

The art of medicine

Diabetes and the public's health

"A melting down of the flesh and limbs into urine", is how Aretaeus the Cappadocia described diabetes in the first century AD. Credited with offering the first detailed account of the disease, Aretaeus painted a horrifying picture of individuals with emaciated bodies, tortured by an "unquenchable" thirst and trapped in an endless cycle of "excessive drinking" and "making water". Fortunately, he commented, diabetes was "not very frequent among mankind".

The second century Roman physician Galen could not have agreed more, remarking that he had seen only two cases of diabetes in all his years of medical practice. While this may have been unusually low, diabetes was uncommon until more recent times. Because it is largely a disease of advanced years, most individuals died before they reached an age when diabetes might develop. Only when the mortality rates from infectious diseases began to decline in western countries during the 19th century did diseases such as cancer, cardiovascular disease, and diabetes—the so-called "diseases of modern civilisation"—begin to command more attention.

By the turn of the 20th century that attention had turned to alarm. Although the number of people dying of diabetes remained small compared with other diseases, medical practitioners were becoming anxious about the rapid rise in the diabetes mortality rate. Cities like Paris, Berlin, London, New York, and Boston exhibited some of the greatest increases. The Harvard medical professor and diabetologist, Elliott Joslin, believed more accurate vital statistics accounted for some of the sharp rise in recorded deaths, but he was nevertheless troubled by what seemed to be an 80% increase in the diabetes death rate in the USA between 1900 and 1915. Extrapolating from numbers of deaths to numbers of cases, Joslin speculated in 1917 that there were "over 1 000 000 potential diabetics" in the USA alone.

The experiments of Joseph von Mering and Oscar Minkowski at the University of Strasbourg in 1889 had shown that diabetes had something to do with the malfunctioning of the pancreas, but that did not explain why certain individuals developed the disease or why the rate was increasing. Most believed heredity played at least some part. Theories of the nervous origin of the disease also enjoyed popularity and others explored the question of contagion. But almost all contended that the greatest risk factor for diabetes was being overweight. Indeed, Joslin went so far as to label diabetes "a penalty of obesity".

Obesity itself was considered to be a product of the modern way of life, linked to increased sugar consumption, the mechanisation of labour, and indulgent behaviours associated with consumer culture. For Haven Emerson, a medical professor at Columbia's College of Physicians and Surgeons, the problem was particularly acute in the USA,

where, as he wrote in 1924, Americans were "bulging with the money bags of the world, fairly oozing with wealth, eating every day much more than any of our allies or opponents of the war...and as it were, dying of overeating". Others insisted that the problem was more universal. Isabelo Concepcion, a Filipino physician, for example, noted that even in India diabetes was especially pronounced "among the idle rich".

Until the mid-20th century, physicians did not distinguish between type 1 and type 2 diabetes, believing instead that they were dealing with a single disease. Still, they recognised a difference between what they called "acute" and "chronic" forms of diabetes and that the rapid rise in diabetes cases was mostly among the middle-aged, elderly, and the "stout" who had the chronic form. The experience of diabetes was changed dramatically in 1921–22, when Frederick G Banting, Charles H Best, James B Collip, and John J R Macleod discovered and developed insulin at the University of Toronto, Canada. Particularly for individuals with the "acute" disease, this pancreatic extract meant the difference between life and death. Before its discovery, physicians tried to manage the disease with diets, although few could agree whether to eliminate carbohydrates, fats, or protein, or simply to restrict the intake of calories, often to near starvation levels. Some diabetes specialists claimed to have some success extending the lives of their young patients with dietary interventions, but even they had to admit that they were really only prolonging the inevitable. Insulin changed all that and miracle stories soon filled newspapers and medical journals, telling of children who had been brought back from the brink of death after starting on a daily regimen of the new drug. One of the most famous stories was of Elizabeth Hughes. The daughter of Charles Evans Hughes, US Secretary of State and later Chief Justice of the United States Supreme Court, Elizabeth had been diagnosed with diabetes when she was about 11 years old. 4 years later, when she began her insulin treatment, she weighed only 45 pounds and could barely walk. Within 5 weeks she had gained 10 pounds, and continued to gain weight steadily as well as grow in height. By June, 1922, *The New York Times* was declaring that Miss Hughes was "now believed to be entirely cured". Amid the excitement, however, cautious voices began to be heard, warning that insulin was not a cure but rather a new, imperfect, tool for managing diabetes. Many affected individuals soon found that what was certainly a new lease on life also meant the beginning of a difficult life-long struggle to stave off renal failure, cardiac arrest, blindness, gangrene, and many of the other complications that can develop when control of one's blood sugar proves elusive.

