

DIABETES IN ICELAND

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Until recent times few clinical observations on diabetes were available. A thesis on diseases in Iceland, written by Finsen¹ and based on his experience as a doctor in the northern part of the country in the decade 1856-1866, contained his conclusion that diabetes must be regarded as a very rare disease as he himself had not seen a single case. He was a well-educated physician, a keen observer and had practiced for a period in Denmark. At the turn of the century Bjornsson,² one of the most experienced doctors in Iceland, also expressed the opinion that diabetes was a rare disease among Icelanders. In 1938 Jónsson,³ the director of Public Health also stated: "Diabetes is a very rare disease in Iceland, and it is an extraordinary occurrence for doctors to come across it."

Several doctors and institutions are still of the opinion that diabetes is a rarity in Iceland. A gastroenterologist informed me that one diabetic was found during the last ten years among 3,300 gastroenterological cases. He confessed that care was not always taken to collect the urine after meals so that incipient cases might have escaped detection. A life insurance doctor also thought that diabetes was very uncommon. Among 2,087 admissions in two tuberculosis sanatoria, diabetes was not found in a single case.

In my mind there is, however, no doubt that diabetes is more common now than 22 years ago when I first was on the lookout for it. According to my calculations, there were about 30 known diabetics in Iceland in 1930. In January, 1942, I sent a questionnaire to all active physicians in Iceland and asked them to give me the name, age, occupation, state of health and all possible information about the diabetics they had under treatment or knew to have the disease. Practically all answered; 63 diabetics were reported (one in 2000 of the population). In 1947, 94 cases were re-

ported to me, and now I estimate that there are about 140 known diabetics in Iceland or a little less than one per thousand.

In my practice, I have routinely tested the urine for sugar and if positive, I have always made a blood sugar test. Among my first 2,000 patients, some 20 years ago, one diabetic was found. During the last three years, I have examined more closely 1,613 Icelanders, of whom 76 per cent were over 40 years of age. Urine was collected and a blood sample taken about 60 to 90 minutes after a full meal. If glycosuria was found and/or blood sugar above a screening level which was chosen at 130 mg. per 100 cc., a modified glucose tolerance test was done. The number of diabetics discovered was seven.

During the fall of 1950 I examined 1479 individuals (about 59 per cent) of the 2,500 inhabitants of Akranes, a town near Reykjavík. Blood and urine tests were made for persons of thirty years and over. Younger patients had only a test of urine, and in these cases absence of glycosuria was assumed to mean freedom from diabetes.

A retired physician of 81, who had practiced there for 42 years, told me that he had never found diabetes in Akranes. The inhabitants numbered only 755 in 1901 and about 1700 when he retired. I learned, however, that a little girl from Akranes had died from diabetes in 1933, and that a sixty year old obese man was found to have mild diabetes in 1949 while being prepared for cholecystectomy. He was found to be without glycosuria when he was on a restricted diet, but a glucose tolerance test showed that he was not cured.

My studies disclosed three additional cases. One of these patients had definite symptoms, but two others were without complaints. None of them had consulted the local physicians during the preceding twelve months. There were also three cases in which I advised supervision; quite recently I found one of these individuals to have incipient diabetes.

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My rather incomplete survey seems to have made the town more diabetes conscious. A 15 year old boy, a near relative of one of the diabetics I found, who had been out of town during my stay at Akranes, was soon afterwards sent to me with vague complaints. I found that he had mild or incipient diabetes. In February 1952, the sixth case was discovered by means of a glucose tolerance test. Consequently, there are now seven known diabetics in Akranes. This represents an incidence of 2.6 per thousand since the population is now 2,700.

I wonder if there are relatively more unknown cases in Iceland than in other countries.

LIFE EXPECTANCY IN ICELAND

My countrymen live long enough to give diabetes opportunity to become manifest. The life expectancy for males at birth rose from 48.3 years at the beginning of this century to 60.9 years in the decade between 1931 and 1940. For females the corresponding increase was from 53.1 to 65.6 years. The Statistical Bureau has informed me that it has increased further.

TABLE 1.

LIFE EXPECTANCY AT BIRTH IN ICELAND

	Males	Females
1902-10	48.3 years	53.1 years
1911-20	52.7 years	58.0 years
1921-30	56.2 years	61.0 years
1931-40	60.9 years	65.6 years

MORTALITY STATISTICS

Detailed mortality statistics became available in Iceland in 1911. These statistics seemed to corroborate the view derived from clinical observations regarding the rarity of diabetes.

From 1911 to 1930 the annual death rate from diabetes in Iceland was 1.8 per 100,000 inhabitants. In a few cases diabetes was mentioned as the contributory cause of death, some other diseases being accorded the priority. Yet even if they are included, the mortality figure reaches only 2.1 per 100,000. The number of males and females was equal.⁴

I found after 1930 that the Statistical Bureau did not classify diabetes as a cause of death according to the rules of joint cause classification of causes of death⁵⁻⁷; the primary cause of death was usually recorded according to the judgment of the certifying physician. In

studying the death certificates for the years 1931-1950, I found that in some instances where diabetes was mentioned, priority was accorded to other conditions such as chronic nephritis, arteriosclerosis, heart disease and senile marasmus. I therefore reclassified diabetes as a cause of death. The annual death rate was then 1.9 to 4.0 per 100,000.

