chronic disease rates in low-income communities. In a year-long program, two cohorts of low-income DPP participants ( $n=29$ ) receive boxes containing healthful food delivered to Share Our Strength: Cooking Matters(CM) workshops. Boxes contain the items of food of the Cooking Matters recipe of that session. Contents are determined by GCFB Registered Dietitians, and contain a variety of fresh, frozen, and shelf-stable items. Cooking demonstrations are incorporated into the DPP curriculum. Survey information is collected throughout the study. Biometric data is collected at the onset and conclusion of the program. 30% of participants will lose  $\leq 5\%$  of their body weight; 50% will report  $\geq 150$  minutes of physical activity per week; 75% will have HemoglobinA1C  $\leq 5.7$ . Participants will be knowledgeable about how to access healthful food and make lifestyle changes that reduce risks for Type II diabetes.

## INTRODUCTION

- Type 2 Diabetes is a chronic condition of hyperglycemia that results from insulin resistance in the body. Food insecurity and chronic disease prevalence are highly correlated.
- Diabetes is a chronic disease that increases risk for blindness, kidney failure, nerve and blood vessel damage, or lower limb amputation.
- As of 2017, over 30 million Americans suffer from type 2 diabetes
- In Michigan, 1.05 million adults are diabetic. 2.6 million are prediabetic.
- In Michigan, diabetes costs \$9 billion annually.
- People with diabetes incur medical expenditures at a rate 2.3 times higher than those without diabetes.
- At 19.5%, Wayne County is the least food secure county in all of Michigan.

## APPROACH

### Intervention:

--28-week community-based intervention

--DPP core curriculum (sessions 1-16)

--Share Our Strength: Cooking Matters curriculum (sessions 17-22)

--DPP completes the intervention (sessions 23-28)

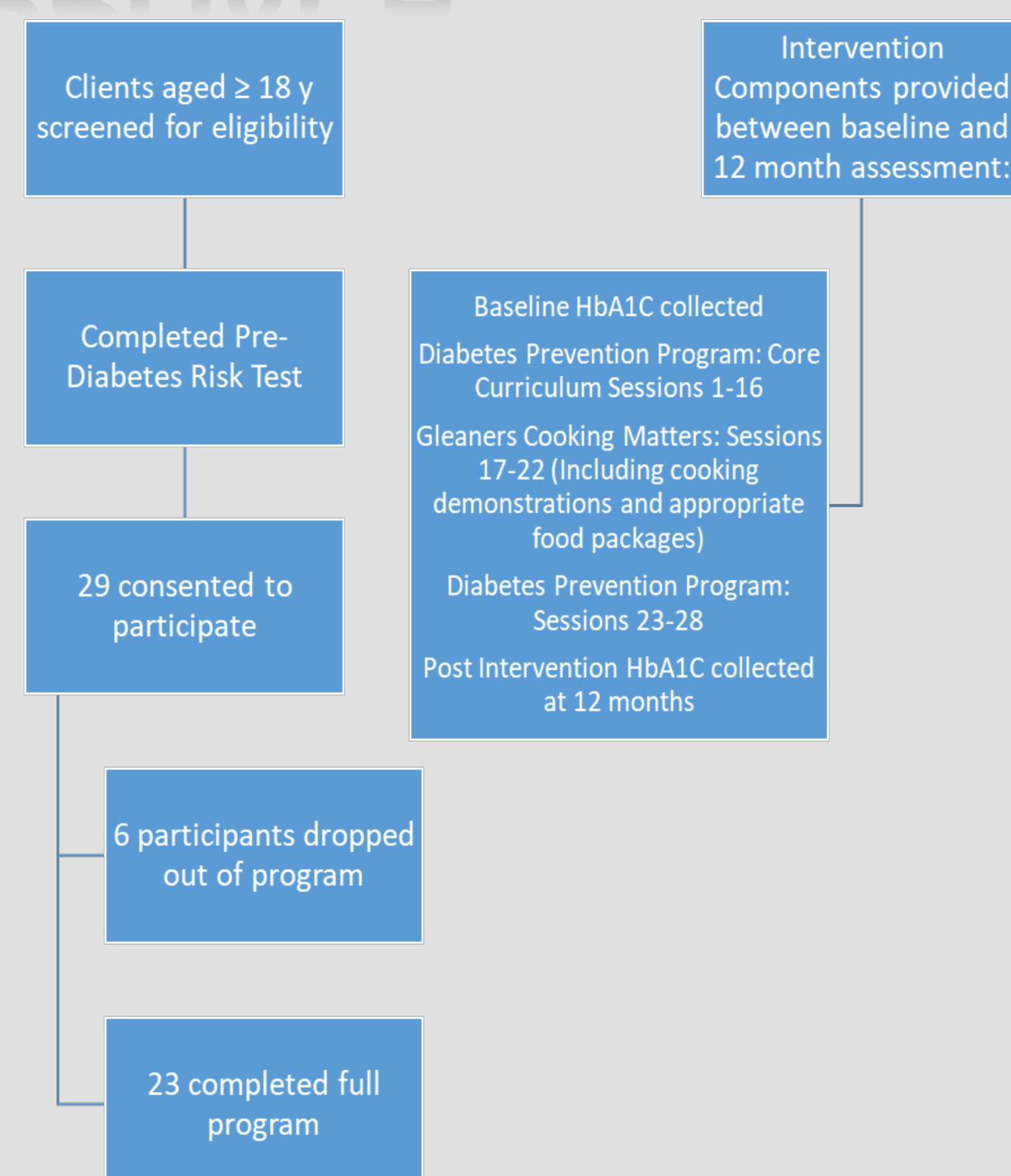
### Endpoints:

