Association of age at diabetes diagnosis and all-cause and cardiovascular mortality among 600,000 US adults

Introduction: Diabetes is a leading cause of morbidity and mortality in the United States, causing an estimated 440,000 deaths among US adults in 2019. Establishing the relevance of diabetes diagnosis at various ages to mortality in the contemporary US population, both overall and among major demographic subgroups, may inform public health policy and strategy.

Methods: We aimed to quantify the association between age at diabetes diagnosis and all-cause and cardiovascular mortality among US adults using publicly-available data from the National Health Interview Survey 1997-2018, linked to the National Death Index through 2019. We used Cox regression adjusted for age, sex, race and ethnicity, educational attainment, smoking status, body-mass index, physical activity, and insurance coverage to estimate all-cause and cardiovascular mortality rate ratios overall, by sex, and by race and ethnicity.

Results: Among 601,467 included adults (56% female, 16% Hispanic and 14% non-Hispanic Black) there were 75,122 deaths during 6.6 million person-years of follow-up. Overall, the all-cause mortality rate ratio associated with diabetes diagnosed at ages 20-29, 30-39, 40-49, 50-59, 60-69, or 70-79 years were 3.87 (95% CI 3.47-4.32), 2.87 (2.68-3.07), 2.26 (2.16-2.36), 1.72 (1.65-1.79), 1.47 (1.41-1.53), and 1.26 (1.19-1.33), respectively. The corresponding cardiovascular mortality rate ratios were 5.02 (4.09-6.16), 3.37 (2.99-3.78), 2.88 (2.65-3.13), 1.94 (1.81-2.09), 1.53 (1.43-1.65), and 1.27 (1.15-1.40), respectively. These associations were similar by sex and by race and ethnicity. However, the age-specific prevalence of diagnosed diabetes among Hispanic and non-Hispanic Black participants was appreciably greater than that of non-Hispanic White participants. These associations were similar among those with and without other major chronic disease at recruitment (eg, heart disease, stroke), but individuals who were insulin-dependent at recruitment had approximately twice the excess mortality of those who were not insulin-dependent.

Conclusion: Age at diabetes diagnosis is associated with all-cause and cardiovascular mortality in a dose-dependent and approximately log-linear manner. Although associations were generally similar across demographic subgroups, differences in age-specific diabetes prevalence led to disparities in disease burden. The prevention and control of diabetes should be an urgent US public health priority, with a focus on addressing health disparities.