During this period, 1931-1950, females outnumbered the males in the mortality statistics; they constituted 58 per cent of the total number.

TABLE 2.

DIABETES MORTALITY IN ICELAND

Annual Death Rate Per 100,000	Living Inhabitants	
	All Iceland	City of Reykjavik
1931-35	2.8	4.5
1936-40	1.9	2.2
1941-45	1.9	3.3
1946-50	4.0	6.2

The deaths from diabetes in the city of Reykjavik are higher—2.2 to 6.2 per 100,000, than for the country as a whole. Here, diagnostic facilities have been good; since 1938 glucose tolerance tests have been performed free of charge. The higher recorded mortality in Reykjavik is certainly due in part to closer medical supervision, but this is not the sole cause. I know some patients who moved to Reykjavik only because they had diabetes.

FACTORS INFLUENCING THE INCIDENCE OF DIABETES

According to Joslin⁶, the statistical incidence of diabetes is highest where the urine tests are most frequently performed, where the inhabitants live longest, and where they weigh the most.

In Iceland, as in other countries, physicians differ. Some are wise and careful and practically always test the urine; some are different in this respect. Iceland is a sparsely populated country and formerly the physicians were few and far between. In 1915 there was one doctor per 1,300 inhabitants. In recent years, the ratio has risen to 1 per 800 or 900. In 1910 only 32.2 per cent of the people lived in towns and villages; in 1950 this percentage had risen to 72.3. Most people now live within easy reach of a physician and better means of communication have made medical supervision easier in the rural areas too. The mortality rate is becoming very low (7.9 per thousand in 1949 and 1950); life expectancy is steadily increasing.

INCIDENCE OF OBESITY

As a boy, 40 years ago, I rarely saw obese people, but overweight is now quite common. The machine age with lessened demand for physical labor and the shorter working day has also come to Iceland although at a somewhat belated date. Steffensen⁸ has found that height of the people has increased considerably during recent decades. He attributes this to less physical labor during adolescence; to improved diet, in some respects at least; and to better conditions of living generally. Whatever may be the reason, the population is growing taller; there is also an increasing tendency to overweight, especially in the middle-aged.

DIET IN ICELAND

For centuries the diet has been unusually rich in protein and fat (derived from milk, meat and fish), but low in carbohydrate.

TABLE 3 THE COMPOSITION OF THE DIET IN ICELAND

	Per Cent	18th Century		1940	
		1850	1850	Country	Towns
Carbohydrate	"	24	30	40.3	44.2
Protein	"	33	28	19.2	17.9
Fat	"	43	42	40.5	37.9
Animal Food	"	90-95	80-85	57.9	45.6

The figures for 1940 were based on the dietary survey made in 1939-1940.⁹ The caloric intake was then found to be 3,090 for adult males in towns and 3,553 in the rural areas. The increase in respect to carbohydrate is derived mostly from white bread, potatoes, and refined sugar. The consumption of sugar has risen greatly. The figures for the 18th century and 1850 are Steffensen's estimates,⁸ based on statistical data and various other kinds of information.

RELATION OF FAT AND PROTEIN TO THE INCREASE OF DIABETES

Himsworth¹⁰ made an interesting study on the frequency of diabetes in relation to the quantitative composition of the diet in different countries. He concluded that a diet relatively high in fat predisposes to diabetes. Young¹¹ found that a diet high in protein, especially meat, given experimental animals increases susceptibility to the diabetogenic action of anterior pituitary extract to a greater extent than does a high carbohydrate diet.

He also mentioned the possibility that a diminution in the consumption of animal protein during wartime might be a factor of significance in the fall of diabetic mortality associated with food rationing.

In spite of these observations, the conditions in Iceland seem to show that a diet high in animal protein and fat is not accompanied by a high incidence of diabetes in the population.

SUMMARY

Diabetes, which was considered a rare disease in Iceland up to fairly recent times, is now diagnosed with increasing frequency. It is estimated that there were 30 cases, or about 1 in every 3,500 inhabitants in 1930, as compared with 140 cases, or 1 per 1,000 population at present. The death rate from diabetes in Iceland has increased from 1.8 per 100,000 population in 1911-1930, to 4.0 in 1946-1950. In the capital city of Reykjavik, the death rate has been consistently higher than in the whole country in each 5-year period from 1931-1935 to 1946-1950. Females account for approximately 60 per cent of all deaths from the disease.

The increase in known frequency of diabetes in Iceland reflects the increased length of life of the population, changed dietary habits, easier working conditions, and, last but not least, a closer medical supervision.

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