New from nchs

The Scope of Diabetes in the United States Population

MARY GRACE KOVAR, DRPH, MAUREEN I. HARRIS, PHD, MPH, AND WILBUR C. HADDEN, MA

Since 1932, diabetes has been ranked among the 10 leading causes of death in the United States. Diabetes is the underlying cause of about 36,000 deaths annually,[1] and is a contributing cause in an additional 95,000 deaths.[2] It is the principal or secondary diagnosis in about 2.8 million hospitalizations each year and is believed to be a major cause of blindness, renal failure, lower extremity amputations, and congenital malformations.[3] Cardiovascular and peripheral vascular conditions appear to be about twice as common in diabetics as in nondiabetics.[3]

Despite diabetes being a significant cause of morbidity and mortality, knowledge of the prevalence of the disease in the population has been limited. National prevalence of self-reported diabetes has been estimated since 1958, using data from the National Health Interview Survey. Among all persons, self-reported diabetes has increased in prevalence from 0.9 per cent in 1958 to 2.6 per cent in 1985.[3,4] In addition, several community-based surveys have been conducted over the past 40 years to assess the impact of diabetes. Until recently, however, there have been no reliable estimates of the national prevalence of undiagnosed diabetes or impaired glucose tolerance. New data have become available because two-hour, 75-gram oral glucose tolerance tests (OGTT) were administered to a representative sample of civilian, noninstitutionalized adults aged 20–74 years with no medical history of diabetes. That study was part of the Second National Health and Nutrition Examination Survey (NHANES II) conducted by the National Center for Health Statistics (NCHS) in 1976–80.[5] This is the first national study in which criteria of the World Health Organization (WHO)[6] and the National Diabetes Data Group (NDDG)[7] have been used for administering the OGTT and for classifying diabetes and glucose intolerance.

The critical finding from NHANES II is that only about half of people with diabetes know that they are diabetic. While approximately 3.4 per cent of the US population age 20–74 years have been diagnosed as having diabetes, an additional 3.2–3.4 per cent meet criteria for the disease but have not been diagnosed (Figure 1). Thus diabetes appears to be twice as prevalent in the United States as rates estimated from medical history surveys.

Address reprint requests to: Wilbur C. Hadden, MA, Division of Health Examination Statistics, National Center for Health Statistics, 3700 East-West Highway, Room 2-58, Hyattsville, MD 20782. Dr. Kovar is with the Office of Vital and Health Statistics Systems at NCHS; Dr. Harris is with the National Diabetes Data Group, National Institute of Diabetes and Digestive & Kidney Diseases, National Institutes of Health.

Editor's Note: See also related editorial p 1502 this issue.

The age, race, and sex patterns are similar for both diagnosed and undiagnosed diabetes (Figure 1). Prevalence of both rises with age and is higher among Blacks than Whites. Sex differences are smaller, but at younger ages women are more likely than men to be diabetic. Prevalence increases with higher levels of overweight; people who are 50 per cent over desirable weight are five times as likely to be diabetic as those at desirable or lighter weight.[5]

NHANES II also provided information on impaired glucose tolerance (IGT), a condition newly defined by WHO and NDDG to encompass persons who were formerly termed "borderline" or "chemical" diabetics. Persons with IGT have abnormal glucose tolerance, although less severe than that of diabetics. They are at greater risk for development of diabetes than the general population, but may not be at risk for the acute or chronic complications of the disease as long as their glucose tolerance does not deteriorate further. Prevalence of IGT is 11.2 per cent using WHO criteria and 4.6 per cent using NDDG criteria. This difference resulted primarily because NDDG utilizes a mid-test glucose value in defining glucose tolerance. The use of the mid-test value did not greatly affect estimates of prevalence of undiagnosed diabetes (3.4 per cent by WHO and 3.2 per cent by NDDG).

Summing the prevalence of diagnosed and undiagnosed diabetes and impaired glucose tolerance, it appears that 18.0 per cent (using WHO criteria; 11.2 per cent by NDDG criteria) of the US population ages 20–74 years exhibit some degree of glucose intolerance. At age 65–74 years, the oldest age group studied, the prevalence is 41.5 per cent.

It is remarkable that in community studies over the past 40 years, and now in this recent national study, the same ratio of about half diagnosed and half undiagnosed diabetes has been found—even though the WHO and NDDG criteria are far stricter for diagnosing diabetes than earlier criteria. It is also remarkable that the ratio holds for different age groups, for both sexes, and for both Whites and Blacks. This is unlike the situation for hypertension, where awareness has increased over the years and there are differences in the ratio of diagnosed to undiagnosed hypertension by age, race, and sex.[8] It is likely that High Blood Pressure awareness programs have been effective in making increasing numbers of people aware that they have hypertension. There has been no such successful effort for diabetes.

It is not known why there is a large reservoir of undiagnosed diabetics in the United States. It is independent of age, race, and sex and so does not appear to result from lack of access to medical care settings where a diagnosis would be made. In all likelihood, it is due to the diabetes being

