

The Impact of a Diabetes Mellitus Education Intervention at an Outreach Program

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Introduction

- ▶ Homelessness: a global pandemic
 - United States: > 550,000 people (National Alliance to End Homelessness, 2020)
 - Male
 - Minority backgrounds
 - Philadelphia, PA: an estimated 5,700 individuals (Office of Homeless Services City of Philadelphia, 2020)

Introduction

- ▶ 8% prevalence of diabetes mellitus (DM) among homeless individuals (Bernstein, Meurer, Plumb, & Jackson, 2015)
 - Greater risk for adverse health events related to DM
 - Attributed to lifestyle realities
 - Poor or inconsistent access to food and/or medications
 - Lack of social resources
- ▶ Accessible food banks, pantries, and soup kitchens
 - Ideal sites to engage homeless individuals with DM (Seligman et al., 2015)

Problem Statement

- ▶ Problem: low knowledge level associated with self-care related to DM
 - An outreach program with an accompanying soup kitchen in Philadelphia, PA
 - Proportionally high level of attendees with DM
 - No current interventions for DM
 - Opportunity to conduct an educational intervention to improve DM knowledge for attendees

Purpose and Aim

- ▶ To determine if a DM focused educational program impacted the knowledge and health literacy of DM among the homeless population who attends an outreach program with a soup kitchen in Philadelphia, PA
- ▶ To determine if education based in a community setting such as a soup kitchen positively impacted the understanding of a DM diagnosis

