

Policy Statement

Low carbohydrate diets for the management of Type 2 Diabetes in adults

Summary

The role and the amounts of carbohydrate in foods as part of the diet of people with type 2 diabetes is often misunderstood, and has been questioned in recent years.

Low carbohydrate diets have been regarded as an effective option for people with type 2 diabetes since the publication of the Diabetes UK Guidelines in 2011 (Dyson 2011a) with the recently updated Diabetes UK guidelines reiterating this recommendation (Diabetes UK 2018). Dietitians have a key role to play in supporting those choosing a low-carbohydrate diet to manage their nutritional needs and their type 2 diabetes.

Weight loss remains the cornerstone of type 2 diabetes management, regardless of how it is achieved, be that a low-carbohydrate, very-low-calorie or low-fat diet, or as a result of bariatric surgery. As with all areas of diet and nutrition, an individualised approach needs to take account of different tastes, lifestyles and beliefs.

More research is needed to ascertain the long-term health impacts of a low-carbohydrate diets, including on heart health.

A joint working group of The Scientific Advisory Committee on Nutrition (SACN) NHS England and Diabetes UK, with input from the BDA and Royal Colleges, is reviewing the evidence on low carbohydrate diets compared to current government advice for adults with type 2 diabetes. It is expected to report in early 2020.

This BDA policy statement (written by dietitians with clinical expertise in treating people with type 2 diabetes) is intended to state the BDA's view point in the interim and it will be reviewed as necessary, following the publication of the joint working groups report.

This statement does not attempt to cover the needs of people with type 1 diabetes or a range of groups of people with particular needs such as children, adolescents and pregnant women. The exclusions are listed in the Background section of this Policy Statement.

The BDA believes that:

- Low-carbohydrate diets (i.e. defined as diets containing between 50g and 130g carbohydrate) can be effective in managing weight, improving glycaemic control and cardiovascular risk in people with Type 2 diabetes in the short term i.e. less than 12 months (Diabetes UK 2018). This is probably due to the accompanying reduction in energy (calorie) intake and subsequent weight loss (Diabetes UK 2018).

- More research is needed to determine the effect of long-term adherence (over 12 months) to low carbohydrate diets (as defined above) on blood glucose control (and therefore control of diabetes), and also the effect on heart health in people with type 2 diabetes.
- When people restrict their intake of carbohydrate, the relative amounts of other macronutrients (fat and protein) tend to increase. More research is needed to identify the best dietary patterns (and therefore ideal nutritional composition) to ensure both good glycaemic control and reduction in cardiovascular disease risk.
- Weight loss is still the cornerstone of management of type 2 diabetes. There is insufficient evidence to indicate that low carbohydrate diets are a superior or better approach than other strategies for weight loss and subsequent weight maintenance in the long term.
- When considering a low carbohydrate diet as an option, people with diabetes who are on certain drugs including insulin should be made aware of possible side effects such as the risk of hypoglycaemia or in rare cases ketoacidosis; it is important that individuals on such treatments should be supported by doctors and dietitians to manage such risks which may involve adjusting medication.
- People with type 2 diabetes who choose to follow a low carbohydrate diet (as defined above) should be supported by a dietitian to ensure that their diet is nutritionally adequate, enjoyable and fits in with lifestyle and cultural preferences.

Further information

The role of the dietitians in the management of people with type 2 diabetes

Dietitians are the only regulated healthcare experts in diet and nutrition and should form an integral part of the multidisciplinary team that cares for people with diabetes. They play an essential role in the support of people with diabetes – whatever their dietary preference is – including low carbohydrate approaches. This support can be individual and through the structured education programmes designed especially for people with type 2 diabetes.

The diets of people with type 2 diabetes should be individualised (NICE 2018). People are individuals with different needs, desires, tastes, lifestyles and beliefs. What works for one person with type 2 diabetes may not do so for another. It is clear that the diet of people with type 2 diabetes should have access to a dietitian in order to individualise their diet and achieve optimal glycaemic control, management of weight and risk of cardiovascular disease. The ideal amounts of carbohydrate for each individual will be affected by factors (McArdle et al. 2016) such as:

- Individual dietary preferences
- Current and future diabetes treatment
- BMI and the amount of weight that needs to be lost
- Individual glucose response
- Physical activity levels

Dietitians are both qualified and skilled to take all the above factors into account when supporting individuals with type 2 diabetes.

