

Anemia distorts regular method of diabetes diagnosis and questions its reliability

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The use of glycated haemoglobin (sugar-bound haemoglobin, or HbA1c) is now in almost universal use to assist doctors in the diagnosis of type 2 diabetes. However new research published in *Diabetologia* (the journal of the European Association for the Study of Diabetes) highlights how anaemia—a common condition in the general population, especially in women—can lead to a false diagnosis of diabetes based on HbA1c, when a person's blood sugar control is actually normal. The research is by Dr Emma English, University of Nottingham, UK, and colleagues.

In recent years, there has been a move towards the use of HbA1c for the diagnosis of [type 2 diabetes](#) (T2D). The World Health Organization (WHO) and the American Diabetes Association (ADA) have both advocated the use of HbA1c for diagnosing this condition, at a value of 6.5% (48 mmol/mol). In the UK and most of Europe, the same cut off is used.

Following the recommendations of WHO to use HbA1c as the diagnostic method for T2D, the UK (via its government's Department of Health) issued expert guidance stating that one of the major issues affecting this technique was anaemia, which affects the levels of haemoglobin (Hb) in the blood. WHO defines anaemia in adults as 120 g/l Hb in non-pregnant women and 130 g/l in men. With approximately 29% of non-pregnant women worldwide having anaemia (latest estimate from 2011), this translates to a significant number of people where the use of HbA1c for diagnosis of diabetes is unsuitable. The latest WHO estimate for anaemia prevalence in men was 13%, likely to be higher in elderly men, although

data are scarce.

In this systematic review, the authors aim to address the above questions by assessing the available evidence on the impact of abnormalities of erythrocyte (red blood cell) indices and anaemia on HbA1c levels around the WHO/ADA diagnostic cut off point of 48 mmol/mol (6.5%). The review of research between 1990 and 2014 included studies which had at least one measurement of HbA1c and glucose, and at least one index of anaemia involving non-pregnant adults not diagnosed with diabetes. The authors identified 12 studies suitable for inclusion, the majority of which focused on iron deficiency anaemia and, in general, demonstrated that the presence of iron deficiency with or without anaemia led to an increase in HbA1c values compared with controls, with no corresponding rise in blood glucose, thus rendering any diagnosis of diabetes in such individuals unreliable without further tests.

The authors say: "HbA1c is likely to be affected by iron deficiency and iron deficiency anaemia with a spurious increase in HbA1c values. This may lead to confusion when diagnosing diabetes using HbA1c. This review clearly identifies the need for more evidence, especially in identifying the types and degrees of anaemia likely to have significant impact on the reliability of HbA1c."

While further evidence is gathered, the authors make several recommendations regarding clinical practice, including:

1. During monitoring of people with diabetes, when glucose and HbA1c measurements give different results, consider abnormalities related to anaemia or iron deficiency.
2. Iron deficiency, as well as [iron deficiency anaemia](#), may be sufficient to cause a change in HbA1c values; this is highly relevant in women of childbearing age.
3. If abnormalities such as anaemia are identified, consider

correction of the abnormality (for example using iron supplementation if caused by iron deficiency) before using HbA1c for diagnosis or monitoring. The studies included in this review suggest that it may take up to 6 months after treatment is initiated to normalise haemoglobin levels.

Calling for more research in view of the relatively small number of studies they were able to include in their review, the authors conclude: "The key questions that are still to be answered are whether anaemia and red blood cell abnormalities will have a significant impact on the diagnosis of diabetes using HbA1c in the [general population](#)—something that is now widely performed."

Provided by Diabetologia

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