



CLINICALLY SIGNIFICANT HBA1C DECLINES USING GATHER HEALTH:

Observational Results from a Commercial Pilot in India

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Background

- India has an estimated 65.1 million people living with diabetes and a rapidly growing national prevalence.¹
- Globally there is growing evidence for the benefit of telemedicine interventions in improving diabetes care and blood glucose (BG) control.²
- Similar effects are seen across telemedicine systems run by physicians and other healthcare providers,³ suggesting such systems might be able to be utilized to increase capacity in the healthcare system.
- However, there is limited evidence on smartphone-based mobile-health (mHealth) interventions in the developed and developing world.

Methods

- Routinely collected data was reviewed from all commercial Gather users who installed the app at 5 partner clinics in India between January 1, 2014 and June 15, 2015.
- Individuals with at least 2 HbA2c readings were identified and readings categorized as baseline, 3 month, 6 month, or 9 month based on date.
- Demographics were assessed and associations with HbA1c decrease at 3 months analyzed using Fisher's exact tests (categorical variables) and independent t-tests (continuous variables).
- Paired t-tests were used to determine the significance of changes between baseline and each time-point.

Results

- A total of 552 commercial users downloaded the Gather app at the 5 clinics. There were 41 (7.4%) with at least 2 HbA1c readings. Of these, 8 had 3 HbA1c readings.

- Baseline HbA1c readings ranged from 6% to 13.5% with a mean of 9.4% (SD± 2.1). [Table 1]

- The only characteristic associated with a decrease in HbA1c at 3 months was baseline HbA1c. People with higher baseline readings were more likely to have a decreased HbA1c.

- HbA1c change from baseline [Chart 1]:

- At 3 months (n=25), 64% improved
- At 6 months (n=14), 71% improved
- At 9 months (n=10), 80% improved

- At all 3 time points, participants showed a statistically significant decrease of over 1% point HbA1c [Table 2].

Table 1: Baseline demographics of 41 patients with at least two HbA1c readings

| | % | (n=41) |
|----------------------------|-------|--------|
| Gender | | |
| Female | 58.5% | (24) |
| Male | 41.5% | (17) |
| Ages (years) | | |
| <20 | 7.3% | (3) |
| 20-39 | 39.0% | (16) |
| 40-59 | 39.0% | (16) |
| 60+ | 19.5% | (8) |
| Diabetes Type | | |
| Type 2 | 56.1% | (23) |
| Type 1 | 34.1% | (14) |
| Other | 9.8% | (4) |
| Medication Type | | |
| Both insulin & pills | 63.4% | (26) |
| Insulin Only | 14.6% | (6) |
| Pills Only | 12.2% | (5) |
| Medications per Day | | |
| 0 | 9.8% | (4) |
| 1-2 | 29.3% | (12) |
| 3-4 | 48.8% | (20) |
| 5+ | 12.2% | (5) |
| BG Tests per Week | | |
| 0 | 9.8% | (4) |
| 1-2 | 34.1% | (14) |
| 3-4 | 17.1% | (7) |
| 5-7 | 39.0% | (16) |
| HbA1c at Enrollment | | |
| <7% | 12.2% | (5) |
| 7 - 8.9% | 34.1% | (14) |
| 9 - 10.9% | 24.4% | (10) |
| 11%+ | 26.8% | (11) |

Chart 1: Changes in HbA1c among patients using Gather from baseline to 3, 6 and 9 months

