East Africans in Sweden Have a High Risk for Type 1 Diabetes

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OBJECTIVE—To investigate the prevalence of type 1 diabetes in children with an origin in Sub-Saharan Africa in Sweden.

RESEARCH DESIGN AND METHODS—Nationwide register study based on retrieved prescriptions of insulin during 2009 in children aged 0–18 years. The study population consisted of 35,756 children in families with an origin in Sub-Saharan Africa and 1,666,051 children with native Swedish parents.

RESULTS—The odds ratio (OR) for insulin medication in Swedish-born children in families originating in East Africa was 1.29 (95% CI 1.02–1.63) compared with offspring of native Swedish parents, after adjustment for age and sex, and less common in children who themselves were born in East Africa: 0.50 (0.34–0.73). Offspring of parents from other parts of Sub-Saharan Africa had a comparatively low risk for insulin medication.

CONCLUSIONS—This study indicates that Swedish-born children with an origin in East Africa have a high risk of type 1 diabetes.

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The incidence of type 1 diabetes varies greatly among different populations in the world (1). Finland is the nation with the highest recorded population rate in the world followed by Sweden in second place, whereas the incidence has been found to be particularly low in East Asia (Korea) (2). The incidence in Sub-Saharan Africa is not well known (2), but available studies have shown low rates of type 1 diabetes in child populations (3), with a prevalence ranging from 3.5 to 12 out of 100,000 (4,5). In this study, we exploit the information available in Swedish national registers to investigate the prevalence of type 1 diabetes in child populations, with an origin in Sub-Saharan Africa in exile in Sweden.

RESEARCH DESIGN AND METHODS

This study was based on Swedish national registers held by the National Board of Health and Welfare and Statistics Sweden. All Swedish residents are assigned a unique 10-digit identification number at birth or immigration. This identification number was used to link information from different register sources after the study had been approved by the regional ethics committee in Stockholm.

Study population

All individuals born in 1991–2008, who were alive and registered as residents in Sweden on 31 December 2008, were identified in the Register of the Total Population (RTB). Biological and/or adoptive parents of these individuals were identified in the Multi-Generation Register.

Information about region of birth, date of immigration, sex, and year of birth in RTB was linked to the study subjects and their parents. On the basis of this information, we categorized the offspring of two parents born in a country in Sub-Saharan Africa into Swedish-born and Africa-born by the child's own record of country of birth. These categories were further divided into East Africa (Ethiopia, Somalia, and Eritrea) and South and West Africa by parental country of birth. Children with a record of adoption in the Multi-Generation Register were excluded from the study population. To this population of 35,756 children in families with an origin in Sub-Saharan Africa, we added 1,666,051 Swedish-born residents with two native Swedish parents as a comparison group.

Diabetes

The Swedish Prescribed Drug Register contains data with unique patient identifiers for all drugs prescribed and dispensed to the whole population of Sweden (>9 million inhabitants) since July 2005 (6). The retrieval of at least one prescription of a drug with an Anatomical Therapeutic Chemical-code that started with A10A (insulin-containing drugs) during the calendar year 2009, according to this register, was used to create the outcome variable of the study: insulin.

To check the validity of this variable, we also identified all patients in the Swedish Patient Discharge Register who had been discharged with a diagnosis equivalent to E10 in ICD-10, insulin-dependent diabetes/type 1 diabetes, in all Swedish-born individuals in the study population during 1990–2008. A total of 99.4% of all children with insulin medication in 2009 had been discharged with such a diagnosis, and 96.0% of all who had been discharged with such a diagnosis had received insulin medication in 2009.

Statistical analysis

Logistic regression was used to calculate odds ratios (OR) with 95% CI with insulin medication during 2009, defined above, as the outcome variable. We adjusted the analysis to age in a linear fashion, in accordance with the roughly linear increment in prevalence of insulin medication, and to sex. All statistical analyses were performed using SPSS version 18.0 for Windows.

RESULTS

There were 8,047 children in the age range of 0–18 years with Swedish-born parents and 107 children with parents born in Sub-Saharan Africa who had

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Table 1—*Demographic indicators and offspring medication with insulin during 2009 by own and parental country/region of birth in children aged 0–18 years*

Parental region of birth	Own region of birth	*N*	Male sex (%)	Mean age (years)	Insulin		OR (95% CI)
					Cases	1/1,000	
Sweden	Sweden	1,666,051	51.5	11.5	8.047	4.8	1
East Africa							
Ethiopia	Sweden	3,743	50.3	12.2	16	4.3	1.02 (0.62–1.67)
	Africa	743	50.9	13.7	1	1.3	0.22 (0.03–1.54)
Eritrea	Sweden	2,385	51.2	9.5	16	6.7	1.69 (1.03–2.78)
	Africa	1,020	53.9	12.8	5	4.9	0.94 (0.39–2.27)
Somalia	Sweden	9,629	51.7	7.3	39	4.1	1.30 (0.95–1.78)
	Africa	7,889	51.2	13.6	21	2.7	0.47 (0.31–0.73)
All East Africa	Sweden	15,757	51.1	8.3	71	4.5	1.29 (1.02–1.63)
	Africa	9,652	51.2	13.6	27	2.8	0.50 (0.34–0.73)
South and West Africa	Sweden	5,374	48.9	8.1	6	1.1	0.31 (0.14–0.70)
	Africa	4,529	49.4	14.1	3	0.7	0.11 (0.04–0.36)

retrieved at least one prescription of insulin during 2009.

Table 1 presents incidence rates and demographic patterns in the study groups. Swedish-born offspring of parents born in Eritrea had the highest overall incidence of 6.7 out of 1,000, whereas the lowest incidence, 0.7 out of 1,000, was found in African-born offspring of parents from South and West Africa. Swedish-born offspring of parents from all of East Africa had an OR of 1.29 for type 1 diabetes compared with the Swedish comparison group, whereas children who themselves were born in East Africa had an OR of only 0.50. Swedish-born and African-born children with parents born in South and West Africa had ORs of only 0.30 and 0.11, respectively.

CONCLUSIONS—This study indicates that populations with an origin in East Africa have a high risk to develop type 1 diabetes when they are born and raised in exile in a high-income country such as Sweden. The lower risk in children who themselves were born in East Africa has to be interpreted with caution, because type 1 diabetes might often be an undetected and deadly disease in this impoverished region and may also go undetected to a certain extent during the first years in exile.

Previous Swedish studies of children in immigrant families with an origin in regions with low or moderate rates of type 1 diabetes have demonstrated that the risk of type 1 diabetes tends to remain on the same level as the population of origin for children who were born in the same country as their parents, whereas it tends to increase for children born in Sweden (7,8). The rate of type 1 diabetes in the children who themselves were born in East Africa in this study was much higher than previous studies conducted in this region. If rates for East African immigrants also tend to remain on the same level as in the country of origin, this study suggests that previous studies in this region may have grossly underestimated the risk of type 1 diabetes. It is, however, also possible that East Africans are vulnerable to yet unidentified environmental risk factors in a high-income country such as Sweden. Further studies in Africa and Sweden are needed to clarify these issues.

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