

# What people with diabetes are reading: The 8-Week Blood Sugar Diet

Clare Bailey

**This is the second in our series of reviews of books that people with diabetes may be reading to help them self-manage their condition. These reviews are not designed to encourage people to recommend any of these programmes; rather, they share what is being recommended in the books so that we can better understand what we may do to support people if they choose to follow the diets or programmes. As with all self-management or education programmes for diabetes, there is likely to be a spread of opinion about the appropriateness of the recommendations and, for many, we may agree with some, but not all, of the recommendations.**

Until 5 years ago, as a GP I generally offered my patients the usual “eat less and move more” approach to dietary advice, without seeing much benefit. When my husband, the television presenter Michael Mosley, discovered that he had type 2 diabetes, I joined him in trawling the research to find ways of reversing his diabetes through diet. In the process, Michael developed the 5:2 Diet, lost 10 kg and succeeded in reversing his hyperglycaemia without the need for medication. Whilst refining the diet, he came across Prof Roy Taylor’s research on the use of very-low-calorie diets (VLCDs) to reverse diabetes, following which he developed the 8-Week Blood Sugar Diet (BSD).

Impressed by research demonstrating the potential benefits of low-calorie, low-carbohydrate Mediterranean-style diets on weight loss, reducing blood glucose and improving diabetes, I have now spent several years working with patients to help them implement this diet.

## The Mediterranean diet

The traditional advice for people with diabetes was to eat less fat and increase carbohydrate consumption. Yet this advice does not slow, let alone reverse, the progress of type 2 diabetes. Indeed, there is good evidence that it is the increasing

intake of refined carbohydrates, along with decreasing intake of fibre, that is driving the rising prevalence of type 2 diabetes (Gross et al, 2004). In randomised controlled trials, low-fat diets have often performed poorly when compared to alternatives.

The Look AHEAD Trial randomised 5145 overweight or obese adults with type 2 diabetes to an intervention group or control group (The Look AHEAD Research Group et al, 2013). The intervention aimed at reduced caloric intake, with <30% of calories from fat, and increased physical exercise. The control group received diabetes support and education. After 10 years, the trial was halted for “futility”, as there were no measurable differences in rates of heart disease or stroke between the intervention and control groups, although there was significant weight loss.

The two-year DIRECT (Dietary Intervention Randomized Controlled Trial) study, during which 322 moderately obese subjects were randomised to a low-fat, Mediterranean or a low-carbohydrate diet, found the low-fat diet least effective for weight loss (Shai et al, 2008). After 2 years, the low-fat group had lost an average of 2.9 kg versus 4.4 kg for the Mediterranean-diet group and 4.7 kg for the low-carbohydrate group. The biggest improvements in fasting glucose levels were in the Mediterranean diet group.

Furthermore, a systematic review of dietary

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## Article points

1. There is high-quality evidence that low-carbohydrate diets are more effective at improving weight and glycaemic control than low-fat diets.
2. Based on this evidence, the Blood Sugar Diet was developed. There are different approaches to it, all based on a low-carbohydrate, Mediterranean-style diet.
3. There is some evidence that type 2 diabetes can be reversed through this approach to diet, although further studies are needed to establish if such improvement can be maintained.

## Key words

- Blood Sugar Diet
- Low-carbohydrate diets
- Type 2 diabetes

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### Page points

1. Dietary advice to eat less fat and, as a consequence, increase carbohydrate intake may do little to little to slow the progress of type 2 diabetes.
2. Evidence points to low-carbohydrate and Mediterranean-style diets providing a range of health benefits, including improved glycaemic control and greater weight loss.
3. A low-carbohydrate Mediterranean-style approach can be adapted to most diets around the world.
4. Recent studies have shown that, in the short-term at least, supervised weight loss through restricted-calorie diets (including in the primary care setting) can achieve remission of type 2 diabetes.

approaches to the management of type 2 diabetes looking at randomised controlled trials lasting over 6 months, found that low-carbohydrate, low-glycaemic index and Mediterranean diets all led to a greater improvement in glycaemic control when compared with controls that included low-fat diets (Ajala et al, 2013). The low-carbohydrate and Mediterranean diets also led to significantly greater weight loss compared to their controls.

