Mobile-enabled Food Logging Is Associated With Improved Glycemic Management In the Real-world

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OBJECTIVES

Understanding the relationship between food intake and glycemia is an important part of diabetes self-management. In the current study, we assess whether the use of an in-app food logging feature corresponded with improved glycemic outcomes.

METHODS

We randomly sampled 1000 adult users of a diabetes management mobile app and investigated whether in-app food logging was correlated with self-monitoring of blood glucose (SMBG) behavior and glycemic outcomes (i.e., mean blood glucose, the proportion of hypoglycemic (<70 mg/dL), in-range (between 70-180 mg/dL), and hyperglycemic (>250 mg/dL) SMBG readings) during the first 90 days of mobile app use. To gain a better understanding of the relationship between in-app food logging and SMBG-based outcomes, we also analyzed the data using a quartile split in which the first and fourth quartiles, based on food logging frequency, were compared.

RESULTS

Among those with demographic information (Table 1), 45.2% were female, median age was 47 years (IQR: 35-57 years), and 56.4% self-reported to have type 2 diabetes (27.1% with type 1 diabetes, 16.5% with other diabetes). Food logging was correlated with SMBG check frequency (Spearman's ρ = .16), the proportion of in-range SMBG readings (ρ = .11), mean blood glucose (ρ= -.13), and the proportion of hyperglycemic readings (ρ = -.11; all Ps <.001). Accounting for SMBG check frequency, food logging was still associated with in-range readings (T = 3.48), mean blood glucose (T = -3.46), and hyperglycemic readings (T = -3.38; all P s<.001). Quartile comparisons between frequent and infrequent food loggers showed that frequent loggers performed SMBG checks more often (median 3.0 vs. 2.0 checks/day, P<.001) and had lower mean blood glucose (median 143.2 vs. 137.2 mg/dL, P = .047). Empirical cumulative distribution functions (ECDFs) for each of these outcomes comparing frequent vs. infrequent food loggers are shown in Figures 1-4.

Table 1: Number of individuals by age (CGM and non-CGM users) included in the present analyses. Blood glucose data from non-CGM users are derived from glucometer or insulin pump uploads to Glooko.

Age	Median:	47 years
	IQR:	35-57 years
Gender	Female:	45.2%
	Male:	54.8%
Diabetes Type	Type1:	27.1%
	Type2:	56.4%
	Other:	16.5%

Figure 1: SMBG check rate for frequent and infrequent food loggers. The ECDF for frequent loggers is shifted right (i.e., more checks/day) relative to the ECDF for infrequent loggers.

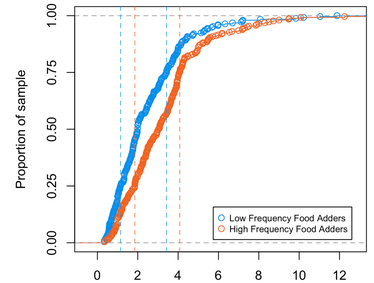


Figure 2: Average blood glucose for frequent and infrequent food loggers. The ECDF for frequent loggers is shifted left (i.e., lower average BG) relative to the ECDF for infrequent loggers.

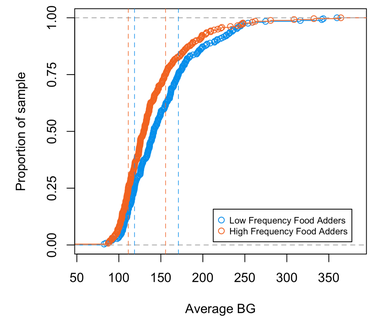


Figure 3: Proportion of in-range BG readings for frequent and infrequent food loggers. The ECDF for frequent loggers is shifted right (i.e., higher proportion of in-range readings) relative to the ECDF for infrequent loggers.

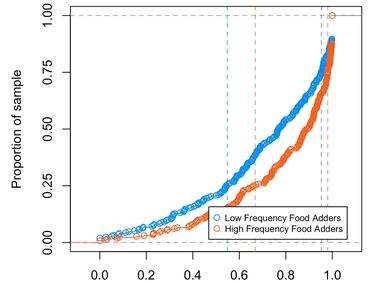
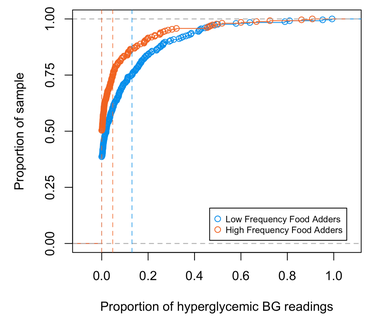


Figure 4: Proportion of hyperglycemic readings for frequent and infrequent food loggers. The ECDF for frequent loggers is shifted left (i.e., lower proportion of hyperglycemic readings) relative to the ECDF for infrequent loggers.



CONCLUSIONS

Our results suggest that mobile-enabled food logging can be a valuable part of glycemic management support in the real world. As mobile health app features and capabilities continue to evolve, they have the potential to encourage greater engagement in self-management that can lead to substantive improvements in diabetes management.

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