

# The factors associated with high levels of HbA1C in children and young people with Type 1 Diabetes mellitus

Ayoola O.O<sup>1</sup>, Kendall D<sup>1</sup>, Patel L<sup>1</sup>

<sup>1</sup> Paediatrics Department, Lancashire Teaching Hospital NHS Foundation Trust, Preston, UK

## Introduction

Patients with diabetes are encouraged to achieve good glycaemic control to reduce the risks of complications. Many factors are associated with glycaemic control.

The objective of this study was to evaluate factors associated with good glycaemic control among a cohort of children and young people with type 1 diabetes in Lancashire United kingdom.

## Methods

All children and young people with Type 1 diabetes being managed in the diabetic unit at Lancashire Teaching hospitals within the North West region of the United Kingdom were evaluated from April 2016 to March 2017. Patients were classified based on their HbA1C levels below 58 mmol/mol (Low HbA1C) and above or equal to 58mmol/mol (High HA1C). Sociodemographic and clinical factors were correlated with HbA1C levels.

## Results

There were 195 total patients aged 4 to 19 years (mean age, 14.4 years) and 43.6% were females. The mean HbA1C of the cohort was 71 mmol/mol (SD 18), and 80% of the patients had high HbA1C.

Table 1- Clinical factors associated with Low HbA1C

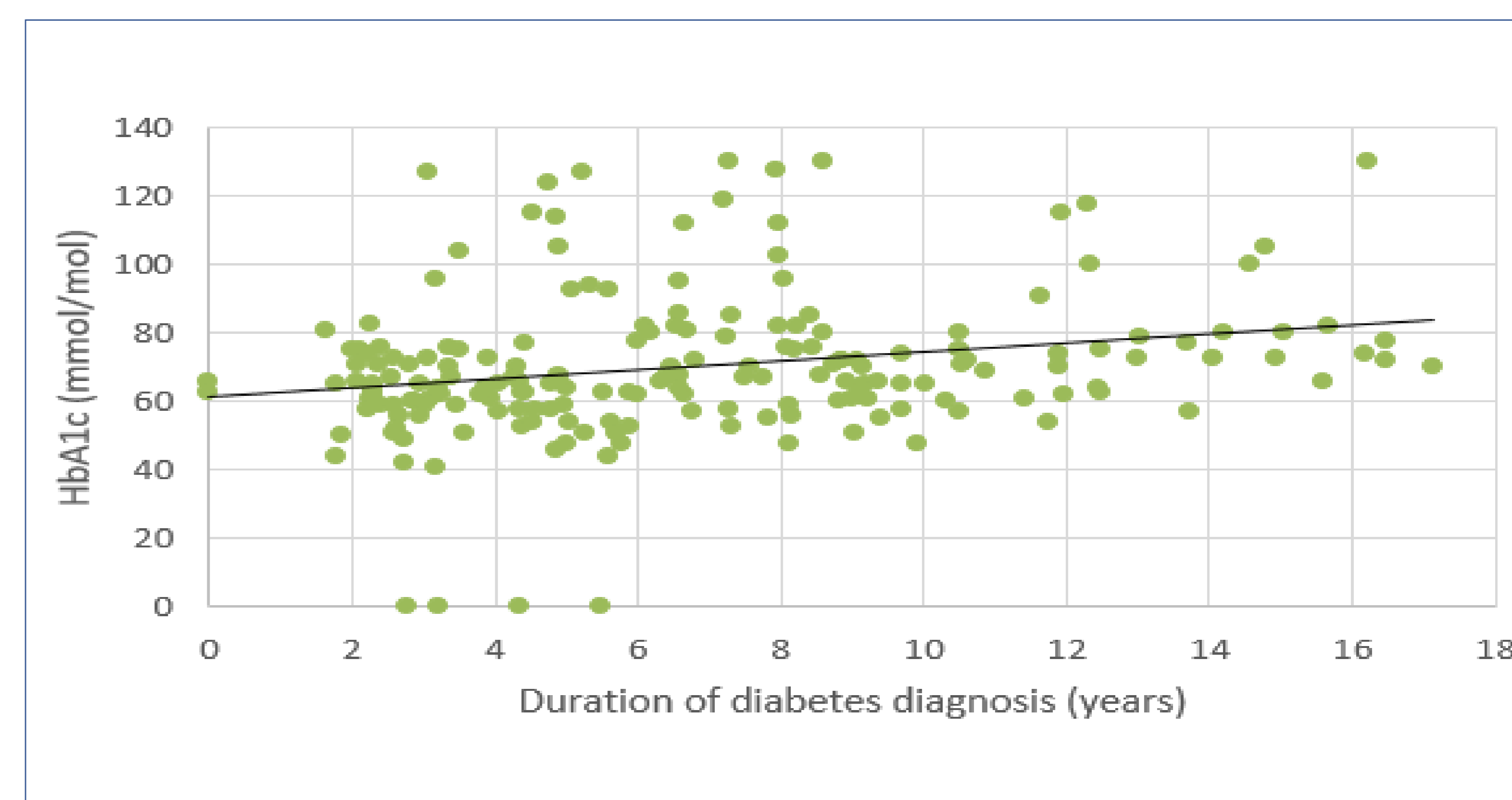
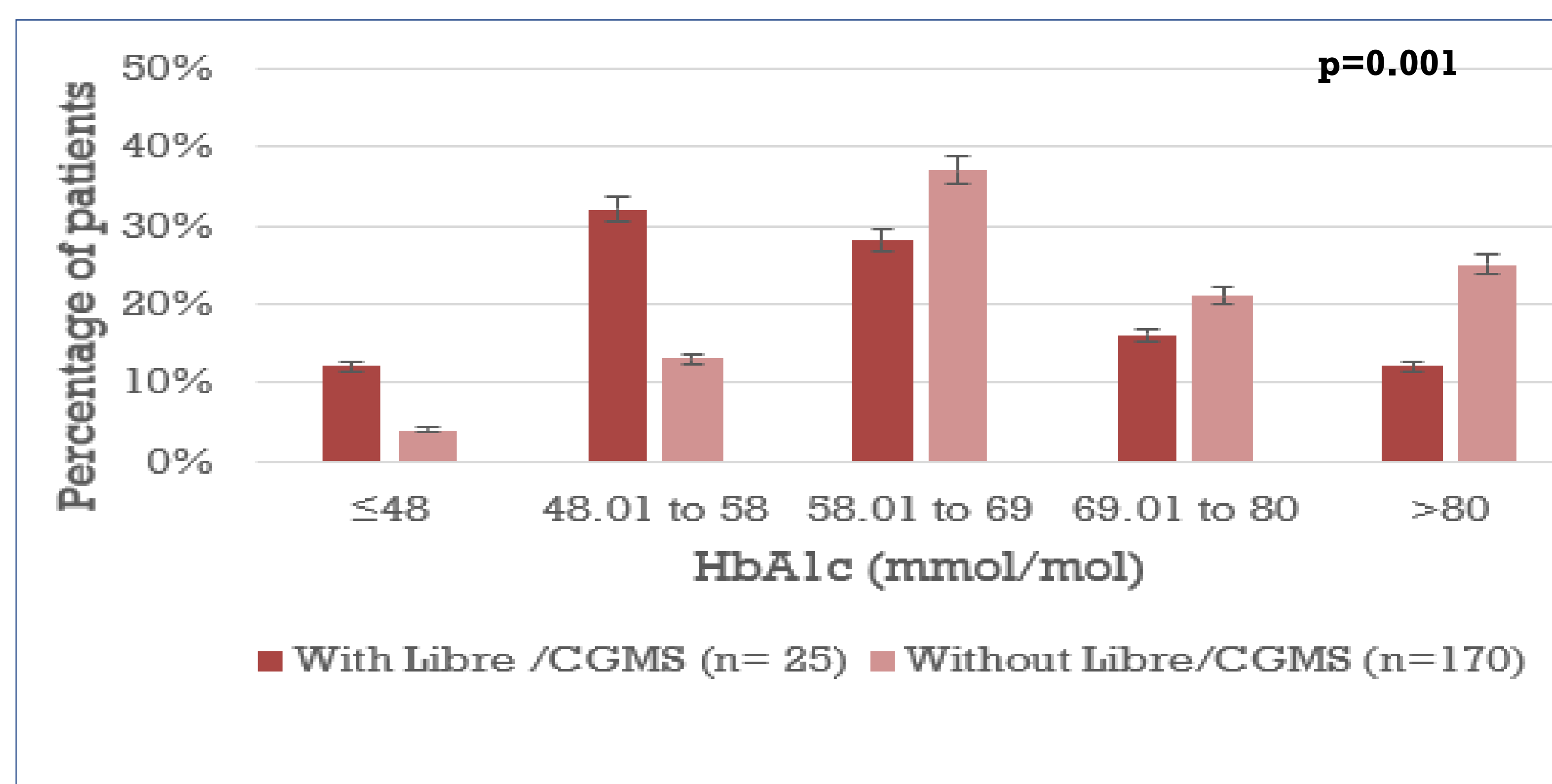
| Clinical factor                        | p-value |
|--|---------|
| Use of CGMS/ Free style libre          | ***     |
| Short duration of diabetes diagnosis   | **      |
| Contact with diabetes specialist nurse | ns      |
| Clinic attendance                      | ns      |
| Carbohydrate counting                  | ns      |
| Ward Admissions                        | ns      |

