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Diabetes UK Position Statements and Care Recommendations

Diabetes UK evidence-based nutrition guidelines for the prevention and management of diabetes

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Abstract

This article summarizes the Diabetes UK evidence-based guidelines for the prevention of Type 2 diabetes and nutritional management of diabetes. It describes the development of the recommendations and highlights the key changes from previous guidelines.

The nutrition guidelines include a series of recommendations for the prevention of Type 2 diabetes, nutritional management of Type 1 and Type 2 diabetes, weight management, management of microvascular and macrovascular disease, hypoglycaemia management, and additional considerations such as nutrition support, end-of-life care, disorders of the pancreas, care of the older person with diabetes, nutrition provided by external agencies and fasting. The evidence-based recommendations were graded using the Scottish Intercollegiate Guidelines Network methodology and, in a small number of topic areas, where strong evidence was lacking, the recommendations were reached by consensus.

The Diabetes UK 2011 guidelines place an emphasis on carbohydrate management and a more flexible approach to weight loss, unlike previous guidelines which were expressed in terms of recommendations for individual nutrient intakes. Additionally, the guidelines for alcohol have been aligned to national recommendations.

The full evidence-based nutrition guidelines for the prevention and management of diabetes are available from: http://www.diabetes.org.uk/nutrition-guidelines

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Introduction

Nutritional therapy is fundamental for the effective management of diabetes and plays a vital role in helping people with diabetes achieve and maintain optimal glycaemic control and reduce the risk of long-term tissue damage [1]. It is almost 10 years since Diabetes UK published nutrition guidelines for people with diabetes [2]. In the absence of good-quality evidence, the 2003 recommendations were formulated by consensus. The Diabetes UK 2011 guidelines are largely evidence based, but also draw upon expert opinion and consensus agreement in areas where there is little or no high-quality published evidence.

There are several existing guidelines for the nutritional management of diabetes, both national [1–3] and international [4]. New recommendations are often criticized for failing to acknowledge existing or competing published guidelines [5]. The Diabetes UK 2011 guidelines address this issue by using the symbol → to signpost current relevant guidelines throughout the document.

The guidelines are relevant to adults with Type 1 or Type 2 diabetes and adults at high risk of developing Type 2 diabetes. The guidelines are intended to provide evidence-based nutritional recommendations for healthcare professionals and people at risk of, and those living with, diabetes in order to support appropriate food choices, reduce the risk of Type 2 diabetes and diabetes-associated tissue damage, achieve optimal glycaemic control and quality of life. They do not, however, cover children and adolescents because Diabetes UK has already adopted the guidelines produced by the International Society of Paediatric and Adolescent Diabetes (ISPAD) [6].

Although it is recommended that a registered dietitian with specialist knowledge should take the lead in delivering nutritional care, it is important that all members of the multidisciplinary team can deliver and implement evidence-based nutritional advice. Achieving nutritional goals requires a

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coordinated approach, with the person with diabetes at the centre of the decision-making process. All advice should be based upon scientific evidence and tailored for the individual, taking into account personal and cultural preferences, beliefs, lifestyle and willingness and ability to change. Specifically, these guidelines aim to:

- support self-management to reduce the risk of Type 2 diabetes and the co-morbidities associated with diabetes;
- promote healthy lifestyles and quality of life;
- provide flexibility and meet the needs of all individuals, including those with co-morbidities; e.g. coeliac disease and cystic fibrosis.

This article summarizes the Diabetes UK 2011 guidelines for the prevention of Type 2 diabetes and nutritional management of diabetes. The full evidence-based nutrition guidelines for the prevention and management of diabetes are available from: http://www.diabetes.org.uk/nutrition-guidelines (Weblink S1).

Methods

In 2009, Diabetes UK appointed an expert panel, the Nutrition Working Group, to review and revise the organization's nutrition guidelines. The American Diabetes Association (ADA) [1] and the American Dietetic Association [7] have recently extensively reviewed the evidence base for nutritional recommendations, and the Nutrition Working Group is in general agreement with their conclusions and recommendations. However, as the literature review for the ADA recommendations was completed in 2006–2007, the Nutrition Working Group proposed that the Diabetes UK guidelines be drawn jointly from the ADA recommendations and a literature review of published evidence from 2008 to August 2010.