Whether people with type 2 diabetes choose to follow a low carbohydrate diet or not, they should be supported by a dietitian to:

- a) choose a variety of foods so that their diet is nutritionally complete. This includes fruit and vegetables, dairy foods, seafood, pulses, and nuts.

- b) moderate their intake of red meat (i.e. choose poultry in preference to red meats) and reduce intake of processed meat, sugar-sweetened foods, particularly sugar- sweetened drinks, and refined grains such as white bread.
- c) ensure fat intake comes mainly from unsaturated sources, whilst limiting saturated fat intake.
- d) include foods high in fibre

NICE (2018) recommend that all people with newly diagnosed type 2 diabetes should attend a structured education programme

Weight loss is the cornerstone of management of type 2 diabetes

Not all people with type two diabetes are overweight or obese, but in those that are weight loss remains the most effective strategy to improve glycaemic control in type 2 diabetes (Dyson 2011b). Limiting carbohydrate often serves to limit calorie intake and therefore aid weight loss (Dyson 2015). Diabetes UK (2018) recommend that to improve glycaemic control and cardiovascular disease risk, overweight or obese people with type 2 diabetes should aim for a 5% weight loss achieved by reducing calorie intake and increasing energy expenditure. There is insufficient evidence to indicate that low carbohydrate diets are superior to other strategies for weight loss and subsequent weight maintenance.

Weight management is effective at controlling glycaemia and people with Type 2 diabetes should:

- a) be given a choice of different evidence-based approaches to weight loss and the most appropriate dietary approach to achieve this is identified between the person with diabetes and their dietitian.
- b) be supported to achieve weight loss of about 5% if necessary
- c) be supported to maintain that weight loss
- d) be supported to increase their physical activity
- e) have access to a dietitian or other appropriately trained health care professionals who can support patients to manage their weight effectively.

Recent evidence indicates that remission from type 2 diabetes (i.e. a return to the levels of glycaemic control experienced by people without diabetes) can occur after weight loss achieved via a dietitian supported total diet replacement / meal replacement plan in the DiRECT study (Lean. 2018). A weight loss of at least 15kg was found to be associated with greatest chance of achieving remission.

As yet, the data from research into low carbohydrate diets do not show that low carbohydrate diets can result in remission from type 2 diabetes. More research needs to be done in this area.

Background

Exclusions

This statement does not cover the needs of

- Adults with type 1 diabetes
- Children with type 1 or type 2 diabetes
- Pregnant women with type 2 diabetes
- Women diagnosed with gestational diabetes
- Sports people with type 2 diabetes.
- People at risk of diabetes
- People wishing to prevent diabetes
- People with 'pre-diabetes'

What is carbohydrate?

Carbohydrates are a nutrient group comprising simple sugars (e.g. glucose, fructose), oligosaccharides (e.g. maltodextrin) starches (including amylose) and fibre (e.g. plant cellulose) (FAO/WHO 1998). In the typical UK diet carbohydrates come mainly from cereal and cereal products e.g. bread, pasta and rice (NDNS 2014). FAO/WHO (1998) and SACN (2015) now refer to the sugars found in soft drinks, honey, syrups, fruit juices, smoothies and the sugar added to sweet foods such as cakes and biscuits as 'free sugars'. Free sugars have been associated with an increased risk of weight gain and developing diabetes (Te Morenga 2013).

How much carbohydrate do we need in the diet?

Starches and oligosaccharides, when eaten and digested, are broken down into simple sugars including glucose. The body needs glucose for energy in all its cells including, particularly, red blood cells and the brain.

