The Effect of a Digital Therapeutic Platform on Glycemic Control in Adults above Age 65 with Type 2 Diabetes

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Introduction

Approximately one-quarter of people over the age of 65 years have diabetes and one-half of older adults have prediabetes[1]. A commonly held belief is that older adults may not be technically savvy enough to benefit from digital therapeutics. The Dario digital therapeutic solution consists of a mobile application, coaching, and glucometer integration allowing the user to log meals, carbs consumption, insulin intake, physical activity and other parameters into a designated App. The system allows adults with diabetes to observe the relationship between their behaviors and glucose measurements and supports them in changing behaviors tied to improved clinical outcomes. All the data collected on the Dario App is stored in the "cloud" and is synchronized with the Dario Engage™ platform for healthcare team members.

Objective

The present study examines whether the Dario digital therapeutic can contribute to better diabetes management in adults above age 65.

Method

A population of 12-month Dario active users with type 2 diabetes, non-insulin treated whose first-month blood glucose average was greater than 180 mg/dl (number of measurements >5) was retrospectively evaluated. Users were recording at least 5 blood glucose measurements in the first month. Clinical outcomes included average blood glucose, ratio of very high readings (>250 mg/dL) per total measurements and the percentage of the population that reduced their average blood glucose below 169 mg/dL (equivalent to A1c 7.5%). Users were stratified into two groups, one age group ≥65 and second age group <65.

Results

- Users in age group ≥65 (N=298) improved their average blood glucose at six months by 13% (187±38 vs. 214±50mg/dL) and sustained outcomes for 12 months (184±37mg/dL). This observation was comparable to the outcome in the <65 age group at 12 months (N=642) (195±36 vs. 221±52mg/dL) (figure 1).
- The high readings ratio (>250 mg/dL) was reduced in the ≥65 age group by 38.1% at six months and by 41.5% at 12 months. The ratio of high readings in the ≥65 age group was significantly lower than in the <65 age group at 12 months (13.7% vs. 20.6%) (t(728)=3.61, p<0.001) (figure 2).
- 47% of users in the ≥65 age group (140 out of 298) reduced their average blood glucose below 169 mg/dL at 12 months.

Average Blood Glucose

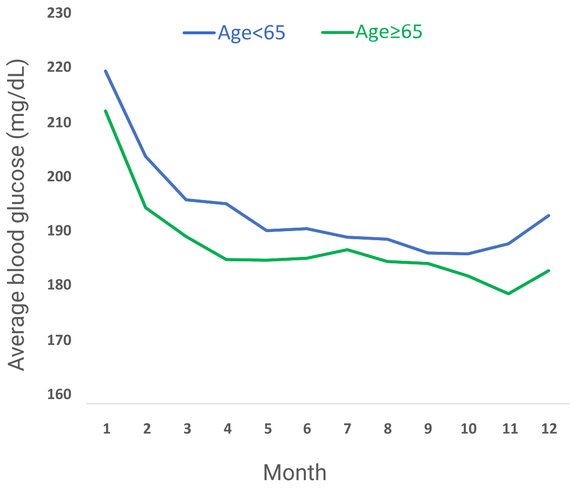

Figure 1: Average blood glucose within 12 months

High readings ratio

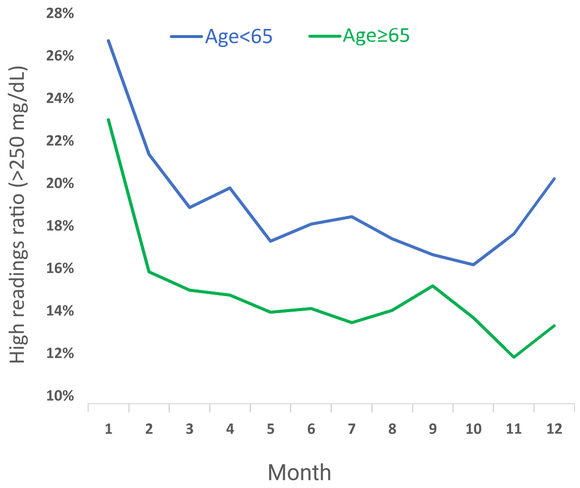

Figure 2: High readings ratio (The percent of measurements that were >250 mg/dL) within 12 months

Discussion

- Diabetes is an important health condition especially for aging populations. Older adults with diabetes have higher rates of premature death, functional disability, accelerated muscle loss, and coexisting illnesses, such as hypertension, coronary heart disease, and stroke. Poor glycemic control is also associated with a decline in cognitive function[2,3].
- Hyperglycemia leading to symptoms or risk of acute hyperglycemia complications should be avoided in all adult patients[2]. The present study outcomes indicate that the ratio of high readings above 250 mg/dL in the ≥65 age group was significantly lower than in the <65 age group—a reduction from 23.4% to 13.7% over 12 months.
- According to the American Diabetes Association, older adults who are otherwise healthy with few coexisting chronic illnesses and intact cognitive function and functional status should have a target A1c 7.5% (equivalent to average blood glucose 169 mg/dL)[2]. A high percentage (47%) of users in age group ≥ 65 in this study reduced their average blood glucose below 169mg/dL at 12 months.
- The findings suggest that older adults can also benefit from digital therapeutic interventions.

Conclusion

Older adults using a digital therapeutic platform have the potential to promote behavioral modification and enhance adherence to diabetes management, demonstrating better glycemic control.

References

1. National Institute of Diabetes and Digestive and Kidney Diseases. Diabetes in America, 3rd edition, 2018. Accessed 27 August 2019.

2. American Diabetes Association, Diabetes Care 2020.

3. Norris SL, Lau J, Smith SJ, Schmid CH, Engelgau MM. Self-management education for adults with type 2 diabetes: a meta-analysis of the effect on glycemic control. Diabetes Care 2002; 25:1159–1171