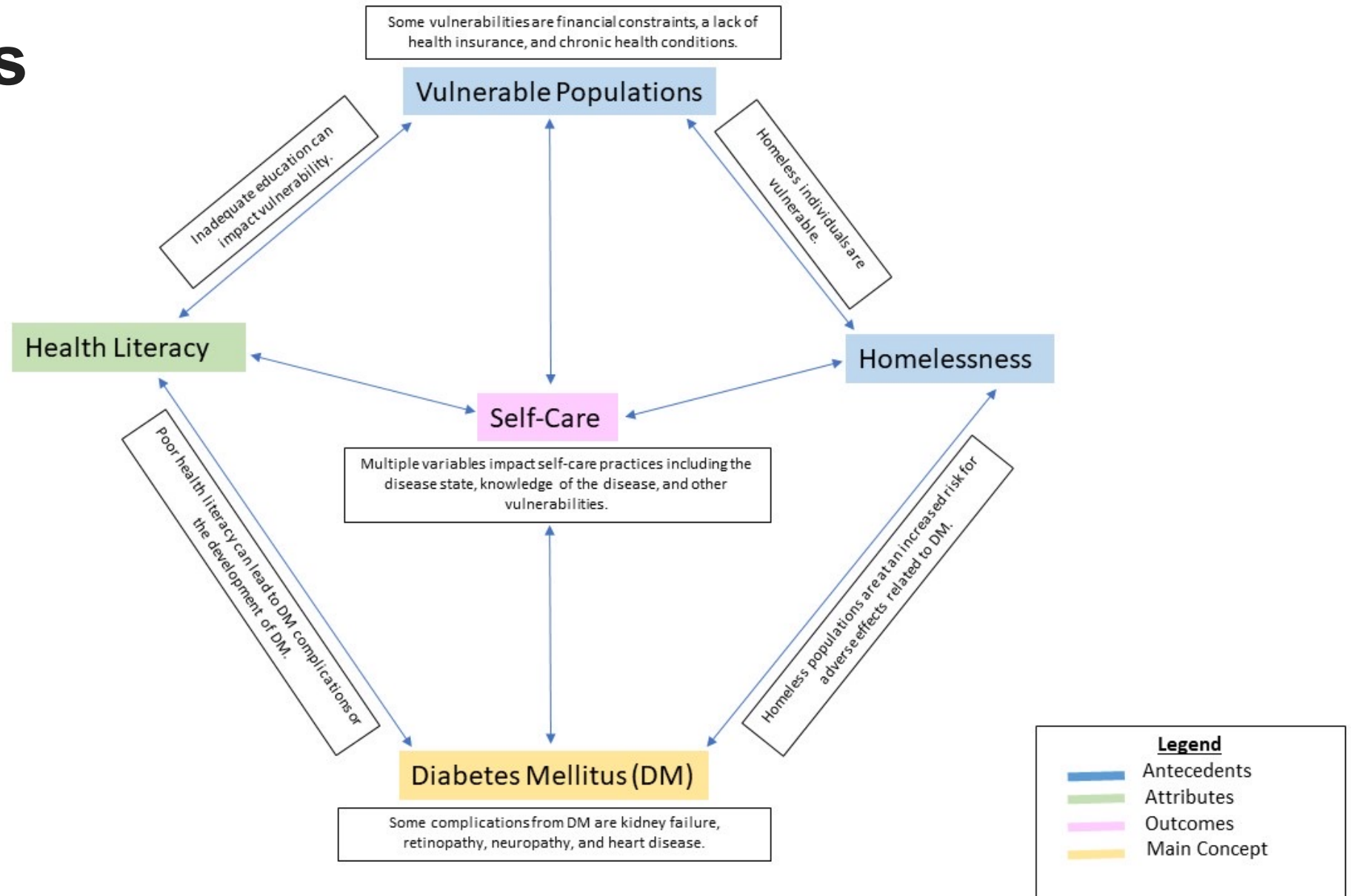
Objectives

- ▶ To identify current knowledge of DM and knowledge gaps among this population using the Revised Brief Diabetes Knowledge Test (DKT2) prior to the intervention on the first day of implementation on 3/20/21
- ▶ To develop an effective educational strategy to deliver content over a four-week period on Saturdays beginning on 3/20/21 and ending on 4/10/21
- ▶ To assess knowledge post-intervention to determine the effectiveness of education and knowledge attainment from baseline utilizing the DKT2 immediately post-intervention on 4/10/21

Background

- ▶ The Faith, Food, and Friends (FF&F) Program at Old St. Joseph's Church in Philadelphia, PA
 - Underserved, vulnerable adult male attendees
 - Approximately 6,474 meals served in FY 2018 (Old St. Joseph's Church, 2018)
 - Intake forms for attendees
 - 149 files reviewed
 - 46 files with medical information listed

Concepts



Framework

▶ Health Belief Model (HBM)

- Attempts to predict health-related behavior (Hochbaum, Rosenstock, & Kegels, 1952)
- Based on 4 original constructs (Hochbaum et al., 1952)
 - Perceived: susceptibility, severity/seriousness, benefits, and barriers
- 2 additional constructs added (Champion & Skinner, 2008)
 - Cues to action and self-efficacy
- Positive outcomes when designing health promotion activities (Simpson, 2015)

▶ Diabetes Health Belief Scale (DHBS)

- Measures attitudes about DM care (Harris, Linn, Skyler, & Sandifer, 1987)

Synthesis of the Evidence: Evidence Search

- ▶ **PICOT** question: “In vulnerable, underserved men who attend an urban food shelter (**P**), does completing a formalized program on DM (**I**) as compared to the beginning of the program (**C**) impact health literacy as evidenced by pre- and post-assessment using the Revised Brief Diabetes Knowledge Test (**O**) over a four-week period (**T**)?”

Synthesis of the Evidence: Evidence Search

- ▶ Levels (The John's Hopkins Hospital/Johns Hopkins University, n.d.)
 - RCTs (level II): Merakou, Knithaki, Karageorgos, Theodoridis, & Barbouni (2015); Seligman, Smith, Rosenmoss, Marshall, & Waxman (2018)
 - Case-controlled cohort studies (level IV): Anderson, Christison-Lagay, & Procter-Gary (2010); Blixen et al. (2018); Cheyne et al. (2020); Seligman et al. (2015); Woolley et al. (2020)
 - Quality improvement projects (level V): Beggs & Karst (2016); Davis, Keep, Edie, Couzens, & Pereir (2016)

Synthesis of the Evidence: Evidence Search

► Themes

- Interventions in food banks or pantries for vulnerable populations with DM
- Education strategies to best improve knowledge and confidence related to DM

► Variation: purposes, methods, results, and conclusions

► DM

- National Standards for Diabetes Self-Management and Support (DSMES)
 - American Diabetes Association (ADA) endorsement (ADA, n.d.)
 - 10 standards (Beck et al., 2019)