Consequently, I recommend that my patients adopt a low-carbohydrate Mediterranean-style diet. This involves:

- Reducing refined, simple and starchy carbohydrates (including pasta, bread, white rice and starchy vegetables, such as potatoes) and breakfast cereals (other than coarse porridge).
- Avoiding fruit juices, sweet drinks and smoothies.
- Reducing fruit intake to 1–2 portions per day (preferably hard fruits or berries).
- Moderately increasing intake of healthy fats (including more olive oil, rapeseed oil, nuts, avocado, eggs and some full-fat dairy products), whilst avoiding trans and processed fats.
- Including plenty of vegetables, oily fish and occasional meat.

This approach can be applied to most diets around the world, from Scandinavian to Asian.

The benefits of the Mediterranean diet are supported by the findings of a systematic review of meta-analyses and randomised controlled trials (Esposito et al, 2015), including the PREDIMED trial.

PREDIMED randomly allocated 7400 people in Spain (aged 55 to 80 years) at high cardiovascular risk to either a standard low-fat diet (lean meat, low-fat dairy, cautious use of oil and plenty of starchy food, such as potatoes, pasta and rice) or one of two Mediterranean diets (rich in oily fish, nuts, olive oil, eggs, pulses and whole grains, as well as dark chocolate and a glass of red wine with their meal). Each group was encouraged to eat plenty of fruit and vegetables. Over a mean follow-up period of 4.8 years, those on the Mediterranean diets put on less weight around their waists, were 30% less likely to die from a stroke or heart attack and were half as

likely to develop diabetes compared to the low dietary fat group (Estruch et al, 2013).

In addition, a systematic review by Ajala et al (2013) concluded that “low-carbohydrate, low-glycaemic-index, Mediterranean, and high-protein diets are effective in improving various markers of cardiovascular risk in people with diabetes”.

### Can type 2 diabetes be reversed?

In healthy individuals, insulin helps to remove glucose from the circulation. Poor diet, lack of exercise and a build-up of abdominal fat can lead to the development of insulin resistance. As a result, the pancreas needs to produce ever-higher levels of insulin in an attempt to reduce blood glucose levels, a condition known as hyperinsulinaemia. Individuals may feel constantly hungry because their cells are feeling “starved”, yet are less able to make use of the circulating glucose and fatty acids. Eventually, diabetes develops.

Steven and Taylor (2015) demonstrated that this process can be reversed by weight loss. In this pilot study, 29 people with type 2 diabetes completed an 8-week VLCD. Overall, 87% of participants with short-duration diabetes (<4 years) and 50% of those with long-duration diabetes (>8 years) achieved non-diabetic fasting plasma glucose levels and had stopped all antidiabetes medication by week 8.

The much larger multicentred DiRECT cluster-randomised controlled trial allocated 149 overweight or obese adults with type 2 diabetes (duration <6 years) from primary care to a low-calorie diet (just over 800 kcal/day). Almost half achieved remission to a non-diabetic state and remained off antidiabetes drugs at 12 months, compared to 4% in the control (best-practice care) group. Two-year data are awaited. The investigators concluded that remission of type 2 diabetes is a practical target for primary care (Lean et al, 2018).

It is, of course, likely that individuals who regain weight will find that their glucose levels return to the diabetes range.

### Examples in general practice

A small trial in general practice by GP Dr David Unwin of a low-carbohydrate, high-fat diet has been conducted (Unwin and Unwin, 2014).

Nineteen people with type 2 diabetes or pre-diabetes were given advice on a low-carbohydrate diet by a GP or practice nurse, as well as either 10-minute one-to-one progress reviews or evening group meetings every month. After 7 months, only one participant had dropped out of the study. The rest all had significant weight loss (mean=8.6 kg). Average HbA<sub>1c</sub> reduced from 51 to 40 mmol/mol (6.8% to 5.8%). Despite the higher fat intake, the mean cholesterol level dropped and liver function improved for nearly all participants. Subsequently, the practice, of 9000 patients, reported savings of around £45 000 on the diabetes-related drug budget. In 2016, the practice continued to report savings, spending £37 000 less in 2016 than was average for the CCG on drugs for diabetes alone, excluding insulin.

