Effectiveness of a Diabetes Prevention Program in a Library Setting

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Introduction

- There is a growing prevalence of diabetes worldwide, from 4.7% in 1980 to 8.5% in 2014 with 90-95% of the diabetic patients having type 2 diabetes[1].

- The National Diabetes Prevention Program (DPP) is a CDC recognized year long program that aims at decreasing the risk of type 2 diabetes through prevention lifestyle changes.

- The CDC found that prediabetic participants who are enrolled in a prevention lifestyle change can cut their risk of developing type 2 diabetes by 58% and 71% for those over 60 years old[2].

- The program consists of a lifestyle coach who is trained to run the sessions, a CDC approved curriculum, and a support group of individuals[3].

- A HbA1c, or hemoglobin A1c, test is a blood test that measures the average blood sugar levels over the past 3 months and is expressed as a percentage. Knowing the percentage can tell an individual if they are within a normal, prediabetic, or diabetic range. Normal range is below 5.7%, prediabetic range is from 5.7-6.4%, and diabetic range is 6.5% and above[4].

Figure 1: HbA1c% ranges for normal (healthy), prediabetic, and diabetic[5].

- In this current study we hypothesized that participation in this program will reduce body weight, increase physical activity, and decrease HbA1c levels to less than 5.7%.

References

1. Henning R. J. (2018). Type-2 diabetes mellitus and cardiovascular disease. *Future cardiology*, 14(6), 491–509. https://doi.org/10.2217/fca-2018-0045
2. About the National DPP. *Centers for Disease Control and Prevention*. Retrieved February 3, 2023, from https://www.cdc.gov/diabetes/prevention/about.htm
3. Lifestyle Change Program Details. *Centers for Disease Control and Prevention*. Retrieved February 3, 2023, from https://www.cdc.gov/diabetes/prevention/lcp-details.html
4. All About Your A1c. *Centers for Disease Control and Prevention*. Retrieved February 3, 2023, from https://www.cdc.gov/diabetes/managing/managing-blood-sugar/a1c.html
5. Understanding A1c. *American Diabetes Association*. Retrieved February 3, 2023, from https://diabetes.org/diabetes/a1c

Results

- There was no significant difference in HbA1c percent levels over the 12-month period (Figure 3A, $p = 0.057$).

- HbA1c was 5.9±0.1% at 0 months (prediabetic), 5.7±0.2% at 6 months (prediabetic), and 5.4±0.4% at 12 months (healthy; Figures 1 and 3A).

- Activity minutes, body weight, and hip and waist circumference did not change when comparing months 0 and 12 (Figure 3B-E, $p>0.05$).
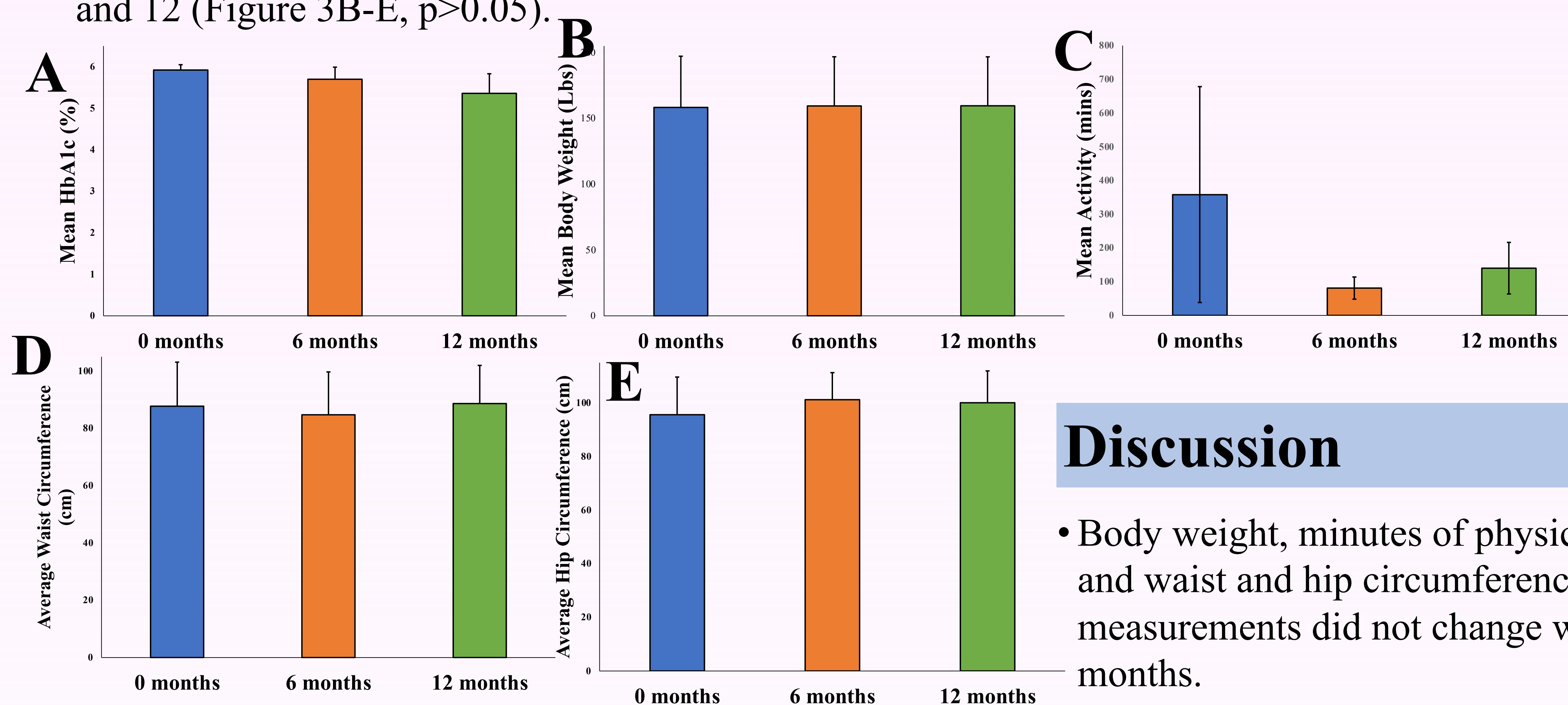

Figure 3: Data are mean ± standard error of the mean for measurements of (A) HbA1c%, (B) body weight, (C) activity minutes, (D) waist circumference, and (E) hip circumference at 0, 6, and 12 months (n= 5). *$P<0.05$ One Way ANOVA.

Methods

- Sessions took place in a library setting in Altadena, California.

- Biometrics, including HbA1c and waist and hip circumference, was measured at 0, 6, and 12 months. Weight and activity minutes were recorded at each session.

- 5 prediabetic participants were included in the study.

- The year-long program consisted of 22 sessions, each session discussing different topics relating to lifestyle changes. Some examples including ways of increasing physical activity and increased awareness of eating healthier ingredients.

Figure 2: From left to right, example of digital scale, HbA1c test kit used, and measuring tape used for hip and waist circumference measurements.

Discussion

- Body weight, minutes of physical activity, and waist and hip circumference measurements did not change within the 12 months.

- Although the decrease of HbA1c percent was not statistically significant, the average HbA1c percentages decreased to a healthy range by the end of the 12 months of the program.

- These findings indicate that a diabetes prevention program in a library setting did decrease the risk of developing type 2 diabetes in prediabetic patients, as evidenced by the decrease of average HbA1c percentages to a healthy range.

- Our study included a small group of prediabetic patients. For future studies, enrolling more participants in the diabetes prevention program in a library setting could precisely describe the effectiveness of such a program.

Acknowledgments