

Poor glycaemic control is associated with higher serum triglyceride levels in clinical practice

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Aim

The relationship between glycaemic control and lipid metabolism in diabetes is complicated and yet to be fully elucidated. Here we aim to characterise the relationship between glycaemic control and serum triglyceride levels in a population with type 2 diabetes.

Background

HbA1c has previously been shown to be a good indicator of both glycaemic control and effective at predicting lipid profile.¹ However, research also suggests managing glycaemic control has limited effects on reducing elevated triglyceride levels.² We hypothesised that a relationship between glycaemic control and serum triglyceride levels exists, whilst controlling for confounding variables.

Methods

We performed a retrospective cross-sectional analysis using the primary care records of a large number of people with type 2 diabetes (n=34,278). Data were collected as part of the University of Surrey-Lilly Real World Evidence (RWE) centre from over 100 primary care centres across England and Wales. All data used were collected as part of routine care. We performed a linear regression analysis to identify any independent relationship between serum triglyceride measurements and HbA1c adjusting for patient demographics and lipid lowering medications.

Results

A total of 22,702 people had complete data for all the variables of interest and were included in the final analysis. Three quarters (77.0%) of the population had a triglyceride level ranging between 0 and 4 mmol/l (Figure 1). The mean HbA1c and triglyceride levels for the included cohort were 57.0 mmol/mol and 1.84 mmol/l respectively. Age, gender, deprivation score, body mass index (BMI), use of insulin, and use of lipid lowering medication were all correlated with triglyceride levels and were therefore included in the regression model. After adjusting for these confounders we identified a small but highly significant relationship between HbA1c and serum triglycerides (Figure 2) with an increase of 5.2×10^{-4} mmol/l per mmol/mol of HbA1c increase ($p < 0.0001$).

Conclusion

Poor glycaemic control is associated with higher serum triglycerides. The direction of causality for the association should be further investigated.

Key findings

- Age, gender, deprivation score, body mass index (BMI), use of insulin, and use of lipid lowering medication are all correlated with triglyceride levels.
- After adjusting for these confounding variables, there is a highly significant relationship between HbA1c and serum triglycerides.
- The magnitude of the association is small and may have limited clinical relevance.