The initial enthusiasm was also tempered as medical practitioners came to recognise that insulin was doing little to

nothing to bring down mortality rates for diabetes. A little more than a decade after insulin's discovery diabetes ranked as the ninth leading cause of death in the USA, surpassing the death rate from the previous century's scourge, tuberculosis, in a growing number of cities. Nor were data from other countries any more encouraging. Statistics from most European countries, as well as from New Zealand, Australia, and Canada, indicated that the death rate from diabetes was increasing throughout the western world.

"Is diabetes a public health problem?" asked the author of a *Lancet* editorial in 1938. Acknowledging that public health efforts had traditionally focused on preventing the spread of communicable diseases, he nevertheless responded yes. In doing so he was joining a small chorus of physicians on both sides of the Atlantic who no longer believed diabetes should be framed solely as an individual condition but one that afflicted a society as well. These physicians' reasons were manifold, including the personal and public financial burden resulting from increased sickness and death, as well as the general social instability from disability and unemployment. However, the main thrust of their message—and the source of their frustration—was the simple fact that the deaths and disability appeared to them to be preventable. The medical community possessed the knowledge and the tools—or so they were convinced—to win its battle against a disease that largely afflicted those who were overweight and sedentary.

The vision of these individuals reflected, however, the narrowness that had come to characterise 20th-century approaches to protecting the public's health. Public health reforms in the 19th century had been defined by huge sanitary engineering projects that had transformed filthy, disease-infested neighbourhoods through the removal of urban waste from the streets, the development of water treatment facilities, the construction of comprehensive sewage systems, and the provision of medical services and public health education. The goals were nothing less than a reconstituting of the city's infrastructure and a reforming of the daily practices of its inhabitants. By contrast, 20th-century public health programmes focused on the identification, education, and treatment of the individual carriers of disease. Convinced that diabetes was largely a disease of the middle-classes and upper-classes, advocates of a public health approach to diabetes therefore directed their efforts towards encouraging annual medical examinations, educating physicians about the seriousness of the disease, and promoting detection drives to uncover "hidden diabetics". In short, what they hoped was that informed individuals would engage in enlightened conversations with their physicians, taking the necessary steps to prevent diabetes from developing or to treat it early, should the disease already be present.

It is no secret that these and other efforts failed to stop what many are now calling a diabetes "epidemic" and what one official at the US Centers for Disease Control and Prevention likened to a "runaway train". By 1985,



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30 million people worldwide were estimated to have diabetes, the vast majority with type 2 diabetes mellitus. That number is now around 180 million people, and WHO estimates that at this rate roughly 360 million people will have diabetes by 2030. No one thinks any longer of diabetes as a disease of the sedentary middle-class or of the idle rich. In developed countries, it has become largely a disease of poverty. Diabetes is, moreover, increasing most rapidly in developing countries, where industrialisation and urbanisation have led to the adoption of a western lifestyle that reduces physical activity and increases the consumption of processed high calorie foods. In stark contrast to Aretaeus's observation two millennia ago, diabetes has become "very frequent among mankind". As we struggle to combat diabetes today, we may, however, do well to pay as much attention to 19th-century public health experts, who understood the need to tackle the structural issues that were making their neighbourhoods unhealthy, as we do to our more immediate predecessors, who believed that encouraging individuals to change their behaviour was the best way to proceed.

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Further reading

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