From 2013 to November 2017, 118 of Dr Unwin's patients with type 2 diabetes were counselled in the practice about the low-carbohydrate diet, of whom 91 have taken it up. The average improvement in HbA<sub>1c</sub> for that cohort was 20.4 mmol/mol (1.9%), with an average duration on the diet of 21 months and a weight loss of 8.76 kg.

One of my early adopters demonstrated a typical response to the BSD for an overweight person newly diagnosed with type 2 diabetes. His initial HbA<sub>1c</sub> was 58 mmol/mol (7.5%). Almost 3 years later, his HbA<sub>1c</sub> is 39 mmol/mol (5.7%) off medication, so he is in remission. He looks and feels well, and his blood pressure and lipids have also improved.

### Impact of the BSD in general practice

To begin to assess the impact of the BSD on HbA<sub>1c</sub>, a limited study was conducted in my general practice surgery at the Burnham Health Centre. Between the end of 2015 and mid 2016, a series of 24 consecutive patients, who were following the BSD approach, was observed in routine surgeries.

These individuals had been recently diagnosed with diabetes or pre-diabetes, or had poor glycaemic control and were considering additional medication or starting insulin therapy. After consultation, they agreed to adopt the BSD approach.

Initial results indicate a positive effect on HbA<sub>1c</sub>. Of the 24 individuals, 23 showed

improved readings and one an increase. The average HbA<sub>1c</sub> reduction across all participants was 18 mmol/mol (1.6%), with a median change of 12 mmol/mol (1.1%).

Furthermore, most of the participants reduced their medication or avoided starting it. Some even stopped taking medication as a result of improvements in their hyperglycaemia.

While this data is very limited and requires a great deal more analysis, I am hugely encouraged by the findings and believe that this low-carbohydrate approach can benefit suitably motivated individuals when implemented in the primary care setting. It is, however, essential that patients are helped and supervised when switching to such a diet. Advice on what to consider when providing such support is shown in *Box 1*.

### The 8-Week Blood Sugar Diet Recipe Book

*The Blood Sugar Diet Recipe Book* is a practical companion to Michael Mosley's original book, *The Blood Sugar Diet* (which looks at the evidence on weight loss and diabetes, provides a detailed plan and some recipes). The recipe book includes the plan outlined in *Box 2* as well as lots of simple daily recipes for a low-carbohydrate, Mediterranean-style way of eating on around 800 kcal/day. There are also practical suggestions for swaps to reduce sugar and starchy carbohydrates, and a 1-month, 800-kcal menu plan. ■

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### Page points

1. A small trial in general practice using a low-carbohydrate, high-fat diet with professional support has indicated that this approach is successful in producing significant weight loss, improvements in HbA<sub>1c</sub> and savings on antidiabetes drugs.
2. A small study involving individuals recently diagnosed with diabetes or pre-diabetes who have elected to follow the BSD has been conducted in a primary care setting at the Burnham Health Centre.
3. Initial analyses of the results suggest that the diet has had a positive effect on HbA<sub>1c</sub> and has led to a reduction in medication needed by most of the participants.
4. *The 8-Week Blood Sugar Diet Recipe Book* is a companion to *The Blood Sugar Diet* book. It provides evidence on weight loss and diabetes, a detailed plan and some recipes.

### Further resources

- Information for healthcare professionals: <https://bit.ly/2qIM7JN>
- Professor Roy Taylor's advice on diabetes reversal for healthcare professionals: <https://bit.ly/2EYUaY2>
- Patient advice, resources, recipes and online community: [www.thebloodsugardiet.com](http://www.thebloodsugardiet.com)
- *The 8-Week Blood Sugar Diet* and *The 8-Week Blood Sugar Diet Recipe Book*: <https://bit.ly/2Hckksg>