HbA1C

BMI

Physical Activity

Behavior assessment



## OBJECTIVES

Promote diabetes prevention in low-income communities by offering Cooking Matters™ (CM) in coordination with the Diabetes Prevention Program with the following outcome goals:

- Reduce outcome disparities
- 30% of participants will lose  $\geq 5\%$  of their body weight.
- 50% of participants will report  $\geq 150$  minutes of physical activity per week.
- 75% of participants will have HemoglobinA1C  $\leq 5.7$ .
- All participants will have improved access to healthful food.

## METHODS

### Completion Rate determination:

DPP methodology traditionally calculates completion rate as a combined function of the number of sessions attended in the first half of the program and the number attended in the second half of the program (Khan, 2017). The inclusion of additional sessions in this program prevents using this DPP method. Instead, we present a simple percentage: (participants completing/participants enrolled)x100 to assess completion rate.

### Biometric Data

A1C: Collected by a licensed phlebotomist, using A1CNow. The following A1C cutoff levels were used to assess participation and effectiveness:

- Normal: below 5.7
- Prediabetes: 5.7-6.4
- Diabetes: 6.5 or higher

Weight: Participant weight was measured each week through the duration of the program.

### Behavior assessment:

Physical Activity and Food Intake: Self-reported participant food consumption and physical activity

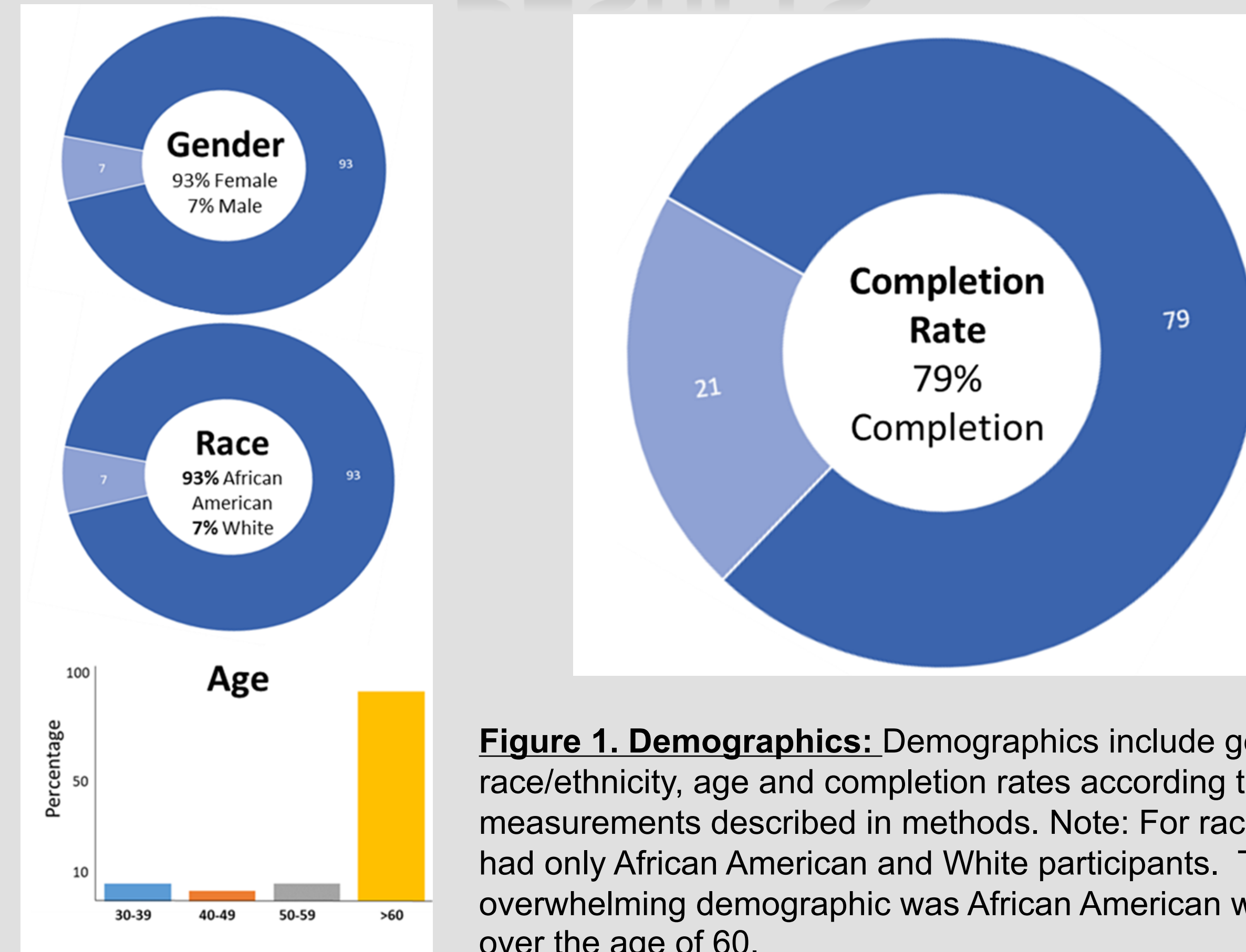
DPP Baseline Survey: A 5-item measure on confidence in making lifestyle changes.