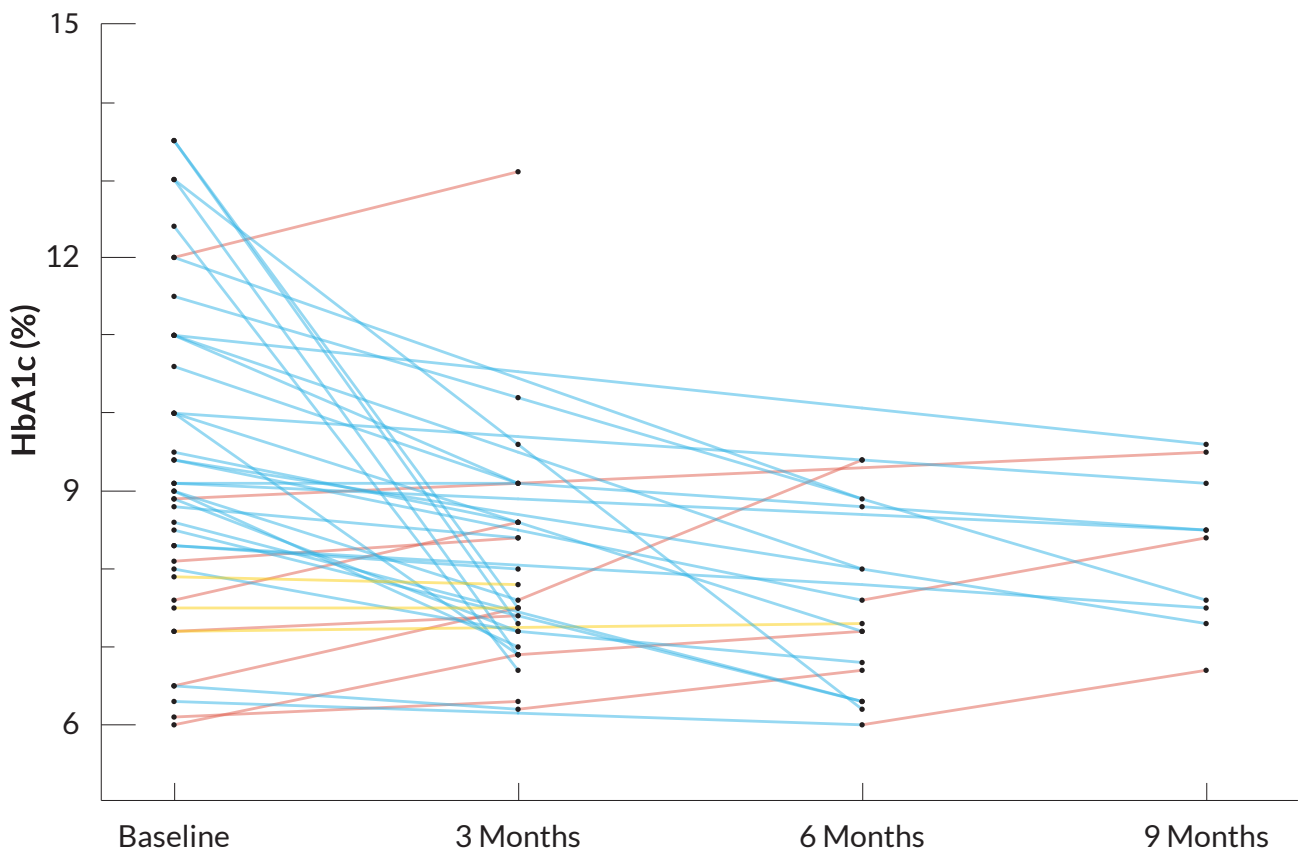


Table 2: Statistically significant decrease in HbA1c from baseline to 3, 6 and 9 months among patients using Gather

| | Baseline | | Follow-up | | | |
|-------------------------|----------|------|-----------|----------------|---------------|---------|
| | Mean | SD | Mean | Average Change | 95% CI | p-value |
| All participants (n=41) | 9.40 | 2.08 | - | - | - | - |
| 3 month readings (n=25) | 9.20 | 2.28 | 7.85 | 1.35 | (0.39-2.30) | 0.008** |
| 6 month readings (n=14) | 8.84 | 2.10 | 7.26 | 1.58 | (0.40 - 2.76) | 0.01* |
| 9 month readings (n=10) | 9.45 | 1.49 | 8.27 | 1.18 | (0.24 - 2.12) | 0.02* |

Note: * significant at $p < 0.05$; ** significant at $p < 0.01$

Discussion

- In this small, observational sample, use of the Gather mHealth platform was associated with clinically and statistically significant declines in HbA1c of over 1% at 3, 6 and 9 months after baseline.
- Additional research is needed in larger sample sizes and more controlled conditions to better quantify the impact of the system.
- A 1% point decrease in HbA1c has been shown to result in a nearly 40% reduction in microvascular complications and an over 20% reduction in any diabetes-related complication or death.⁴

References

1. International Diabetes Federation. IDF Diabetes Atlas, 6th edn, 2014 update [Internet]. Brussels, Belgium: International Diabetes Federation; 2014. Available: <http://www.idf.org/diabetesatlas>
2. Worswick J, Wayne SC, Bennett R, Fiander M, Mayhew A, Weir MC, et al. Improving quality of care for persons with diabetes: an overview of systematic reviews - what does the evidence tell us? *Syst Rev.* 2013;2:26.
3. Marcolino MS, Maia JX, Alkmim MBM, Boersma E, Ribeiro AL. Telemedicine Application in the Care of Diabetes Patients: Systematic Review and Meta-Analysis. *PLoS ONE* [Internet]. 2013 Nov 8 [cited 2014 Jan 2];8(11). Available from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3826722/>
4. UKPDS 35. *BMJ* 2000;321:405-12.

more info: www.gatherhealth.com



This paper was peer-reviewed and presented at the 2015 Wireless Health conference in Bethesda, MD.