Synthesis of the Evidence

- ▶ Current summary
 - Support of educational interventions at food banks or pantries
 - Best practices for delivering education to vulnerable populations
 - Guidelines for developing DM education
- ▶ Gaps
 - Skewed results due to sample sizes (Blixen et al., 2018; Davis et al., 2016)
 - Lack of RCTs
- ▶ Future research
 - Continued evaluation beyond immediate post-intervention
 - Qualitative data

Synthesis of the Evidence

► Strengths

- Positive impact of DM interventions with vulnerable/homeless populations
- Willing participants
- Various educational programs increase DM knowledge and confidence

► Weaknesses

- Lack of longitudinal studies
- Small sample sizes

Methods

▶ **Project Design**

- Quality Improvement

▶ **Setting**

- Old St. Joseph's Church's (Philadelphia, PA) FF&F Program
 - Permission granted
 - Multiple services available
 - Intervention occurred prior to meal service

Methods

► Participants

- Inclusion criteria
 - Adult men > age 17 attending FF&F
 - English speaking
 - Ability to fill out paperwork
- Exclusion criteria
 - Failure to comply or inability to complete project requirements
 - Volunteers
 - Women and children
- Selection
 - Announcements
 - Flyers

Methods

► Intervention

- 4 sessions on consecutive Saturdays
- Led by project leader
- Start time: 10 a.m.
- Duration: 45 minutes
- Topics
 1. Overview of DM
 2. Diet related to DM
 3. Foot care related to DM
 4. Physical activity related to DM

Methods

► Intervention

— Day 1

- 10:00-10:15: Completed the pre-assessment packets.
- 10:15-10:40: Discussed what DM is, a normal blood sugar range, how to test blood sugar, what a HbA1C level is, signs/symptoms of DM and hyper/hypoglycemia, and how to treat hyper/hypoglycemia.
- 10:40-10:45: Played online DM Jeopardy on laptop.
- 10:45: Addressed any additional questions. Distributed handouts on checking blood sugar, hypoglycemia, and type 2 DM.

Methods

► Intervention

— Day 2

- 10:00-10:05: Asked what was remembered from last week. Discussed anything that came up related to DM over the past week.
- 10:05-10:20: Discussed the diabetic diet, how carbohydrates relate to DM, and high sugar foods and alternatives.
- 10:20-10:45: Had each participant “create a plate” of diabetic friendly foods with fake, plastic food, emphasizing vegetables and protein. Ran this activity 3 times for breakfast, lunch, and dinner, putting aside each piece of fake food for sanitization after touching.
- 10:45: Addressed any additional questions. Distributed handouts on nutrition regarding plate portions.

Methods

► Intervention

— Day 3

- 10:00-10:05: Asked what was remembered from last week. Discussed anything that came up related to DM over the past week.
- 10:05-10:30: Discussed foot care, proper foot care maintenance, importance of good shoes for diabetics, and resources on where to get shoes in Philadelphia.
- 10:30-10:45: Presented slide show on foot wounds while highlighting initial indications that a sore is forming.
- 10:45: Addressed any additional questions. Distributed handouts on foot care.

Methods

► Intervention

— Day 4

- 10:00-10:05: Asked what was remembered from last week. Discussed anything that came up related to DM over the past week.
- 10:05-10:20: Discussed importance of exercise, what counts as physical activity, and how much activity a person should get per day/week.
- 10:20-10:35: Played online “diabingo” game on laptop.
- 10:35-10:45: Addressed any additional questions. Distributed handouts on physical activity.
- 10:45: Completed the post-assessment packets.

Methods

► Data Collection

- Concepts measured: health literacy, DM, and self-care
- Pre-assessment packet
 - Demographics: age, race, ethnicity, and pre-diabetes and DM history
 - Reliable/valid surveys to evaluate knowledge and health beliefs of DM
 - Part 1: DKT2 items (Fitzgerald et al., 2016)
 - Part 2: DHBS items (Harris et al., 1987)
- Post-assessment packet
 - Same surveys as the pre-assessment
- Participant attendance
- Project leader led (via papers), organized in a spreadsheet, and securely stored

