

Prediabetes is more than just dysglycaemia

Prediabetes, which is increasing in prevalence, is associated with an increased risk of all-cause mortality and cardiovascular disease. This large study set out to investigate the associations between changes in prediabetes status and risk of death, and to clarify the roles of modifiable risk factors in these associations in a Taiwanese cohort. Participants with prediabetes were recruited and followed for a median of 8 years. Within 3 years, 3.9% of the cohort developed type 2 diabetes and 37.2% reverted to normoglycaemia. Reversion to normoglycaemia was not associated with a lower overall risk of death compared to those with persistent prediabetes. However, reversion to normoglycaemia in combination with physical activity was associated with a lower risk of death compared to persistent prediabetes and inactivity. In those with obesity, risk of death varied between those who reverted to normoglycaemia and those who had persistent prediabetes. The findings support the importance of lifestyle modifications in individuals with prediabetes.



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Prediabetes is very common; a cross-sectional study suggested that more than a third of adults in England had prediabetes and that the prevalence had tripled over the preceding 8 years (Mainous et al, 2014). However, because of the nature of the study, it was not possible to identify how many of these individuals progressed to type 2 diabetes.

A previous high-quality meta-analysis (Cai et al, 2020) demonstrated that prediabetes is associated with an increased risk of all-cause mortality and cardiovascular disease (CVD) in the general population, and in those with atherosclerotic CVD. This has significant implications for the screening and management of prediabetes in the primary and secondary prevention of CVD (see my [earlier Diabetes Distilled piece](#)).

However, high-quality evidence exploring the impact of reversion from prediabetes to normoglycaemia on cardiovascular and mortality outcomes remained, hitherto, sparse.

This recently published, well-conducted, population-based prospective cohort study aimed to investigate the associations between changes in prediabetes status and the risk of death, as well as to clarify any modifiable risk factors in these associations (Cao et al, 2023). It interrogated data from a well-established Taiwanese cohort, so the results are not immediately generalisable to

healthcare professionals working within the UK.

Nearly 46 000 individuals with prediabetes were recruited. The mean age was 44.6 years, 37.1% were females and all identified as being from an Asian ethnic background. Recruited individuals were also generally from higher socioeconomic backgrounds. Median follow-up was 8 years.

Within 3 years of recruitment, 1786 individuals (3.9%) developed type 2 diabetes and 17 021 (37.2%) reverted to normoglycaemia. Unsurprisingly, the authors found that progression from prediabetes to type 2 diabetes within 3 years was associated with higher risks of all-cause death and CVD-related death, compared with a persistent diagnosis of prediabetes.

Notably, reversion to normoglycaemia was not associated with a lower risk of all-cause death, cancer-related death or CVD-related death. However, in individuals who were physically active, reversion to normoglycaemia was associated with a lower risk of all-cause death, compared to those who had a persistent diagnosis of prediabetes but remained physically inactive. High levels of physical activity translated to around 2 years longer life expectancy in this study.

Furthermore, normoglycaemia did not offset the risks of smoking. Current smokers had a

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The full study can be read [here](#).

significantly higher risk of death, irrespective of whether they reverted to normoglycaemia or remained with a diagnosis of prediabetes. Current smoking translated to around 3 years less life expectancy in this study.

Moreover, obesity status also impacted improvement in outcomes when reverting from prediabetes to normoglycaemia. The risk of all-cause death was higher in those living with obesity and reversion to normoglycaemia, or those living with obesity and prediabetes, compared to those with persistent prediabetes and normal weight.

In conclusion, reversion to normoglycaemia was only associated with lower risks of death and a longer life expectancy when accompanied by significant lifestyle change, such as high levels of physical activity, not smoking and maintaining a healthy body weight.

This study suggests that prediabetes is more than just dysglycaemia, and reinforces the importance of maintaining positive lifestyle interventions in those living with prediabetes, even if they subsequently revert to normoglycaemia.

These results should help inform type 2 diabetes prevention programmes, such as the NHS Diabetes Prevention Programme and the Scottish Diabetes Prevention Framework.

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Cao Z, Li W, Wen CP et al (2023) Risk of death associated with reversion from prediabetes to normoglycemia and the role of modifiable risk factors. *JAMA Netw Open* **6**: e234989

Mainous AG 3rd, Tanner RJ, Baker R et al (2014) Prevalence of prediabetes in England from 2003 to 2011: population-based, cross-sectional study. *BMJ Open* **4**: e005002