

Just a Little Prick; The Effect of Blood Glucose Monitoring on HbA1c Levels

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Introduction

The outcomes of patients with poor diabetic control swing in the polar opposite direction to those with good control.¹ As such, identifying factors which affect the control of type 1 diabetes mellitus (T1DM) is critical to improving outcomes.



Figure 1. Image adapted from (2)

Blood glucose monitoring is a fundamental factor of T1DM management. It demonstrates the ability of a patient or the family, in the case of Paediatrics, to effectively manage the condition.

The recommended minimum number of tests/day is four.³

Here, the effect of number of tests/day on HbA1c levels is explored.

Methods

First, a list of all patients was obtained. Hospital ID numbers were then inputted into a database containing patient information, namely Accu-Chek. This programme contains test data uploaded from two patient devices: the bolus advisor and insulin pump.



Figure 2. Image adapted from (4)



Figure 3. Image adapted from (5)

Data was obtained on age, average HbA1c levels and tests/day. This was cross referenced with hospital data from the National Paediatric Diabetes Audit to obtain information on admissions. These were sub-classified into preventable and non-preventable admissions based on preset criteria.

The data was analysed using IBM SPSS Statistics Data Editor (v20). Unpaired t-tests were performed. Patients were split based on adherence to recommended guidelines.

Results

82 patients were under the care of the paediatric diabetic team at the time of study. Of these, 17 (21%) adhered to the minimum recommended tests/day (demonstrated by the red line on figure 4). This group of patients achieved a lower average HbA1c value compared to the <4 tests/day group; HbA1c values were 63.94 and 93.90mmol/mol respectively. This was statistically significant, with a difference between the means of 29.96 mmol/mol ($P < 0.05$, (95% C.I.: 15.24 – 44.67)).

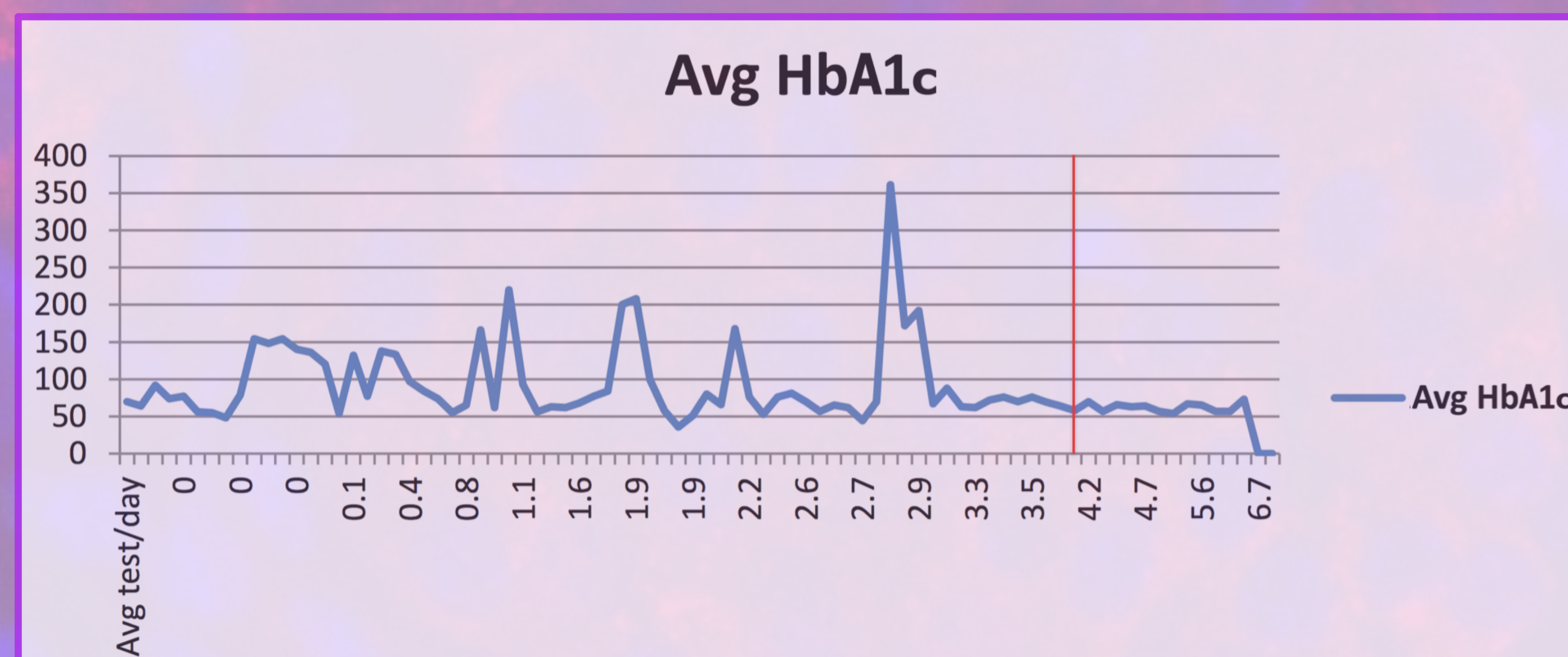


Figure 4. The relationship between number of tests per day and HbA1c levels. Each point is correspondent to a patient.

Upon analysis of preventable hospital admissions, there was no significant difference found based on tests/day. There was, however, a difference in HbA1c levels and preventable admissions/patient. 17 patients out of 82 (21%) were below the target set by NICE of 58mmol/mol⁶. In this group, the number of preventable admissions/patient was 0.12. In the >58mmol/mol group, the number of preventable admissions/patient was 0.51. This was a mean difference of 0.39 (95% C.I. 0.09 to 0.69), which was statistically significant ($P < 0.05$).

No differences were found based on age.

Conclusions

Abiding by the currently accepted minimum standard of measurements is a key component to achieving target HbA1c levels, and therefore fewer admissions. The identification of current glucose levels provides a platform for individual and familial diabetic control. In fact, visualising the intraday changes in levels may identify factors which fluctuate blood glucose levels. This is on the condition of adequate motivation levels.

Motivational interviewing is a component of everyday life as a Paediatrician, junior doctor or diabetic nurse. This study not only provides goals for individual departments, but, also provides an evidence base for this interviewing. Upon patient admission, it would be beneficial to relay this information; in an ultimate aim to reduce: school days missed, underdevelopment, demotivation, noncompliance and risk of complications.

References

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