Analysis

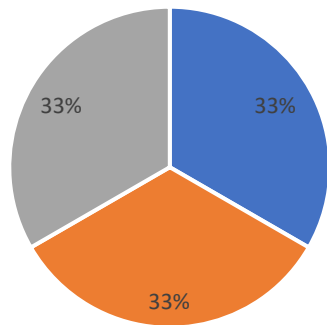
- ▶ Descriptive statistics
 - Excel
 - Demographics: frequency
 - DKT2: frequency and means; pre-post comparison
 - DHBS: frequency; pre-post comparison
 - Attendance: frequency

Results

► Demographics

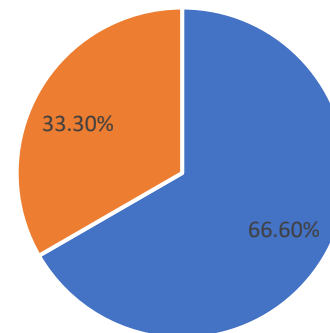
- Ethnicity: 100% Non-Hispanic or Latinx
- Pre-diabetes diagnosis: 100% without
- Diabetes diagnosis: 100% without

Age



■ 30-39 (n=1) ■ 40-49 (n=1) ■ 50-59 (n=1)

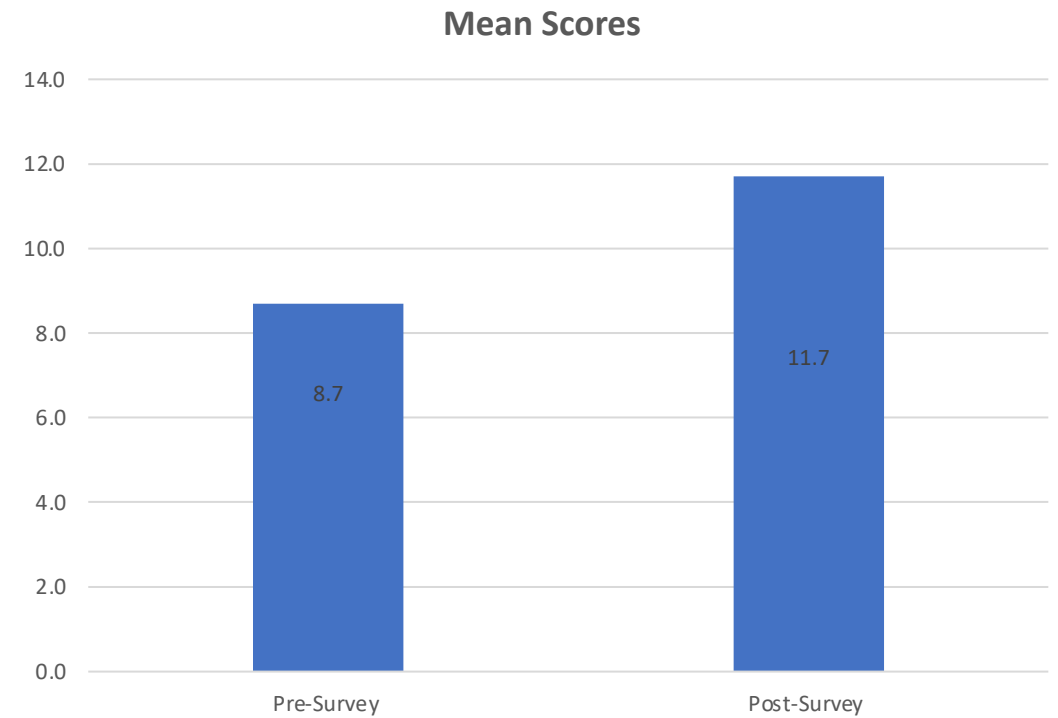
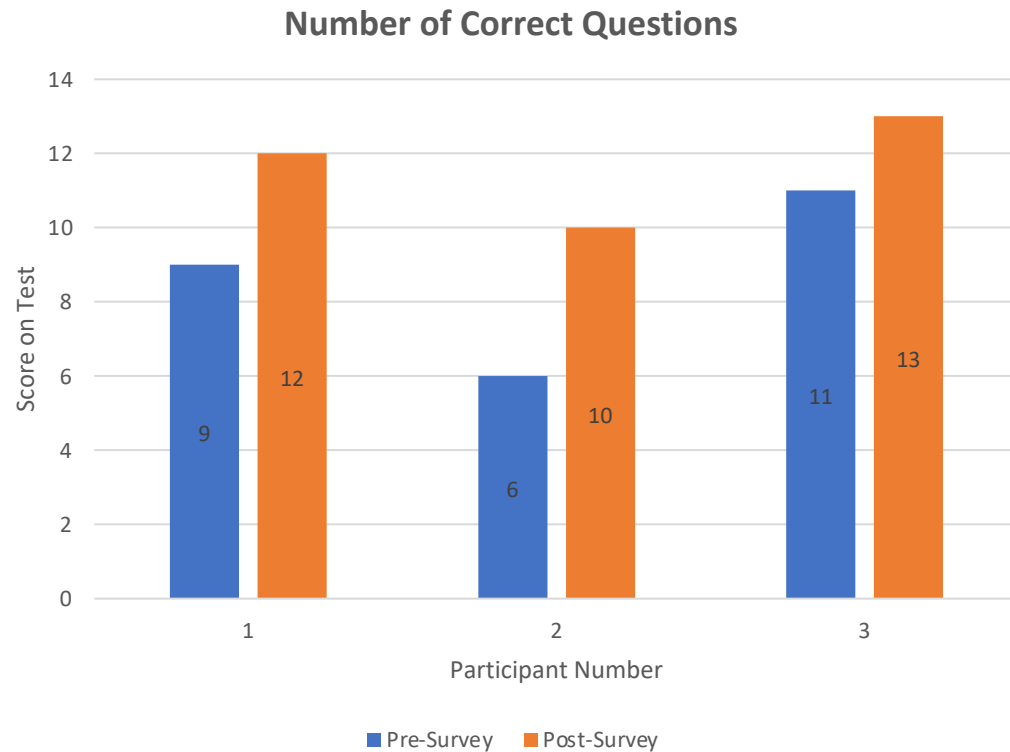
Race