The Nutrition Working Group also recommended that the new guidelines be formulated in terms of prevention of Type 2 diabetes and management of diabetes, and adopt a person-centred strategy. The previous approach of making specific recommendations for single nutrients, including carbohydrate, fat and protein, salt and added sugar [2], was no longer considered appropriate.

The panel identified the following as topics for inclusion: prevention of Type 2 diabetes; glycaemic control of Type 1 and Type 2 diabetes; weight management; cardiovascular risk; diabetes-related complications; and additional considerations such as co-morbidities, nutrition support, pregnancy and lactation, fasting and eating disorders.

With the support of Diabetes UK's Library and Information Team, literature searches were carried out in each topic area and key information extracted and summarized using an evidence grid. The evidence was graded according to prescribed guidelines developed for the Scottish Intercollegiate Guidelines Network [8]. Through a series of expert consensus meetings, the Nutrition Working Group then formulated several graded recommendations for each topic, based upon the evidence grading, as seen in Table 1.

Table 1 Grading scheme for recommendations in the nutrition guidelines for the prevention and management of diabetes

Classification of evidence		Grading of recommendations	
Ia	Evidence from meta-analysis of randomized controlled trials	A	Based on category I evidence
Ib	Evidence from at least one randomized controlled trial		
IIa	Evidence from at least one controlled study without randomization	B	Based on category II evidence or extrapolated from category I
IIb	Evidence from at least one other quasi-experimental study		
III	Evidence from non-experimental descriptive studies such as comparative studies, correlation studies and case– control studies	C	Based on category III or extrapolated from category I or II
IV	Evidence from expert committee reports or opinions and/or clinical experience of respected authorities	D	Based on category IV evidence or extrapolated from category I, II or III

Members of the Nutrition Working Group reviewed the final guidelines internally, while they also underwent external review by members of the Diabetes UK Council of Healthcare Professionals, and by the British Dietetic Association's specialist Diabetes Management and Education Group (DMEG) and its Educational and Professional Development Department.

Summary of guidelines

An overview of the recommendations is provided below. The evidenced-based recommendations are graded and marked by A, B, C or D at the end of each statement. The expert consensus recommendations are marked by (consensus) at the end of each statement. The overview also includes signposting to other relevant guidelines and this is depicted by the → symbol.

1. Recommendations for nutrition management and models of education

- Nutrition therapy is effective in people with diabetes and those at high risk of diabetes when it is an integrated component of education and clinical care. (A)
- Everyone with diabetes should receive individual, ongoing nutritional advice from a registered dietitian. (A)
- All people with diabetes and/or their carer should receive structured education at the time of diagnosis, with an annual follow-up. (A)

- Education should involve a patient-centred approach and a variety of learning styles. (A)

→ NICE (2003). Diabetes (Types 1 and 2)—patient education models. Technology Appraisal TA60. National Institute of Health and Clinical Excellence, London.
→ NICE (2011). Quality standards for diabetes. National Institute of Health and Clinical Excellence, London.
→ For diabetes information in different languages, visit the Diabetes UK language centre: http://www.diabetes.org.uk/languages.
→ Diabetes UK Task and Finish Group report (2010). Commissioning specialist services for adults with diabetes: http://www.diabetes.org.uk/SpecialistServices.

2. Recommendations for prevention of Type 2 diabetes in high-risk groups

- Weight loss is the most important predictor of risk reduction for Type 2 diabetes. Weight loss of at least 5–7% is effective for Type 2 diabetes prevention. (A)
- Lifestyle interventions that incorporate energy restriction, low-fat diets and increased physical activity can effectively reduce the risk of Type 2 diabetes in high-risk groups. (A)
- There is no evidence for the most effective dietary approach over another to achieve weight loss and prevent Type 2 diabetes. (D)
- Interventions promoting diet alone, increased physical activity alone or a combination of the two are equally effective in reducing risk. (A)
- Dietary patterns characterized by low intakes of saturated fat and higher intakes of unsaturated fat are protective. (B)
- Diets of low glycaemic index/load and higher in dietary fibre and wholegrains are protective. (B)
- Some specific foods (low-fat dairy foods, green leafy vegetables, coffee and moderate intakes of alcohol) are associated with reduced risk of Type 2 diabetes. (B)
- Other foods (red meats, processed meat products and fried potatoes) are associated with increased risk of Type 2 diabetes. (B)

