

# Diabetes Under Seven (DU7)

## Aspects of glycaemic control, hypoglycaemia, nutrition and physical activity in children younger than seven years with type 1 diabetes

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### ABSTRACT

**Aim:** The aim of this thesis is to elucidate the specific challenges in insulin treatment for children younger than seven years with type 1 diabetes, with a focus on glycaemic control, hypoglycaemia, nutrition and physical activity.

**Methods:** There were 24 children younger than seven years with type 1 diabetes and 27 healthy children from Gothenburg in the observational study that forms the basis of this thesis. Continuous glucose monitors, glucometer memories, accelerometers, food diaries, log books and questionnaires were used to collect data on the everyday life of these children.

**Results:** In Paper I we showed that children with type 1 diabetes are less physically active than healthy children. In Paper II we found that most hypoglycaemic events in very young children with type 1 diabetes are asymptomatic and go undetected despite 10 plasma glucose tests per day. In Paper III we observed that both children with type 1 diabetes and healthy children eat too much saturated fat and too little fruit, vegetables and fibre. In Paper IV we found that young children with type 1 diabetes have lower health-related quality of life than healthy children of the same age and gender.

**Conclusion:** The circumstances and health-related quality of life of young children with type 1 diabetes need more attention from the health care system. Modern technical tools should be used to improve hypoglycaemia detection and to reduce glycaemic variability. These children's low physical activity and their food intake habits are associated with high cardiovascular risk and warrant further family-based support from the diabetes team.

**Keywords:** preschool children, type 1 diabetes, glycaemic control, hypoglycaemia, nutrition, physical activity, health-related quality of life

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- I. Sundberg F, Forsander G, Fasth A, Ekelund U. Children younger than 7 years with type 1 diabetes are less physically active than healthy controls. *Acta Paediatrica* 2012; 101; 1164-1169.
- II. Sundberg F, Forsander G. Detection and treatment efficacy of hypoglycemic events in the everyday life of children younger than 7 yr. *Pediatric Diabetes* 2014; 15; 34–40.
- III. Sundberg F, Augustsson M, Forsander G, Cederholm U, Axelsen M. Children under the age of seven with diabetes are increasing their cardiovascular risk by their food choices. *Acta Paediatrica* 2013 doi;10.1111/apa.12533
- IV. Sundberg F, Sand P, Forsander G. Health-related quality of life and glycaemic control in pre-school children with diabetes. (Submitted).