■ White (n=2) ■ Black or African American (n=1)

Results

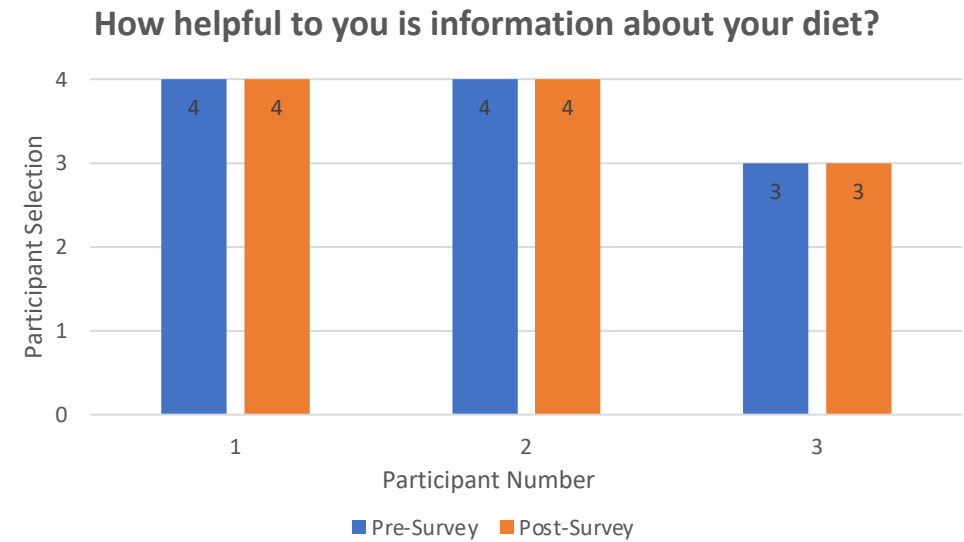
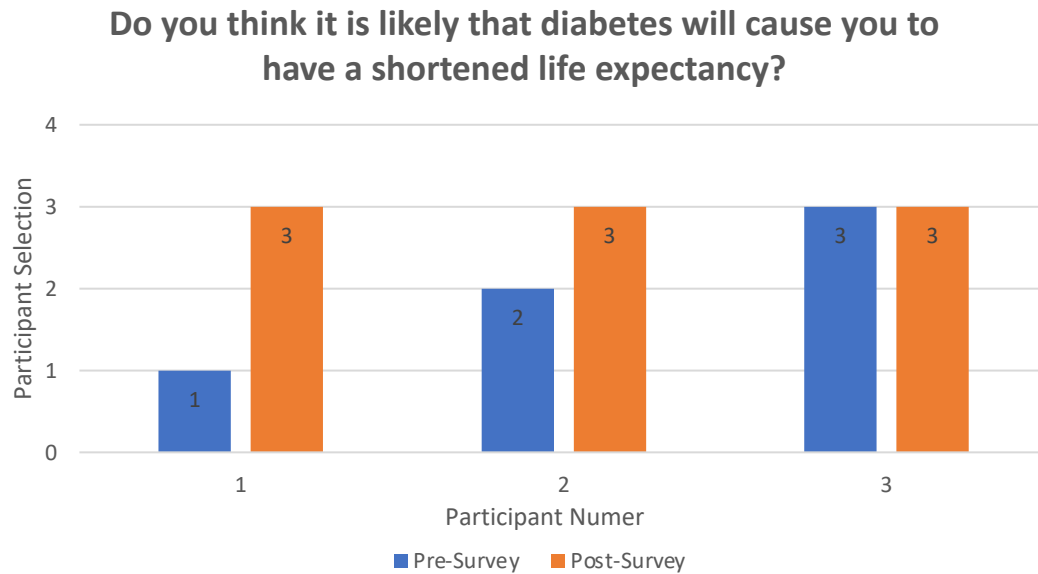
▶ DKT2



