

Socioeconomic Aspects of Diabetes and Cardiovascular Disease

Studies based on the Swedish National Diabetes Register

Akademisk avhandling

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Av

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Fakultetsopponent

Professor Anders Ekblom
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Avhandlingen baseras på följande delarbeten:

- I. A Rawshani, M Landin-Olsson, A-M Svensson, L Nyström, H J Arnqvist, J Bolinder, S Gudbjörnsdottir. The incidence of diabetes among 0-34 year olds in Sweden: new data and better methods. *Diabetologia*. 2014 Jul;57(7):1375-81.
- II. A Rawshani, A-M Svensson, A Rosengren, B Eliasson, S Gudbjörnsdottir. Impact of socioeconomic status on cardiovascular disease and mortality in 24,947 individuals with type 1 diabetes. *Accepted in Diabetes Care*.
- III. A Rawshani, A-M Svensson, A Rosengren, S Franzén, B Eliasson, S Gudbjörnsdottir. Long-term trends in cardiovascular risk factors in type 1 diabetes: nationwide monitoring of 38,169 individuals from 1996 to 2014. *Submitted*.
- IV. A Rawshani, A-M Svensson, A Rosengren, B Zethelius, B Eliasson, S Gudbjörnsdottir. Impact of ethnicity on progress of glycaemic control: a study of 131,935 newly diagnosed patients with type 2 diabetes. *Accepted in BMJ Open*.
- V. A Rawshani, A-M Svensson, A Rosengren, B Zethelius, B Eliasson, S Gudbjörnsdottir. Ethnicity and development of heart failure: a study of 215,138 patients with type 2 diabetes. *Manuscript*.



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ABSTRACT

Background and Aims: Four hundred million people in the world have diabetes. The incidence of type 1 diabetes has increased steadily in the last few decades and it is now the second most common chronic disease of childhood. Type 2 diabetes develops in adults and older individuals with unhealthy dietary patterns, overweight and sedentary habits. It is well known that socioeconomic status has a substantial impact on health and longevity. The effect of socioeconomic status has been examined thoroughly in cardiovascular medicine. When it comes to diabetes, however, there are important gaps in knowledge. Socioeconomic status includes primarily income, education, ethnicity and occupation. These variables may serve as easily accessible risk markers.

Patients and Methods: The present thesis is based on the Swedish National Diabetes Register (NDR). The NDR includes the majority of all individuals (aged 18 years and older) with diabetes. We examined how socioeconomic status affects survival, risk factor control and the risk of developing heart failure. We also examined the incidence of type 1 diabetes in people aged 34 and younger.

Results: We show that the incidence of type 1 diabetes in 15–34 year-olds is two to three times as high as previously reported. Our analyses show that the Prescribed Drug Register is probably the gold standard for monitoring the incidence of type 1 diabetes.

Low income and educational level was associated with two to three times as great a risk of serious cardiovascular events and death in type 1 diabetes. Being male, divorced, single or widowed was also associated with substantially higher risk of adverse outcomes. Controlling for conventional risk factors and confounders did not eliminate the disparities.

Risk factor control in type 1 diabetes has improved in the last two decades. However, the improvements have been less pronounced among individuals with low socioeconomic status. Some of the socioeconomic gaps have widened over time. For example, individuals with low education have not improved their glycaemic control (HbA1c) during the period 1996 to 2014, whereas those with high educational level lowered their HbA1c by 4.0 mmol/mol.

Non-Western immigrants to Sweden develop type 2 diabetes a decade earlier than native Swedes. Immigrants have higher HbA1c, greater risk of therapy failure and higher probability of developing albuminuria than native Swedes. Ethnicity has a greater impact on glycaemic control than income or educational level.

There are ethnic differences in the risk of developing heart failure among individuals with type 2 diabetes. Individuals from South Asia appear to be at greater risk of developing heart failure, whereas those from Latin America are at lower risk, than native Swedes. Individuals with low income had 70% higher risk of developing heart failure, as compared with individuals with high income.

Conclusions: Ethnicity and socioeconomic status should be routinely considered in clinical management if diabetes care is to improve. These variables are easily accessible risk markers. Stringent risk factor control may be the most effective means of reducing these disparities.

Key words: diabetes, socioeconomic status, ethnicity, cardiovascular disease, risk factors

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