DPP Midpoint Survey: A 12- item (9 Likert type questions & 3 open ended questions) measure on confidence in making lifestyle changes. This survey was completed at the midpoint of the program (At session 16)

DPP 1 Year Survey: A 9-item measure (7 Likert type questions & 2 open ended questions) on confidence in making lifestyle changes. This survey was completed at the end of the program  
DPP Patient Activation Measure (PAM): A standardized, 10-item that measures self-efficacy and engagement in healthcare decisions and behavior. This survey was completed at baseline and at midpoint of the study.

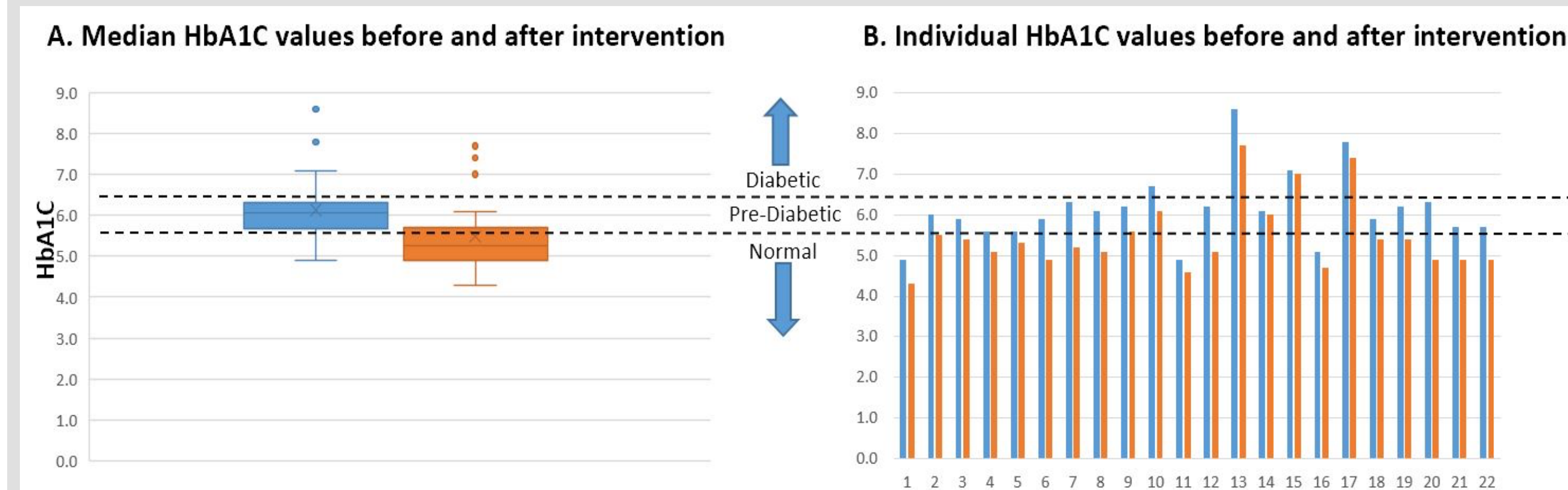
Cooking Matters Survey: A 36-item measure that assesses food and drink consumption, cooking preferences, budgeting and shopping. This measure was administered at the beginning of the study and after completion of the Cooking Matters portion of the program.

