Prevalence of diagnosed diabetes and quality of care among Greenlanders and non-Greenlanders in Greenland

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ABSTRACT

Aims: To estimate the actual prevalence of diagnosed diabetes in Greenland as at 2014, and to evaluate the quality of diabetes care among Greenlanders and non-Greenlanders in Greenland, six years after a national diabetes program was initiated.

Methods: The study was designed as an observational cross-sectional study based on review of data obtained from the electronic medical record (EMR) in Greenland. All permanent residents of Greenland who as at October 2014 were registered with the diagnosis diabetes in the EMR ($n = 1071$) were included in the study. The prevalence was calculated using the population in Greenland as at first of June 2014 as background population. Quality of diabetes care was determined using indicators proposed by the Organization for Economic Cooperation and Development.

Results: The prevalence among Greenlanders aged 20–79 years was 2.36% (95% CI 2.19–2.52) and significantly lower than the prevalence among non-Greenlanders in the same age group, which was 3.69% (95% CI 2.18–4.20). More Greenlanders than non-Greenlanders had glycosylated haemoglobin below 7.0% (53 mmol/mol), blood pressure below 140/90 mmHg and their blood pressure measured within the last year. No other differences in quality of diabetes care were observed between the groups.

Conclusions: A higher prevalence of diagnosed diabetes was observed among non-Greenlanders compared to Greenlanders, while no major differences were observed in quality of care between the two groups. The overall prevalence of diagnosed diabetes has increased compared to earlier studies. Continued monitoring of prevalence and quality of care is recommended.

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1. Introduction

Diabetes has become a rapidly growing disease worldwide. It is estimated that 347 million people worldwide have diabetes and the World Health Organization (WHO) projects that diabetes deaths will double between 2005 and 2030 [1].

In Greenland, the diabetes rates have been found to be increasing. Fifty years ago, diabetes in Greenland was almost

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non-existent. Along with the transformation from a traditional hunting society to a modern society, there has been a profound cultural and social change, followed by a health transition with increasing prevalence of lifestyle related diseases [2,3]. Furthermore, a demographic shift towards a population with more adults and elderly people due to changes in fertility, mortality and life expectancy has been observed over the last half century, naturally leading to increased prevalence of age related diseases like diabetes [4].

Epidemiological studies based on oral glucose tolerance tests (OGTT) have indicated a high prevalence of diabetes (9%) among adult Greenlanders. The majority (around 70%) of the study population was undiagnosed and increasing awareness of diabetes was recommended [2]. These findings led to the implementation of a national diabetes program in 2008, where the aim was to improve diabetes care for patients with diabetes in Greenland [5,6]. One key element in the program was registering all diabetes patients in the electronic medical record (EMR) in Greenland in order to monitor both prevalence of diagnosed diabetes and quality of diabetes care. A program started back in 1985 in Alaska, USA, inspired this. In the Alaska program, data from all patients who received diabetes care in the Alaska Tribal Health System was collected in the population-based Alaska Native Diabetes Registry [7]. In addition to the registration of diabetes patients in the EMR, other key elements in the national diabetes program in Greenland were national guidelines, disease education and performance feedback [5,6].

A study evaluating the program using data obtained from 2008 to 2010 estimated an increase of 19% in prevalence of diagnosed diabetes among Greenlanders as well as a significant improvement of the process indicators used to describe the quality of diabetes care, observed before and after the implementation of the diabetes program [6]. The prevalence of diagnosed diabetes in Greenland has been shown a further increase, but the actual prevalence remains unknown.

In 2011, the diabetes program was replaced with a lifestyle project focusing on general prevention and quality of care among patients with hypertension and chronic obstructive lung disease in addition to diabetes [8]. However, the actual quality of diabetes care in Greenland is unknown. Thus the aim of this study was to estimate the actual prevalence of diagnosed diabetes in Greenland as at 2014, and to evaluate the quality of diabetes care among Greenlanders and non-Greenlanders living in Greenland, six years after the diabetes program was initiated.

2. Material and methods

The study was designed as an observational cross-sectional study based on review of data obtained from the electronic medical record in Greenland.

2.1. Setting

Approximately 56 000 people live in Greenland, and the population is widely spread geographically along the coast in 18 towns and 60 settlements. Of the current population, approximately 90% were born in Greenland and are ethnic Greenlanders [9]. In 2014, approximately 80% of the immigrants living in Greenland were of Danish nationality [4].

Since 2007, data from all primary healthcare clinics in Greenland have been using the same electronic medical registration system. The healthcare system used to be divided into 16 health districts, but in January 2013 the system underwent reformation and was divided into 5 larger healthcare regions [10]. Queen Ingrid Hospital (QIH) is located in Nuuk, and provides secondary specialized health care for all of Greenland. Health care is delivered to all residents in Greenland free of charge. This includes providing free medications. In most towns, primary health care is delivered through a health care clinic staffed by physicians, nurses and other health care workers. For Greenlanders living in settlements, contact with the health care system is trough a local nurse or health aid. All persons living in Greenland diagnosed with diabetes, have since 2008 been given the data code "D" in their medical journal [5,6]. To optimize the register, an annual data extraction of all persons prescribed antidiabetic medicine not included in the database, is performed. In case the indication for the drug prescription is diabetes, a "D" code is added to the medical journal securing inclusion in the register.

2.2. Study population

All permanent residents of Greenland who as at October 2014 were registered with the diagnosis diabetes mellitus in the EMR were included in the study. Both patients with diabetes type 1 and type 2 were included. The medical records were reviewed for information about age, gender, place of birth and year of diagnosis. The latest data on height, weight and body mass index were collected as well as latest results of urine- and eye examination and last registered measurement of blood pressure, glycosylated haemoglobin (HbA_{1c}) and low-density lipoprotein (LDL) cholesterol levels. To make this study more comparable with earlier studies, data from patients who had received an eye exam and whom underwent urine testing within the last two years were also included.

2.3. Definition of variables

Age was reported in whole years calculated as 2014 minus year of birth, and duration of diabetes was measured as 2014 minus the year in which the patient was diagnosed. Quality of diabetes care was described using process indicators and outcome indicators proposed by the Organization for Economic Cooperation and Development (OECD), and most recent registered measurements were used [11]. In addition, some quality indicators suggested by the National Diabetes Quality Improvement Alliance (NDQIA) were used (Table 1) [12].

Blood pressure was defined as the latest registered ambulant measurement. The standard guidelines of measuring height and weight were defined as measurements with the patient wearing light clothing and no outerwear or shoes. The latest recorded data was used. HbA_{1c} measurement was based on analysis of venous blood using a Tosoh G8 HPLC analyzer in the laboratory at Queen Ingrids Hospital in Nuuk. In addition, LDL cholesterol analysis and urinary albumin/