Based on all the available evidence from research across the world SACN (2015) recommends that for a healthy adult the following is required to maintain good health:

Table 1. Key Recommendations from the SACN Report on Carbohydrate (SACN 2015)

Nutrient	Recommendation
Total carbohydrate	50% energy
Of which free sugars	Maximum 5% of total energy
Fibre	30g per day

For people with diabetes there is insufficient evidence to recommend an optimal, specific amounts of carbohydrates in the diet (Diabetes UK 2018). This is because there have been several confounding factors in the studies of low carbohydrate i.e. participants in the studies:

- Experienced weight change when on a low carbohydrate diet (weight loss on its own has been shown to improve glycaemic control in people with diabetes)
- Consumed different amounts of total energy intake
- Consumed different amounts of carbohydrates rather than a set amount)

Also in the studies the definition of a 'low carbohydrate diet' has differed from study to study therefore it is not possible to compare like with like easily.

There is now a more widely recognised definition of a 'low carbohydrate' diet (Feinman 2015). See Table 2. for the values.

Table 2. Consensus definition of different levels of dietary carbohydrate. (Feinman 2015)

	Carbohydrate : g/day	Carbohydrate: % energy*
Very Low Carbohydrate	20-50g	6-10%
Low carbohydrate	<130g	<26%
Moderate Carbohydrate	130 – 225g	26-45%
High Carbohydrate	>225g	>45%
*Based on 2000 kcal diet		

All healthy adults, including people with type 2 diabetes, should consume fewer foods and drinks that are high in sugar such as cakes, pastries, muffins, biscuits, lollies, ice cream and sweetened drinks. All these foods are also low in fibre and low in essential nutrients.

Effect of low carbohydrate diets on glycaemia

There is evidence from three recent meta analyses (Sainsbury et al 2018, Snorgaard et al 2017, Fan et al 2016, Korsmo-Haugan et al 2018, Huntriss et al 2018 and Meng et al 2017) to show that, in the short term, low carbohydrate diets improve glycaemic control and HbA1c. Whether or not this is due to the associated weight loss by patients on low carbohydrate diets is yet to be determined.

The meta analyses also that show there are no significant differences in HbA1c from 12 months when a low carbohydrate diet was compared to a traditional or higher carbohydrate diet (Snorgaard et al 2017, and Sainsbury et al 2018). This means that low carbohydrate diets seem to be approximately equivalent in effectiveness to other dietary approaches, being no worse, but no better and what seems to matter is supporting individuals to find the dietary approach that is sustainable for them over the long term. However, these results need to be interpreted with caution as the metanalyses were based on research trials in which people found it difficult to adhere to the low carbohydrate diets for longer than six months. Therefore, more research is needed to find out whether low carbohydrate diets have beneficial effects in the long term (over 12 months).

Effect of low carbohydrate diets on cardiovascular health

There is some evidence from meta analyses to say that, in the short term, low carbohydrate diets affect the blood lipids associated with risk of cardiovascular disease i.e. reduces triglycerides and raises HDL Cholesterol (Meng et al 2017, Huntriss et al 2018, and Sainsbury et al 2018). Whether or not this is due to the associated weight loss by patients on low carbohydrate diets is yet to be determined. Other systematic reviews and meta-analyses show no benefit at all of a low carbohydrate diet on levels of LDL Cholesterol, total cholesterol, blood pressure and body weight. (Naude et al 2014, Korsmo-Haugan et al 2018). More research is needed to confirm the short-term effects of a low carbohydrate diets on markers for cardiovascular disease as well as to demonstrate any affects in the long term (>12 months).

Future research needs

Research is needed in all the following areas to enable a better understanding of what diet(s) are most suitable for people with type 2 diabetes in the long term. More research is needed to find out:

- a) How much carbohydrate (as a % of total calorie intake) needs to be restricted in order to lower glucose concentrations and control type 2 diabetes and / or put it into remission

- b) Whether carbohydrate restriction is able to lower glucose concentrations without the usual accompanying weight loss.
- c) What the ideal nutritional composition of the rest of the low carbohydrate diet should be (i.e. the percentage of fat and protein) in terms of the effect on both glycaemic control as well as the risk of developing cardiovascular disease in people with type 2 diabetes.
- d) More research is needed to demonstrate the effect of a low carbohydrate diet in the long term (>12 months) in terms of its effect on glycaemic control and risk of cardiovascular disease.

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