Diabetes accelerates the onset of severe long-term conditions by 15-20 years, cutting life expectancy

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In a recent study published in the journal *Nature Medicine*, researchers in the United Kingdom (UK) estimated the onset age, number of years spent, and life loss in diabetes-related multiple long-term conditions (MLTCs) among 46 million English adults. They found that diabetes accelerated the onset of severe MLTCs by 15–20 years, significantly reduced life expectancy, and varied in impact across age groups. While hypertension, cancer, depression, and coronary heart disease were found to be major contributors in older adults, mental health conditions and asthma were found to be significant in younger adults.

Study: The burden of diabetes-associated multiple long-term conditions on years of life spent and lost. Image Credit: Ground Picture / Shutterstock

Background

Type 2 diabetes significantly contributes to various forms of morbidity due to insulin resistance, chronic hyperglycemia, and related dysfunctions. It is strongly associated with both microvascular and macrovascular complications, including cardiovascular, eye, foot, and kidney diseases. Although guidelines and prevention efforts have reduced these complications, diabetes also increases morbidity risks for conditions like cancer, respiratory disease, infections, liver disease, and dementia. These conditions are becoming more prevalent due to factors like increasing life expectancy and obesity, shifting the burden of complications toward younger adults and from cardiovascular to non-cardiovascular diseases, leading to a rise in MLTCs. The healthcare system, particularly in England, faces challenges in managing the growing burden of MLTCs, which affects clinical care, costs, and quality of life. Current metrics inadequately capture the diversity and severity of MLTCs, emphasizing the need for better quantification of years spent and life reduced due to these conditions. Improved metrics could help understand modifiable risk factors and inform healthcare responses and prevention strategies for MLTCs. Therefore, researchers in the present study examined the burden of MLTCs associated with diabetes among adults in England using a comprehensive dataset to develop new metrics.

About the study

The study used the National Bridges to Health Segmentation Dataset, which includes data from individuals registered with a general practitioner (GP) in England since 2014. A total of 46,748,714 adults aged 20 and older were included in the study. To avoid distortions related to the coronavirus disease 2019 (COVID-19) pandemic, data were included from April 2019 to March 2020. Further, data on socio-demographics, geography, and clinical diagnoses for 35 long-term conditions. The conditions were defined based on extensive clinical review and established coding systems such as the International Classification of Diseases (ICD)-10, Office of Population Censuses and Surveys (OPCS), and Systematized Medical Nomenclature for Medicine–Clinical Terminology (SNOMED CT) codes.

The prevalence of diabetes with MLTCs was estimated. A three-state illness-death Markov model was then used to estimate the years people spend with and lose due to these conditions. Key metrics were determined, including

lifetime risk, median age of onset, years lived with the conditions, age at death, and years of life lost, considering both individual and community perspectives.

Results and discussion

Among all the included participants, 7.8% were diagnosed with diabetes. Adults with diabetes showed a higher prevalence of MLTCs compared to those without diabetes. At 50 years of age, about one-third of the adults with diabetes had at least three MLTCs, a prevalence not reached in the general population until age 65–70 years. Common comorbid conditions included hypertension, coronary heart disease (CHD), osteoarthritis, depression, and asthma, and varied by age and sex. For example, older adults often had hypertension and CHD, while younger adults more commonly experienced depression and asthma.

The median onset age for at least two conditions was found to be 66–67 years, with persons observed to develop more conditions experiencing earlier death and fewer years with MLTCs. Younger adults with MLTCs were found to face a greater impact on life years spent and lost. For diabetes-associated comorbidities, classic vascular-renal complications showed a late onset and fewer years lost, while mental health conditions and asthma showed an earlier onset and longer life spent with the conditions. Additionally, community-level impact was highlighted, with hypertension, depression, osteoarthritis, asthma, and CHD posing significant burdens. Men experienced more years of life lost due to hypertension and CHD, while women were more significantly affected by depression.

The study is strengthened by its comprehensive coverage of over 98% of the English population registered with a GP, providing highly representative data on diabetes-associated MLTCs and quantifying the burden at both individual and community levels. However, the study is limited by the potential under-ascertainment from hospital/community datasets, the exclusion of some conditions, the inability to differentiate between diabetes types, and the focus on 35 prioritized conditions, possibly leading to conservative estimates of the metrics.

Conclusion

In conclusion, the present study highlights the extensive burden of diabetes-associated MLTCs, considering both individual and community perspectives. The

findings support improved health service resource allocation and commissioning decisions, emphasizing the need for innovative prevention and treatment strategies for MLTCs.

Journal reference:

- The burden of diabetes-associated multiple long-term conditions on years of life spent and lost. Gregg, E.W. et al., *Nature Medicine* (2024), DOI: 10.1038/s41591-024-03123-2, https://www.nature.com/articles/s41591-024-03123-2

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