Results

▶ DHBS

– Questions 1 (susceptibility) – 2 (treatment benefits)

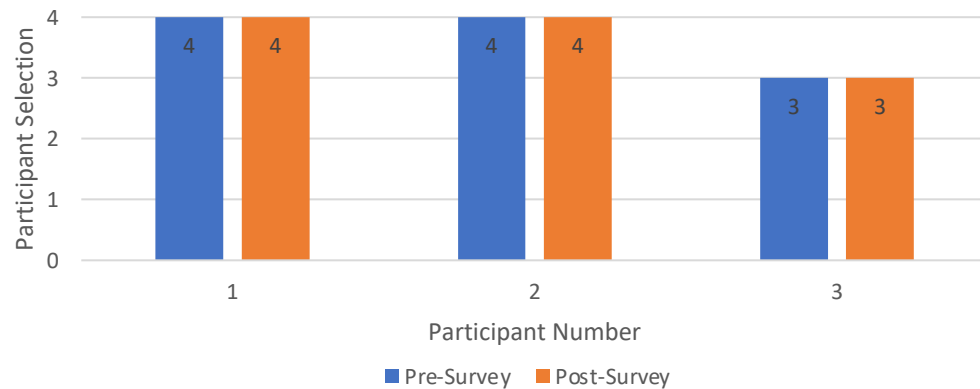


Results

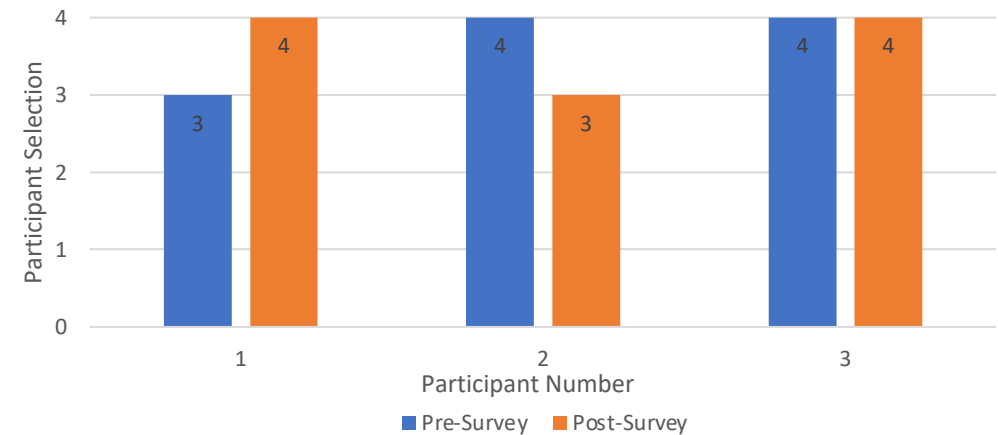
► DHBS

– Questions 3 (treatment benefits) – 4 (severity)

How much do you think your doctor can help you if you develop/have tingling and numbness in your arms and legs?