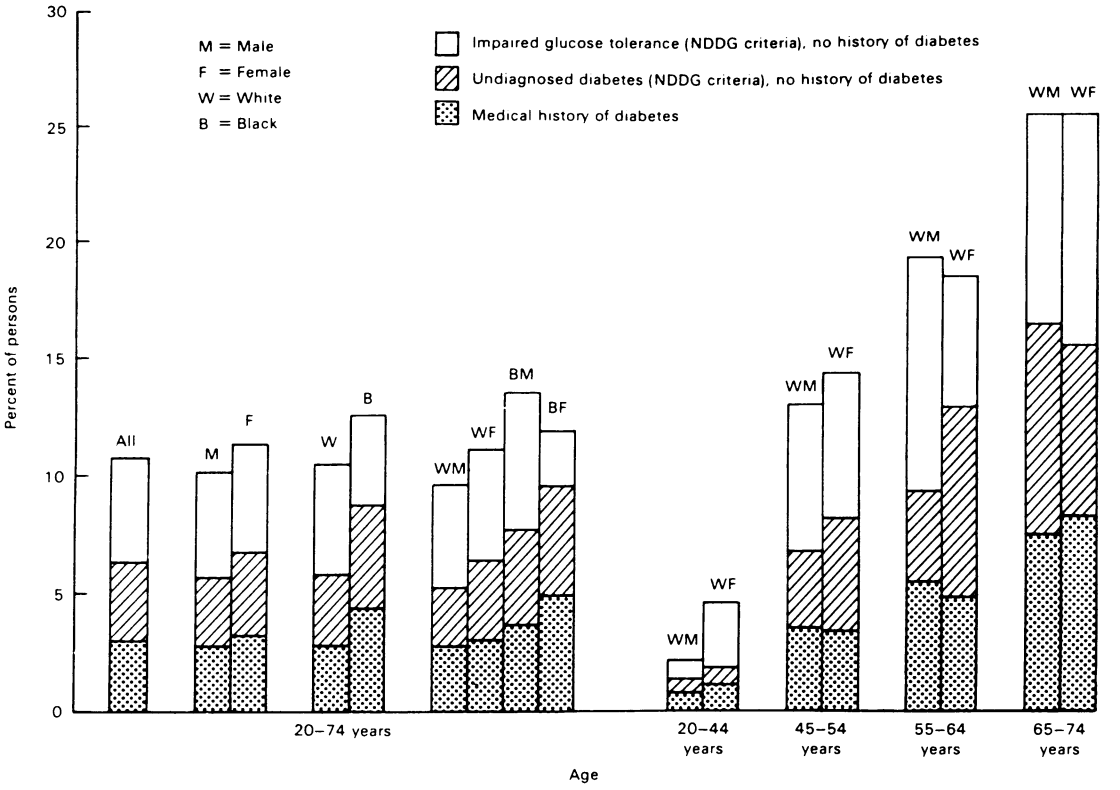

FIGURE 1—Per Cent of Adults Aged 20–74 Years with Medical History of Diabetes (NHIS, 1976) and Per Cent with No Medical History of Diabetes Who Had Undiagnosed Diabetes or Impaired Glucose Tolerance Using National Diabetes Data Group (NDDG) Criteria (NHANESII, 1976–80), by Race, Sex, and Age, United States

so asymptomatic that diagnosis is not sought. Consequently, these undiagnosed individuals are not receiving treatment for their diabetes. It is believed that elevated blood glucose levels are a major cause for the complications of diabetes and that these complications can be avoided or delayed in many cases by control of blood glucose and close medical supervision with appropriate intervention. The high prevalence of undiagnosed diabetes places many people unknowingly at increased risk of heart disease, blindness, renal failure, and inadequate circulation and sensation in peripheral tissues that can lead to infection, injury, and amputation. Applying estimates from NHANES II data to 1987 population estimates suggests that as many as 5.0 million people may be at such increased risk, in an age when there are known medical interventions.

REFERENCES

1. National Center for Health Statistics: Births, marriages, divorces, and deaths for 1986. NCHS Monthly Vital Statistics Report, Vol. 35, No. 12, April 2, 1987.
2. National Center for Health Statistics: Multiple causes of death in the United States. NCHS Monthly Vital Statistics Report, Vol. 32, No. 10, Suppl 2, February 17, 1984.
3. National Diabetes Data Group, Harris M, Hammon R (eds): Diabetes in America. NIH Pub. No. 85-1468. Washington, DC: Govt Printing Office, 1985.
4. National Center for Health Statistics, A. J. Moss and V. L. Parsons: Current estimates from the National Health Interview Survey, United States, 1985. Vital and Health Statistics, Series 10, No. 160. DHHS Pub. No. (PHS) 86-1588. Washington, DC: Govt Printing Office, September 1986.
5. National Center for Health Statistics, Hadden WC, Harris MI: The prevalence of diagnosed diabetes, undiagnosed diabetes and impaired glucose tolerance in adults 20–74 years of age, United States, 1976–80. Vital and Health Statistics, Series 11, No. 237. DHHS Pub. No. (PHS) 87-1687. Washington, DC: Govt Printing Office, February 1987.
6. National Diabetes Data Group: Classification and diagnosis of diabetes mellitus and other categories of glucose intolerance. Diabetes 1979; 28:1039–57.
7. World Health Organization: Report of Expert Committee on Diabetes Mellitus. Technical Report Series No. 646. Geneva: WHO, 1980.
8. National Center for Health Statistics, Drizd T, Dannenberg AL, Engel A: Blood pressure levels in persons 18–74 years of age in 1976–80, and trends in blood pressure from 1960 to 1980 in the United States. Vital and Health Statistics, Series 11, No. 234. DHHS Pub. No. (PHS) 86–1684. Washington, DC: Govt Printing Office, July 1986.

Copies of "Prevalence of Diagnosed Diabetes, Undiagnosed Diabetes, and Impaired Glucose Tolerance in Adults 20–74 Years of Age: United States, 1976–80", *Vital and Health Statistics* Series 11, No. 237 are available from the US Government Printing Office, Washington DC 20402. Order stock no. 017-022-00988-9. The price is $3.00.

For more information about this and other reports and data from the National Center for Health Statistics, write to the Scientific and Technical Information Branch, NCHS, 3700 East-West Highway, Hyattsville, MD 20782, or call (301) 436-8500.