

# Evaluations of diet strategies in improving risk factor control in adults with type 1 diabetes

Akademisk avhandling

Som för avläggande av medicine doktorexamen vid Sahlgrenska akademien, Göteborgs universitet kommer att offentlig försvaras i hörsal Arvid Carlsson, Medicinaregatan 3, den 9 maj 2025, klockan 9.00

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Fakultetsopponent:

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## Avhandlingen baseras på följande delarbeten

- I. **Sterner Isaksson S**, Benschow Bacos M, Eliasson B, Thors Adolfsson E, Rawshani A, Lindblad U, Jendle J, Berglund A, Lind M, Axelsen M. *Effects of nutrition education using a food-based approach, carbohydrate counting or routine care in type 1 diabetes: 12 months prospective randomized trial*. BMJ Open Diabetes Res Care. 2021 Mar;9(1):e001971.
- II. **Sterner Isaksson S**, Ólafsdóttir AF, Ivarsson S, Imberg H, Toft E, Hallström S, MD, Rosenqvist U, Ekström M, Lind M. *The effect of carbohydrate intake on glycaemic control in individuals with type 1 diabetes: a randomised, open-label, crossover trial*. Lancet Reg Heal Eur. 2024; 4;37:100799.
- III. **Sterner Isaksson S**, Imberg H, Hirsch IB, Schwarcz E, Hellman J, Wijkman M, Bolinder J, Nyström T, Holmer H, Hallström S, Ólafsdóttir AF, Pekkari S, Polonsky W, Lind M. *Discordance between mean glucose and time in range in relation to HbA1c in individuals with type 1 diabetes: results from the GOLD and SILVER trials*. Diabetologia. 2024 Apr 26.
- IV. **Sterner Isaksson S**, Hellman J, Wijkman M, Imberg H, Ólafsdóttir AF, Axelsen M, Lind M. *Diet and diet related challenges with specific focus on carbohydrates and carbohydrate counting in adults with type 1 diabetes: insights from a Swedish survey*. Under review.

**SAHLGRENKA AKADEMIN  
INSTITUTIONEN FÖR MEDICIN**



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## Abstract

Achieving optimal glucose control remains challenging for many individuals with type 1 diabetes (T1D), leading them to explore various dietary strategies. However, evidence from dietary trials in T1D remains limited. The aim of this thesis was to evaluate dietary approaches for risk factor management in T1D and examine associations and deviations between different glucose metrics. In Paper I, a 12-month randomized multicenter trial compared two group education methods, carbohydrate counting and a food-based approach, with a control group receiving individual education. Paper II assessed the impact of carbohydrate intake levels in a randomized crossover trial. Paper III analyzed associations between HbA1c and continuous glucose monitoring (CGM) metrics using 2.5 years of data from a randomized trial and its follow-up. Paper IV explored dietary intake and challenges among adults with T1D through a survey.

In Paper I, both group education methods led to significant HbA1c reductions at 3 months compared to the control group, but the effects were not sustained at 12 months. However, diet quality improved in the food-based approach group. In Paper II, a moderate carbohydrate diet improved glucose control, measured by masked CGM, compared to a traditional diet, with no observed adverse effects. Paper III demonstrated strong associations between HbA1c and mean glucose, and time in range, but also revealed clinically significant discordance among many participants. Paper IV found that many participants struggled with carbohydrate counting, specific foods, and meal-time situations, and expressed a need for greater dietary support.

These findings highlight the potential of diverse dietary strategies to improve glucose control and diet quality, while also indicating a need for enhanced dietary support for individuals with T1D. More research is needed to determine the optimal dietary approach. Additionally, the significant discordance between HbA1c and mean glucose for many individuals should be carefully considered in clinical practice.

**Keywords:** type 1 diabetes, dietary intake, carbohydrates, diet education, dietary challenges, glucose metrics

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