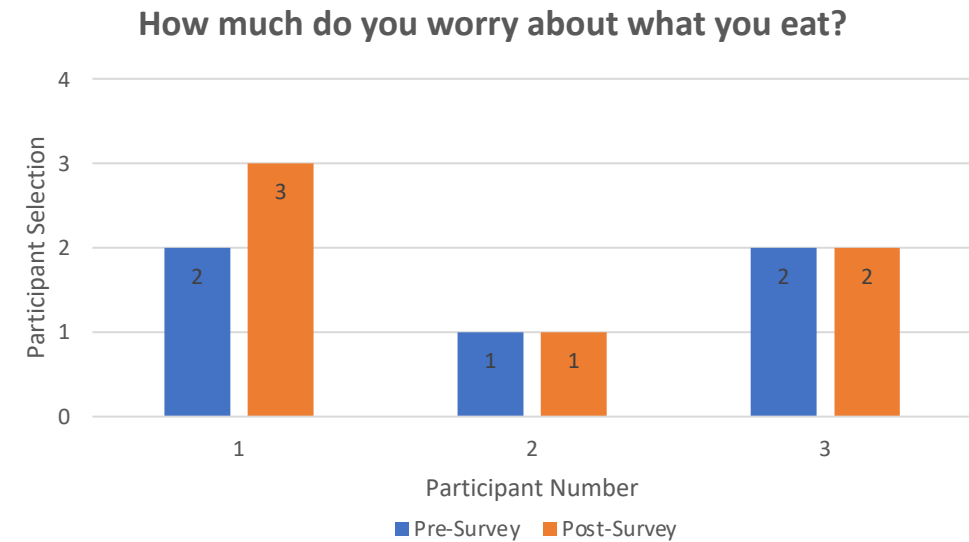
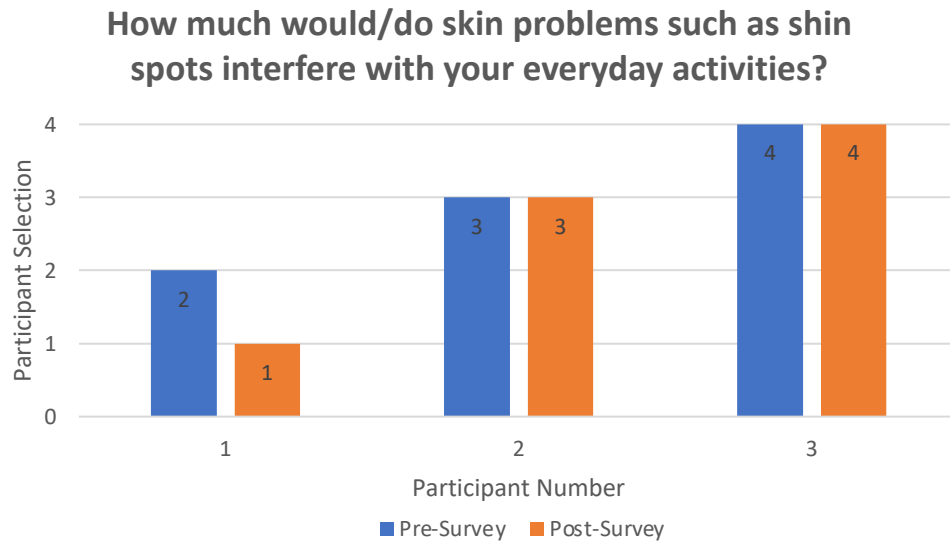
How much would/does kidney disease interfere with your normal everyday activities?



