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# Managing non-diabetic hyperglycaemia (pre-diabetes) in primary care

## What is non-diabetic hyperglycaemia?

Non-diabetic hyperglycaemia is the preferred NHS England term for a condition which has previously been described as pre-diabetes. It is defined as blood glucose levels which are above normal, but not in the diabetic range (HbA1c 42-47 mmol/mol or 6.0-6.4% or a fasting plasma glucose of 5.5-6.9 mmol/L).<sup>[1]</sup> For consistency, this article will use the term non-diabetic hyperglycaemia and use the abbreviation NDH, although some of the references may refer to the older term of pre-diabetes.

## How common is non-diabetic hyperglycaemia? (Epidemiology)

- In 2011 it was estimated that one third of adults in England had NDH, a significant increase from the 2003 prevalence of 11%.<sup>[2]</sup>
- This large increase in prevalence has raised concerns about overdiagnosis, and that giving a label of NDH may cause health anxiety and stigma in patients who may never become unwell from NDH. The opportunity costs of identifying and managing NDH need also to be considered in a primary care system which is increasingly stretched (what else could GPs be doing with this time?).<sup>[3]</sup> On a related subject, it has been suggested that all new guidelines should include a calculation of the time which will be needed to implement them, which would be a useful addition to guidance on NDH.<sup>[4]</sup>

### Risk factors<sup>[5]</sup>

The National Institute for Health and Care Excellence (NICE) advises that the following groups of people should have a risk assessment for diabetes (at which it is possible that NDH may be diagnosed):

- All non-pregnant adults aged 40 or above.
- Those in high-risk black and minority ethnic groups aged 25 to 39, excluding pregnant women. High-risk groups include those of South Asian, Chinese, African-Caribbean and black African ethnicities.
- Adults with conditions that increase the risk of type 2 diabetes, including vascular disease, obesity, hypertension, polycystic ovary syndrome and learning disabilities.
- All those with a past history of gestational diabetes.

There are scoring systems which can be used in primary care to identify those who are at high risk of having NDH or diabetes and who should therefore have their blood pressure checked. These include QDiabetes<sup>®</sup>,<sup>[6]</sup> the Cambridge Diabetes Risk Score<sup>[7]</sup> and the risk score on the Diabetes UK website.<sup>[8]</sup> However, these scoring systems may not take into account all risk factors and so clinical judgment is also needed.

## Non-diabetic hyperglycaemia symptoms

There are usually no symptoms, although patients may be aware of having conditions which increase the likelihood of NDH, such as obesity, hypertension or vascular disease.

## Investigations

The diagnosis is made as described above, usually with an HbA1c blood test but sometimes with a fasting blood sugar. Other relevant tests may include those for other cardiovascular risk factors, such as lipids.

## Associated diseases

Several cardiovascular findings are more prevalent, including [hypertension](#), [angina](#) and medical history of [atherosclerosis](#) and [stroke](#). [Hyperlipidaemia](#) is also often associated.

## Treatment for non-diabetic hyperglycaemia

Intervention can favourably influence the clinical course of impaired glucose tolerance, with a reduction in progression to diabetes. An overall [assessment of cardiovascular risk](#) is recommended and any conditions found should be treated (eg, hypertension or hyperlipidaemia).<sup>[5]</sup>

## General measures

- It has been shown that the risk of progression from impaired glucose tolerance to type 2 diabetes mellitus can be reduced by lifestyle interventions.<sup>[9]</sup>
- Several clinical trials have found that lifestyle modification is the most effective strategy to prevent progression to type 2 diabetes.<sup>[10]</sup>
- The advice is essentially the same as diet and exercise advice in diabetes:
  - Weight reduction, if appropriate.
  - Reduction in total intake of fat and intake of saturated fat.
  - Increasing intake of dietary fibre.
  - Increasing physical activity.<sup>[11]</sup>

## Referral to the Diabetes Prevention Programme (DPP)

The DPP is available to all those who have been identified as being at high risk of developing type 2 diabetes – it is a nine-month, evidence-based<sup>[12]</sup> lifestyle change programme which can be attended digitally or face to face and individually or in a group.<sup>[13]</sup> There are sessions tailored to specific populations, such as those who require it to be delivered using British Sign Language, those with visual impairment and those from populations who need it to be delivered in a particular language or in a culturally specific way.

It has been estimated that out of a cohort of 390,000 participants taking part in the DPP over five years, 18,000 cases of diabetes would have been prevented or delayed and that the DPP has the potential to save £35 million and 18,000 quality adjusted life years over 20 years.<sup>[12]</sup>

## Pharmacological

The risk reduction of diabetes using metformin, pioglitazone, acarbose, valsartan and orlistat in clinical studies has ranged from 14% to 72%.

- Reversal of drug-related iatrogenic causation of glucose intolerance. Whenever possible, substitute agent(s) that do not have an adverse effect on glucose tolerance, or reduce the dosage of the offending drug - eg, replacing a thiazide diuretic when treating hypertension, minimising use of corticosteroids.
- Metformin should be considered for adults at high risk whose blood glucose measure (fasting plasma glucose or HbA1c) shows they are still progressing towards type 2 diabetes, despite their participation in an intensive lifestyle-change programme, or if they are unable to participate in lifestyle-change programmes.<sup>[5]</sup>
- Orlistat should be considered for adults who have a BMI of 28.0 kg/m<sup>2</sup> or more, as part of an overall plan for managing obesity which takes into account the person's risk and the level of weight loss and lifestyle change required to reduce this risk.<sup>[5]</sup>
- There is increasing interest in the GLP-1 analogue group of drugs for weight loss and reduction of risk of diabetes. Liraglutide is now approved for use on the NHS for those with obesity and NDH who are being seen in a tier 3 weight management service<sup>[14]</sup> and there are ongoing studies showing a reduction in progression to diabetes with the use of semaglutide.<sup>[15]</sup> At present this category of drugs is not funded in primary care for this indication (although they are routinely used to treat diabetes) but this may change in the future.

## Complications

- Approximately 70% of individuals with NDH will progress to [type 2 diabetes](#) over their lifetime and it is also associated with the development of vascular disease.<sup>[16]</sup>

*In 2019, Dr Hazell was the eLearning fellow on an RCGP course about non-diabetic hyperglycaemia and the diabetes prevention programme. The funding for this course came from NHS England.*

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