**Box 1. Consider the following when supporting patients to reverse type 2 diabetes.**

1. **Consider a different variant of diabetes or type 1** if the patient's presentation is atypical, or they are not responding as expected.
2. **Significant restriction of food intake (up to 8–12 weeks)**. Important to increase water intake by 1.0–1.5 L per day (to about 2.5–3.0 L per day) on 800 kcal days, particularly at first.
3. **Managing antidiabetes medication**. Aim to reduce medication that could cause hypoglycaemic episodes first; otherwise, on a last-in, first-out basis. Reduce evening hypoglycaemic medication first. Provide reassurance that there may be a temporary increase in blood glucose, but, if they stick to the diet, it will improve.
  - **Insulin**. If making a significant change to a low-carbohydrate diet (and particularly if reducing to 800 kcal), reduce insulin by half if on >20 units (do this the previous night for long-acting insulin). Advise regarding risk of hypoglycaemic episodes and management. Continue to reduce by half again, depending on blood glucose levels. (Usually insulin can be reduced or discontinued by 2 weeks if fasting blood glucose is 8 mmol/L or below). If insulin <20 units, stop it altogether. Ask patient to check fasting blood glucose regularly (about 4 times/day, initially). Aim to run a bit high for a few weeks. Review at 1 week or sooner, as required.
  - **SGLT2 inhibitors**. Stop (risk of euglycaemic DKA, mainly if there is undiagnosed type 1 diabetes).
  - **Sulfonylureas**. Stop or reduce by half on commencement of the BSD Fast 800 option (see Box 2).
  - **All other oral hypoglycaemic agents**. Can be decreased or stopped according to degree of control achieved.
  - **Antihypertensives**. Unless control is poor or individual is taking two or more medications, this can be halved or stopped on commencement of the BSD. Blood pressure is likely to reduce within days as insulin resistance improves. Watch out for feeling light-headed and/or check blood pressure at home.
  - **Agree a plan** for the patient to contact appropriate healthcare professional if blood glucose levels become very high (i.e. fasting >10 mmol/L) or they are experiencing hypos. Management of hypos to be discussed. Also if the blood pressure is too high or too low.
4. **Baseline blood tests**
  - **HbA<sub>1c</sub>**. Although usual advice is to test only every 3 months, significant improvements usually seen within 6 weeks.
  - **Fasting glucose**. May return to normal within a few weeks.
  - **Lipid profile**. Usually improves alongside reduced blood glucose level, despite increase in fat intake.
  - **ALT/SGT**. Improves as liver recovers.
  - **Hb and iron status**. Should be assessed prior to starting, especially for the elderly or vegetarians.
  - **Urea and electrolytes, thyroid function**
  - **Other measurements**. Blood pressure, weight, height, BMI, waist circumference (via umbilicus).
5. **Goal**. Depends on starting weight. Aim to lose 10–15% of body weight. If original BMI >40 kg/m<sup>2</sup>, goal may need to be 15–20%. South Asians may need to aim for BMI of 23 kg/m<sup>2</sup>.
6. **Encourage patient to choose which approach to follow**. Check lifestyle, individual suitability, motivation and clinical needs. Consider the 5:2 BSD or the easier Mediterranean-style Way of Life. Can move from one approach to another.
7. **Consider vitamin supplementation**. Ensure that adequate nutrients and vitamins are being obtained.
8. **Extra retinal screening required if moderate or more severe retinopathy is present**. Re-screen within 6 months of achieving a substantial improvement in blood glucose. Sudden normalisation in retinal blood flow can disadvantage damaged areas of the retina, resulting in deterioration in retinopathy.
9. **Side effects**. Commonest are headache, constipation and tiredness, usually owing to dehydration. Normally settles with extra water (1.0–1.5 L per day). Sometimes helped by a little extra salt in the diet.
10. **Although a low-calorie Mediterranean-style diet is suitable for most people, AVOID reduced calorie dieting if any of the following apply to the patient:**
  - Under 18 years of age.
  - Breastfeeding, pregnant or undergoing fertility treatment.
  - Underweight and/or has a history or suspicion of an eating disorder.
  - Significant psychiatric disorder or substance abuse.
  - Recent cardiac event, myocardial infarction or cerebrovascular accident (<3 months previously), cardiac failure or renal failure (CKD >stage 3).
  - Uncontrolled ischaemic heart disease, uncontrolled hypertension, cardiac arrhythmia or other abnormalities.
  - Unwell, has a fever, is frail or recovering from significant surgery (<6 months ago).
  - Under active investigation or treatment for cancer, or has a significant medical condition affecting ability to comply with diet, including a history of intermittent porphyria.
  - Some medications, such as warfarin, need adjusting and are not suitable for intermittent fasting owing to dose fluctuations.
  - Increased monitoring if significant retinopathy, proliferative diabetic retinopathy, or maculopathy.
11. **Review** adherence, hypos, side effects, blood sugars, medication, blood pressure, weight and waist at 2 weeks, then monthly for 2–3 months, then as required. Monitor HbA<sub>1c</sub>. Maintain routine diabetes reviews.
12. **Exercise**. Although less effective for weight loss, we encourage exercise for the metabolic benefits, particularly in reducing insulin resistance and blood sugars. Encourage patients to move more, become more active and walk more. Where possible, incorporate some element of high-intensity interval training (HIIT), even if this means 30 seconds on three occasions of walking faster (Adamson et al, 2014).
13. **Poor sleep and stress** has a significant impact both directly on blood glucose and in reducing motivation and engagement. Lifestyle factors need to be addressed if possible to get the best benefit.