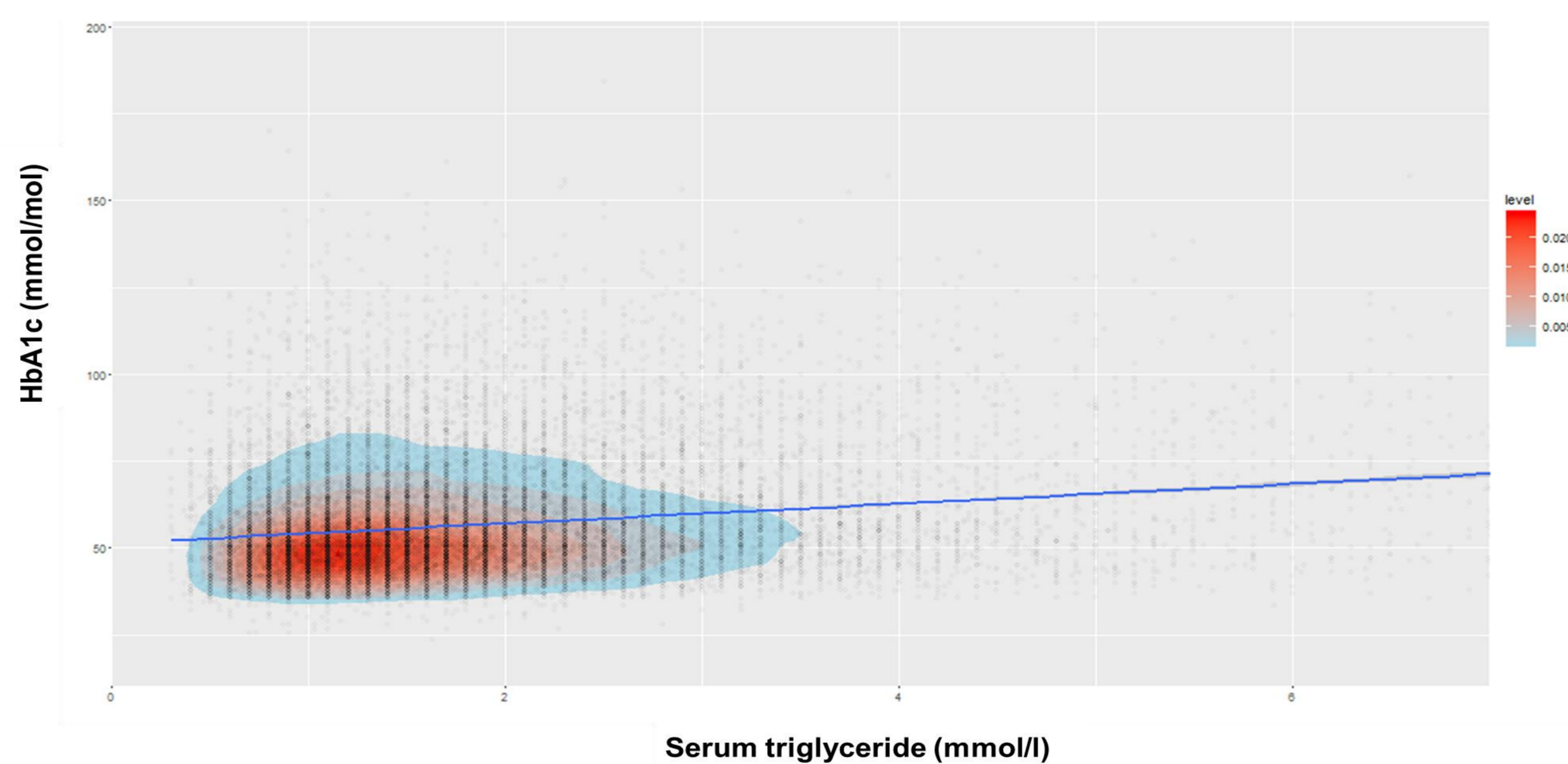


Figure 2. Linear regression model. For every unit increase in the serum triglyceride level, there was an increase of 5.2×10^{-4} mmol/l per mmol/mol of HbA1c ($p < 0.0001$).

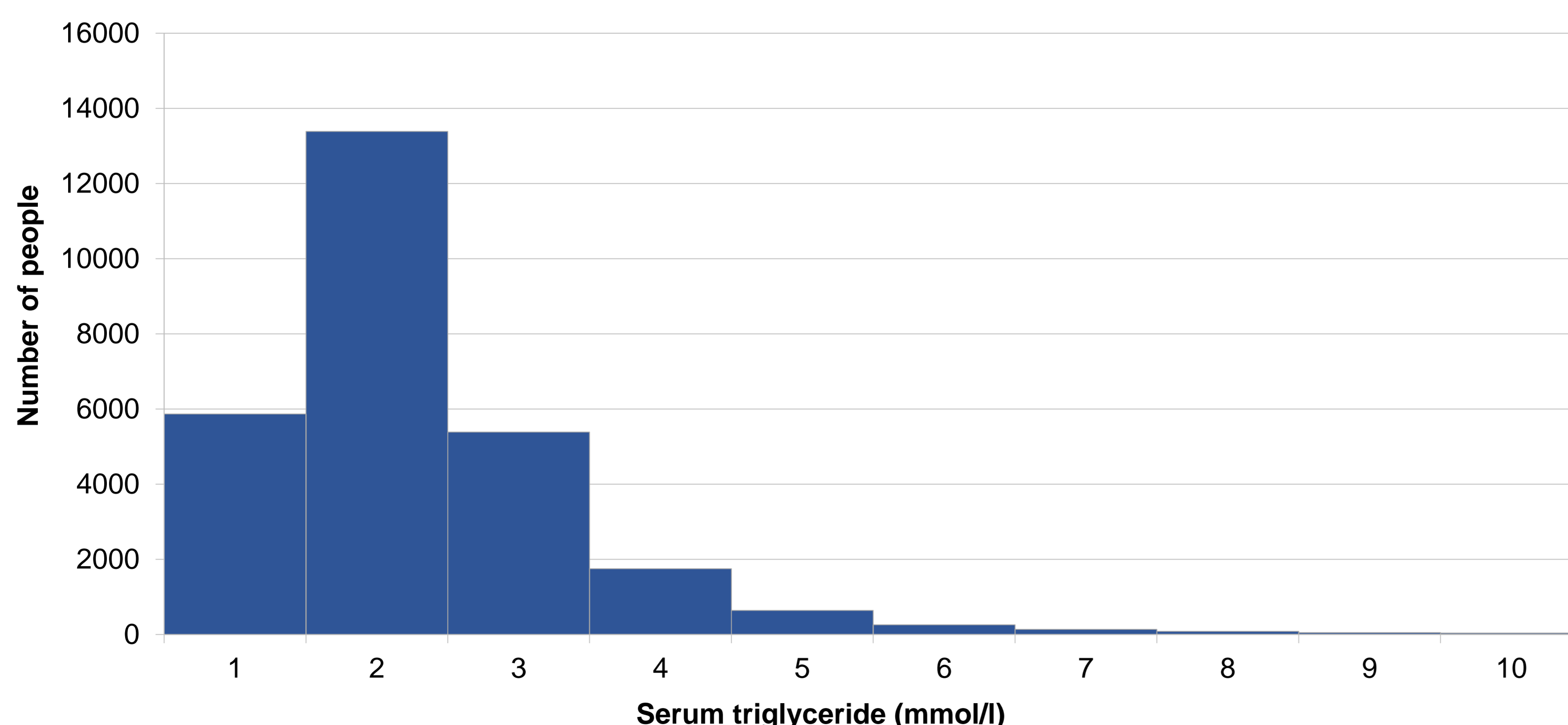


Figure 1. Counts of people with type 2 diabetes against serum triglycerides levels. 77.0% of the cohort ranged between 0 and 4 mmol/l.

References

1. Khan, H.A., S.H. Sobki, and S.A. Khan. Association between glycaemic control and serum lipids profile in type 2 diabetic patients: HbA1c predicts dyslipidaemia. Clin Exp Med, 2007. 7(1): p. 24-9.
2. Davidson, M.B., et al., The relationship of glycaemic control and triglycerides in patients with diabetes mellitus: a PreCIS Database Study. Diabetes Obes Metab, 2009. 11(2): p. 118-22.

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