Results

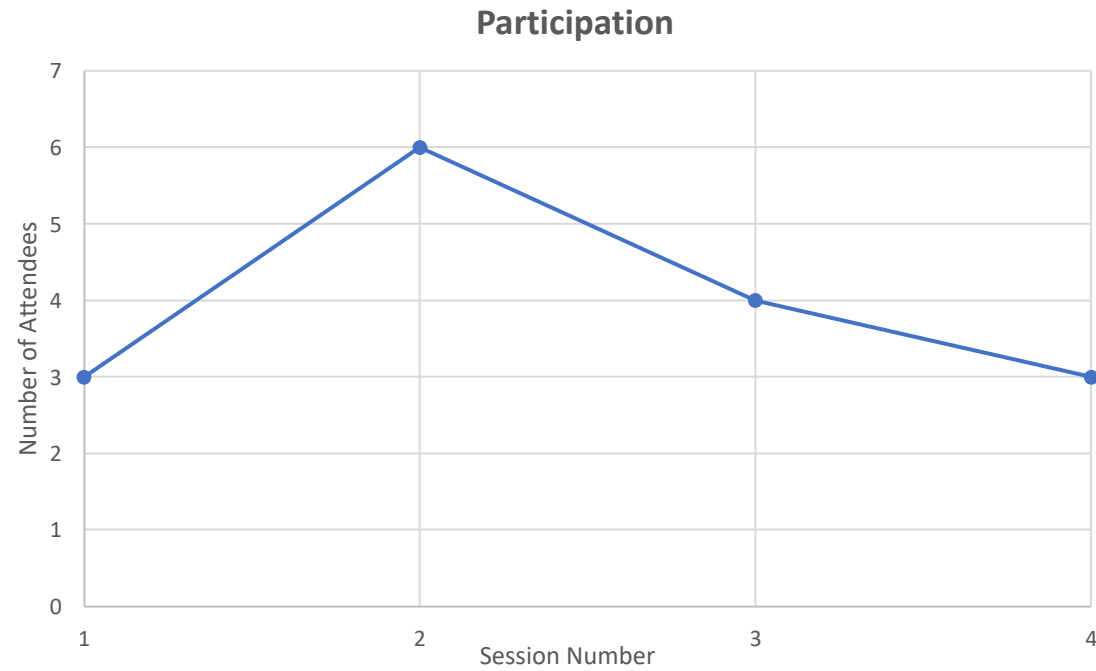
► DHBS

— Questions 5 (severity) – 6 (psychological barriers)



Results

► Participant attendance



Results

- ▶ Link to purpose
 - DKT2: 3-point post-intervention mean score increase
- ▶ Link to aim
 - DHBS: 3-point susceptibility and 1-point psychological barriers post-intervention score increases
- ▶ Link to objectives
 - Assessed DM knowledge before and after 4 educational sessions

Discussion

- ▶ Relation to purpose
 - Improved DM knowledge and health literacy
- ▶ Relation to aim
 - Improved DM knowledge and self-care
 - Stronger beliefs that DM would cause a shortened life expectancy
 - An increased concern regarding diet

Discussion

► Literature review link

- Location

- Food for vulnerable populations (Cheyne et al., 2020; Seligman et al., 2015; Seligman et al., 2018)

- Educational strategies

- Group setting, several week duration, and written materials (Beggs & Karst, 2016; Blixen et al., 2018; Davis et al., 2016; Merakou et al., 2015; Woolley et al., 2020)

- Games (Beggs & Karst, 2016; Merakou et al., 2015)

- ADA's DSMES (Beck et al., 2019)

Discussion

- ▶ Literature review link
 - Outcomes
 - Knowledge acquired at similar food sites (Cheyne et al., 2020; Seligman et al., 2015; Seligman et al., 2018)
 - Improved DM knowledge in participants with and without DM using similar interventions (Beggs & Karst, 2016; Blixen et al., 2018; Cheyne et al., 2020; Davis et al., 2016; Merakou et al., 2015; Woolley et al., 2020)
 - Similar results with similar time frames (Davis et al., 2016; Merakou et al., 2015)

Discussion

- ▶ Strengths
 - Strong stakeholder buy-in
 - Multiple sessions over several weeks
 - Going to participants
 - Participant age variation
 - Minimal costs

Discussion

► Limitations

- Small sample size
- COVID-19 restrictions
- Distribution of checks
- Relatively homogenous sample
- No DM or pre-diabetes participant diagnoses
- Lack of control group and randomization
- Bias from known project leader

Discussion

- ▶ Findings' implications
 - Positive
- ▶ Next steps for future innovation
 - Longitudinal follow-up
 - Identified participation barriers
 - Large, heterogenous sample
 - Qualitative data
 - Tool for the beliefs of non-diabetic individuals
 - Enhanced comfort measures
 - Local resources for participants

Conclusion

- ▶ Feasible and impactful project
- ▶ Room for project/literature expansion
- ▶ Potential for improved DM care through resource investment for vulnerable populations

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