**Box 2. The Blood Sugar Diet (BSD) options.**

All options are based on a low-carbohydrate, Mediterranean-style diet. People can choose an intensive or more gentle approach.

**The BSD Fast 800.** Fast, intensive and effective. Involves eating just over 800 kcal/day. Requires motivation and commitment. This is the “treatment phase”.

**The 5:2 BSD with intermittent fasting.** More flexible, less intensive. Cut down to 800 kcal on some days, also known as “fasting”. Usually means 5 days eating a Mediterranean-style diet, with some portion control, and 2 days “fasting” on about 800 kcal. Not suitable for those on certain medications, such as insulin, gliclazide or warfarin.

**The BSD Med-style Way of Life.** A slower, but effective, approach. No fasting, just portion control. Suitable for most people, including those who don’t need to lose weight, are less motivated, the elderly and, with medical supervision, can include people with type 1 diabetes or those on particular medications.

**Maintenance.** Once target is reached, continue to base food on the Mediterranean-style diet. Many can relax a bit, no longer counting, just watching portion sizes. Resort to previous diet and diabetes is likely to return. Some find that they prefer to continue intermittent fasting, perhaps doing a 6:1 version (i.e. fasting 1 day/week) to maintain the benefits. Continue to avoid snacking, if possible.

**Page points**

1. The Blood Sugar Diet (BSD) provides a number of approaches, so that an individual considering the diet can choose the right option for them.
2. While low-carbohydrate diets are becoming more popular, we await the results of larger-scale trials to see if the benefits that they provide are sustainable.
3. Low-carbohydrate eating is an important option for those willing to commit to it. For those taking antidiabetes medications, professional supervision is needed to help individualise and reduce their medications appropriately

**Independent perspective**

**Pam Brown, GP and Editor-in-Chief, *Diabetes & Primary Care***

In this article, Dr Clare Bailey, who has recently been accepted as a clinical adviser to the RCGP, shares the rationale behind the Blood Sugar Diet, a summary of the programme recommendations and how we might help support people who are using it to lose weight and potentially improve their diabetes control. Dr Bailey has personal experience of implementing the recommendations in her own practice and is, therefore, able to share some of her early results.

An editorial in the *Journal of the American Medical Association* (16 January, 2018) suggests that similar low-carbohydrate diets are becoming more mainstream, and outlines the potential benefits of such a “ketogenic” diet for weight reduction and improvement in type 2 diabetes control. The author, however, reminds us that we need to await larger-scale trials to see if these ways of eating, and the short-term benefits they provide,

are sustainable. Potential early side effects include hypovolaemia, which is characterised by blood pressure drops causing dizziness. These side effects can be significant if not properly monitored and managed, and, for this reason, talking about the ketogenic diet reminds us that, for many, “this is not a do-it-yourself diet”.

As described in Dr Bailey’s review of this programme, those taking diabetes medications and reducing their carbohydrate intake significantly, even if not to the extent that they become ketogenic, will need our help and supervision to encourage them to increase their fluid intake, and to help individualise and reduce their diabetes and blood pressure medications appropriately. As someone who supervises this kind of dietary intervention in my practice, I believe that low-carbohydrate eating is an important option for those who are willing to commit to it.