Life expectancy in people with type 1 diabetes

A prospective cohort study in Scotland reported that men aged 20 years with type 1 diabetes had a life expectancy 11 years shorter than unaffected men in the general population, and women with type 1 diabetes could expect to live 13 years less.

**Overview:**
- In Scotland, men with type 1 diabetes had a life expectancy 11 years shorter than unaffected men, and women with type 1 diabetes could expect to live 13 years less than unaffected women.
- Some improvements in life expectancy have occurred compared with 50 years ago, when the additional life expectancy for a 20-year-old person with diabetes was 25–30 years.
- This positive trend in life expectancy mirrors the improvements in management of type 1 diabetes over the past decades, although more efforts are required to better manage the risk of complications, such as cardiovascular disease and diabetic ketoacidosis.

**Background:** Life expectancy is shorter for people with type 1 diabetes compared with people who do not have diabetes. Previous studies have put the reduction in life expectancy for people with type 1 diabetes in the range of 15 to 17 years (Brown et al. 2001). Acute metabolic complications of diabetes and cardiovascular disease are the greatest causes of excess death in people with type 1 diabetes (Laing et al. 2001). The risk of these complications is greatly reduced by treatment that keeps circulating glucose levels to as near normal as possible.

**Current advice:** The recently updated NICE guideline on type 1 diabetes in adults recommends treating people who have type 1 diabetes with insulin replacement therapy. This approach should be supported by active management of other cardiovascular risk factors, such as hypertension and high circulating lipids.

Blood glucose (HbA1c) levels should be measured every 3–6 months in adults with type 1 diabetes. Adults with type 1 diabetes should aim for a target HbA1c level of 48 mmol/mol (6.5%) or lower, to minimise the risk of long-term vascular complications. Cardiovascular risk factors should be assessed.
annually. NICE guidance on lipid modification should be used for primary prevention of cardiovascular disease in adults with type 1 diabetes.

The NICE pathway on type 1 diabetes in adults brings together all related NICE guidance and associated products on the condition in a set of interactive topic-based diagrams.

New evidence: A cohort study by Livingstone et al. (2015) used population data from Scotland to estimate the life expectancy for people with type 1 diabetes compared with people who did not have diabetes.

People aged 20 years or older who had type 1 diabetes were identified from the Scottish Care Information—Diabetes Collaboration database. A total of 24,691 people who were registered with the database between 2008 and 2010 were included in the study cohort. This group had 1043 deaths over 67,712 person–years of follow-up.

These data were linked with mortality data from the National Records of Scotland, which were also used to provide general population data for 2008 to 2010. A total of 161,023 deaths over 12,064,456 person–years were recorded over this period for the general population without type 1 diabetes aged 20 years or older. The authors used period life expectancy estimates to calculate the expected additional years of life for the study cohort if mortality rates observed in 2008 to 2010 across all age strata were valid throughout their lives.

The life expectancy for men aged 20 years who had type 1 diabetes was 66.2 years, compared with 77.3 years among men without type 1 diabetes. This difference corresponded with an estimated loss in life expectancy for men with diabetes of 11.1 years (95% confidence interval [CI] 10.1 to 12.1 years). Among women aged 20 years, those with type 1 diabetes could expect to live to 68.1 years and those without diabetes to 81.0 years. This difference corresponded with an estimated loss in life expectancy of 12.9 years for women with type 1 diabetes (95% CI 11.7 to 14.1 years).

Overall, ischemic heart disease was responsible for most of the reduced life expectancy in people with diabetes, accounting for 36% of the estimated loss in life expectancy in men and 31% in women. In people aged 50 years or less, diabetic coma or ketoacidosis was the largest factor in the loss in life expectancy for people with diabetes (29% of the estimated loss in men and 22% in women).

This study used contemporary death rates and a very large sample, and the population was very similar to that in England. However, it was limited by the lack of long-term data, which could be used to assess whether life expectancy had improved over time. In addition, it is not clear if and how the authors adjusted for confounding factors, such as socioeconomic status and comorbidities.

Commentary by David Dunger, Professor of Paediatrics, University of Cambridge and MLoredana Marcovecchio, Clinical Research Associate, University of Chieti, Italy:

“The study by Livingstone et al. (2015) offers a contemporary picture of life expectancy in people with type 1 diabetes based on registry data from Scotland. This large data collection confirms that type 1 diabetes has a serious impact on the long-term prognosis of patients. Fortunately, some improvements have occurred compared with 30 years ago, when the reduction in life expectancy for a person with diabetes was 15–17 years (Brown et al. 2001).

“This positive trend in life expectancy mirrors the effect of improvements in diabetes management that have occurred during the past decades. These have included the implementation of more intensive insulin approaches, as well as the introduction of cardio-renal interventions with antihypertensive drugs and statins for adults with type 1 diabetes. However, the study results suggest that diabetes management is still far from perfect, and more efforts are required to better manage and care for people with type 1 diabetes in order to reduce complication risk.

“Another key point that emerged from this study was that cardiovascular disease was the main cause of loss of life expectancy. This finding underlines that prevention of cardiovascular disease is a clinical and public health priority in the population with type 1 diabetes. There is a strong need to identify new...
biomarkers to improve early prediction of cardiovascular disease risk. Efforts to improve glycaemic control, as well as control of other cardiovascular risk factors, with known and new treatment strategies are also required.

“This study also highlights a greater loss of years of life in women than in men. This is in line with other reports indicating a higher cardiovascular risk in women with type 1 diabetes (Huxley et al. 2015). Although the underlying factors for this sex-related difference are not fully understood, it suggests that women with diabetes might require more intensive treatment strategies to prevent complications.

“Last but not least, this study confirms that acute complications, such as diabetic ketoacidosis, still represent life-threatening events in people with type 1 diabetes, mainly in people younger than 50 years. Therefore, efforts are required also to prevent them.”

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