HbA1c Response to Remote Glucometer Data Collection and Clinician Titration of Insulin

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ABSTRACT

The initiation and titration of insulin among Type 2 diabetic patients is delayed 3-7 years after oral medicines fail and upwards of 50% of patients who are prescribed insulin either never refill their prescription or have their insulin regimen intensified by their clinicians.[1,2] This failure leads to patients having long-term high blood glucose levels and is due to :

- Primary care physicians treat 90% of diabetics don't have the time or expertise with insulin.[3]
- Optimal titration of insulin would ideally require at least monthly clinician review of glucometer data, which is difficult to achieve because it requires monthly office visits.

This study examined the effect on HbA1c of a combination of Insulin Insights' software-based analysis which provided injection and dose specific recommendations to clinicians for their review with glucose data collected via mobile phone-based glucometers in automated set up.

METHODS

Patient Selection

Insulin-requiring patients with elevated HbA1c levels and access to a mobile phone were selected for the study. Specifically the patients had to meet the following criteria:

- 8.0% or greater HbA1c.
- On insulin a least 6 months
- Have mobile phone that could support the iHealth Align glucometer.

iHealth Align Meter

No in-person office visits were needed by the patient nor intensive lifestyle instruction given or behavioural changes asked of the patient. Patients were taking a variety of insulin regimens including basal, basal/bolus, self mixed/split and premixed.

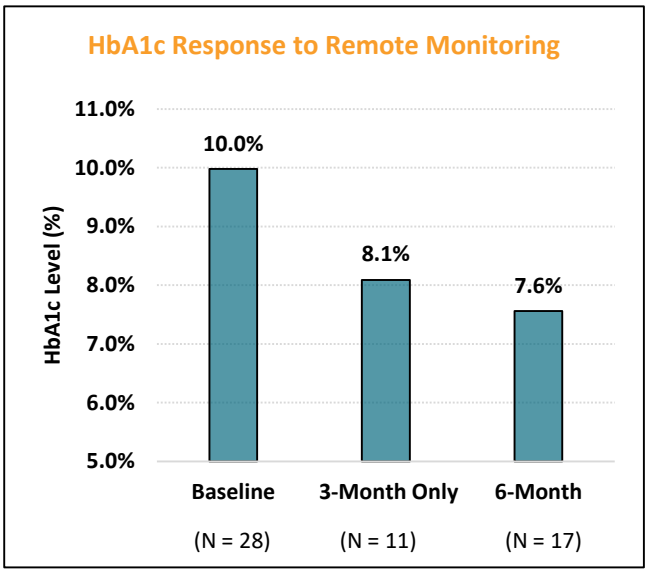
Workflow

Each time the patient took a glucometer reading on the iHealth Align meter, Mellitus Health's servers were notified and their Insulin Insights analysis software was run, as long as at least 2 weeks of data were available for analysis. The Nurse Practitioner (NP) received reports with recommendations for necessary insulin dose changes every 2-3 weeks.

The NP reviewed the recommendation and agreed with it or modified it, then a study coordinator called the patient. After confirming that the patient was taking their previous insulin regimen, the new regimen was given to the patient. If not, the recommendation was ignored, and the patient was instructed to continue to take their previous regimen.

RESULTS

A drop in average HbA1c from the baseline value of 10.0% to 8.1% occurred within the first 90 days that a patient was part of the study. For those patients who remained for the next 90 days, their average HbA1c dropped another 0.5% to 7.6%.



Further, there were no reported incidents of severe hypoglycaemia, as defined by the American Diabetes Association as "severe cognitive impairment requiring external assistance for recovery."[4]

Lastly, the lowering of the HbA1c levels was achieved by an average increase of approximately 25% in the number of units of insulin prescribed to the patients. At baseline, the average was 86 daily units, and when a patient ended their study participation, the average was 107 daily units or an increase of 21 daily units of insulin.

CONCLUSIONS

Frequent insulin titrations by a clinician are shown to optimize the insulin the patient is taking and can dramatically reduce their blood sugar levels.

Tools such as decision support software and remote meters achieve this goal by:

- Helping clinicians by assembling and analysing the data and then coming to a titration conclusion.
- Minimizing the patient's burden in collecting the glucometer data and delivering it to their clinician for review monthly.

This combination has been shown to help achieve the goals of frequent insulin titration necessary for optimal insulin dosing and significant reductions in patient blood sugar levels.

REFERENCES

[1] "Clinical Inertia in People with Type 2 Diabetes: A retrospective cohort study of more than 80,000 people." Diabetes Care. 2013 Nov 36(11): 3411-3417.
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[3] "Ambulatory Medical Care for Diabetes: Diabetes in America." Bethesda, Md: National Institutes of Health, US Dept of Health and Human Services; 1995. Publication 95-1468.
[4] American Diabetes Association Issues Hypoglycemia Position Statement November 22, 2016