## RESULTS



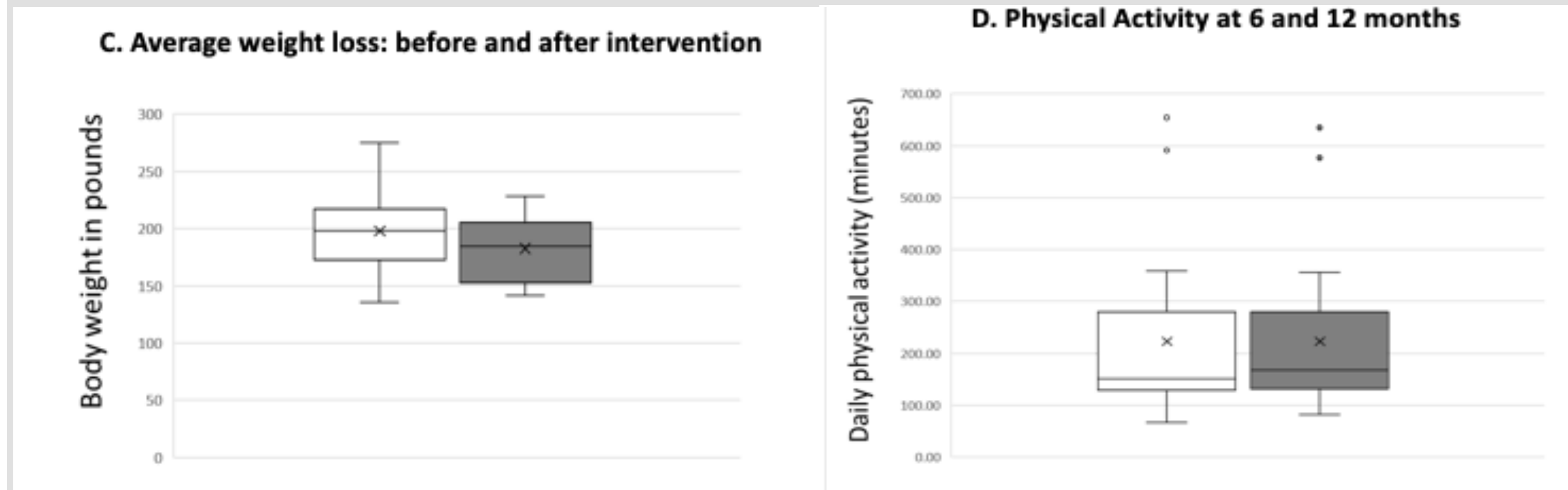
**Figure 1. Demographics:** Demographics include gender, race/ethnicity, age and completion rates according to measurements described in methods. Note: For race, we had only African American and White participants. The overwhelming demographic was African American women over the age of 60.

## RESULTS



**Figure 2. Hemoglobin A1C reduction: An effective intervention for reducing diabetes risk. A pilot study. A. Median Values.** Hemoglobin A1C values were measured for all study participants at the start and completion of the study. Median values were calculated. The average change in value was a 10.6% decline,  $p < 0.001$ . The median value is almost entirely below the pre-diabetic level.

**B. Individual Values.** Values for each individual are presented. The value at the start of the study is indicated by a blue bar. The value at the completion of the study is indicated by a red bar. Of the 22 individuals who completed the study, all 22 had lower HbA1C values, and 77% of participants reduced their values to the normal level. The dashed line represents the CDC-established values for diabetic, pre-diabetic, and normal HbA1C values.



**Figure 3. Weight Loss and Physical Activity. C. Average weight loss.** Participant's weight was taken at each session by DPP lifestyle coach. Average weight loss was calculated. The average weight loss was 7.6%, Paired t-test,  $p < 3.4E-06$

**D. Physical Activity.** Participant's reported average minutes of physical activity weekly to DPP lifestyle coach. Average physical activity was measured at 6 and 12 months. No p-value for physical activity because no significant difference was found.

## CONCLUSIONS/FUTURE

- Combining DPP and CM resulted in a 79% program completion rate. Mean HbA1C dropped 10.6% (paired t-test,  $p < 0.01$ ), and each participant demonstrated lower post-test HbA1C values.
- Participants experienced a mean weight loss of 7.6% (paired t-test,  $p < 0.01$ ), and >75% of participants exceeded the 5% DPP weight loss outcome objective at 12 months.
- Cooking Matters™ coupled with the Diabetes Prevention Program is an effective strategy to improve outcomes and reduce diabetes in low-income communities
- Food bank resources can be coupled with existing chronic illness prevention programs to improve both disease risk and food security.

## ACKNOWLEDGMENTS

- Gleaners Community Food Bank
- National Kidney Foundation of Michigan

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