Self-Care Tracking and Blood Glucose Stability Among One Drop Mobile App Users

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Background and Introduction

- Mobile application (app)-based self-tracking of weight, diet, and exercise is growing in popularity.
- Both type 1 (T1D) and type 2 (T2D) diabetes require self-management of these areas, so there is potential for app-based tracking to improve diabetes control.1
- Many studies have reviewed mobile apps for diabetes,2 but the purported health benefits of tracking behavior using apps have been hard to quantify.1
- We investigated the relationship between wellness tracking and self-reported blood glucose (BG) levels in individuals with T1D and T2D using the One Drop app.

The One Drop mobile application

- One Drop is a mobile app for T1D, T2D, LADA, pre-diabetes, and gestational diabetes.
- One Drop’s features include:
  - Blood glucose, insulin/medication, food and exercise tracking;
  - Wireless syncing with Bluetooth connected meters, insulin pumps, and continuous glucose monitors (CGMs);3
  - Diabetes-centered news and a community support.3

Methods

- Inclusion criteria: at least 20 BG readings between Jan. 2015 and Jan. 2016, with at least 90 days between the first and the last reading.
- Data included self-reported carbohydrate (carbs) intake, insulin doses, and physical activity reported through the One Drop app.
- Outcome of interest: Effective BG control, approximated by %OOR (percentage of Out-Of-Range BG readings, below 70 or above 180 mg/dL).
- Explanatory variables: Logarithm of the counts (log-count) of each kind of self-report.
- We created a panel dataset consisting of the %OOR and the recording log-counts measured each month for each user.
- We used fixed-effects panel regression to model the association between effective BG control and the amount of wellness tracking while controlling for heterogeneity between users. This controls for unobserved confounders such as socioeconomic status.

Results: Wellness tracking and %OOR

- There were no significant changes in %OOR associated with increased activity tracking.
- There were significant and near-significant increases in %OOR in T2D and T1D respectively associated with increased tracking of insulin injections, suggesting OOR BG readings encourage users to inject insulin more frequently.

Conclusions and Further Research

- Increased BG logging with the One Drop app was associated with fewer BG readings outside the ideal 70-180 mg/dL range, after controlling for heterogeneity between users.
- Future analyses will examine any relationships by user age, insulin status, and duration of diabetes.
- This study is relatively low power. Larger studies are needed, particularly on the association between BG control and activity tracking and on the smaller T1D population.
- Further research should assess whether the increased stability in observed BG measurements reflects improved glucose control among One Drop users.

References