CGMS= continuous glucose monitoring system

Level of significance was determined using univariate analysis.

\*p<0.05, \*\*p<0.01, \*\*\*p<0.001 and \*\*\*\*p<0.0001 when mean HbA1c levels were compared with and without clinical factor.

Factors independently correlated with increased HbA1c levels included duration of diabetes, number of contacts with diabetic nurses and the use of continuous glucose monitoring system (CGMS) and free style libre. Significant factors associated with low HbA1C using univariate analyses included duration of diabetes with diagnosis duration less than 5 years (p=0.002) and use of continuous glucose monitoring system (CGMS) and free style libre (p=0.001).



Other factors such as insulin regime, (MDI vs Pump) age, gender, clinic attendance, carbohydrate counting and ward admissions were not significantly correlated with HbA1c levels (Table 1).

## Conclusions

Good glycaemic control was associated with diabetes duration less than 5 years and use of CGMS or free style libre.

Therefore, management of patients focusing on these relevant associated factors would be of great benefit in improving glycaemic control.

## References

- Angamo M, Melese B, Ayen W. Determinants of Glycemic Control among Insulin Treated Diabetic Patients in Southwest Ethiopia: Hospital Based Cross Sectional Study. PLoS ONE. 2013;8(4):e61759.
- Andrade C, Ribeiro G, Santos C, Neves R, Moreira E. Factors associated with high levels of glycated haemoglobin in patients with type 1 diabetes: a multicentre study in Brazil. BMJ Open. 2017;7(12):e018094.
- Davison, Kariane A K et al. "Relationship between adherence to diet, glycemic control and cardiovascular risk factors in patients with type 1 diabetes: a nationwide survey in Brazil." *Nutrition Journal* (2014).

## Acknowledgment

We would like to thank all the members of the Diabetes team at Lancashire teaching hospital for their contribution to this work.