3. Recommendations for people with diabetes

Glycaemic control and Type 1 diabetes

- Carbohydrate is the main nutritional consideration for glycaemic control in individuals with Type 1 diabetes. (A)
- People using multiple daily injections and continuous subcutaneous insulin infusion benefit from adjusting insulin to carbohydrate intake and should be offered education to support this. (A)
- Consistent quantities of carbohydrates on a day-to-day basis are beneficial for those individuals on fixed insulin regimens. (C)
- Increased physical activity offers general health benefits although there is no evidence of benefit in glycaemic control. (A)

Glycaemic control and Type 2 diabetes

- Weight management should be the primary nutritional strategy in managing glucose control in Type 2 diabetes for people who are overweight or obese. (A)
- Regular, moderate physical activity can reduce HbA_{1c} by 0.45–0.65%, independent of weight loss. (A)
- Focus should be on total energy intake rather than the source of energy in the diet (macronutrient composition) for optimal glycaemic control. (A)
- The total amount of carbohydrate consumed is a strong predictor of glycaemic response and monitoring total carbohydrate intake, whether by use of exchanges, portions or experience-based estimation, remains a key strategy in achieving glycaemic control. (A)
- Low glycaemic index diets have been shown to reduce HbA_{1c} by up to 0.5%. (A)

→ EU Directive. European Parliament and Council Directive 94/35/EC of June 1994 on sweeteners for use in foodstuffs, amended by Directives 96/83 EC and 2003/115/EC.
→ Diabetes UK position statement on sweeteners: http://www.diabetes.org.uk/sweeteners2
→ http://www.nhs.uk/Livewell/alcohol
→ http://www.diabetes.org.uk/Guide-todiabetes/Healthy_lifestyle/alcohol_and_diabetes

Weight management

- Weight reduction for the overweight or obese person with Type 2 diabetes is effective in improving glycaemic control and cardiovascular risk factors. (A)
- The main requirement of a dietary approach to weight loss is that total energy intake should be less that energy expenditure. (D)
- Dietary, physical activity, surgical and pharmaceutical approaches that are currently recommended for people without diabetes are appropriate and can be adopted by people with diabetes. (D)

→ NICE (2004). Obesity—the prevention, identification, assessment and treatment of overweight and obesity in adults and children. Clinical guidelines CG43. National Institute for Health and Clinical Excellence, London.
→ http://www.domuk.org
→ http://www.nationalobesityforum.org.uk

Cardiovascular disease—blood lipids and blood pressure

- Saturated fats should be limited and replaced by unsaturated fats, predominantly monounsaturated fats. (A)
- Daily consumption of foods fortified with plant sterols or stanols (2–3 g/day) significantly improve total and LDL

cholesterol for people with diabetes, irrespective of statin treatment. (A)
- Reduced sodium intake combined with the Dietary Approaches to Stop Hypertension (DASH) or Mediterranean-style diets can lower blood pressure. (A)
- A Mediterranean-style diet lowers blood pressure and improves HDL cholesterol and triglyceride levels. (B)
- In overweight individuals, a modest amount of maintained weight loss (4.5 kg or more) results in improvements in blood pressure. (B)
- In individuals with Type 2 diabetes with elevated levels of blood triglycerides, supplementation with up to 3 g per day of n-3 marine fish oils [docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA)] can improve blood triglyceride levels without adverse effects. (B)
- Consumption of oily fish, rich in n-3 unsaturated fats, is recommended at least twice per week. (B)
- Thirty to 60 min of aerobic exercise on a minimum of three occasions per week (minimum of 150 minutes each week) and resistance training at least twice per week lower blood pressure. (B)
- Intakes of trans-fatty acids should be limited. (C)

4. Recommendations for managing diabetes-related complications

Short-term complications: mild to moderate hypoglycaemia
- Glucose (15–20 g) glucose should be used to treat hypoglycaemia. If glucose levels have not risen above 4 mmol/l after 15 min, treatment should be repeated. (B)
- A follow-up carbohydrate snack (15–20 g) may be necessary in order to reduce the risk of further hypoglycaemia. (C)

→ http://www.diabetes.org.uk/hypo
→ Sports advice for people with Type 1 diabetes: http://www.runsweet.com

Long-term complications
- Glycaemic control should be the main focus for preventing and slowing the rate of developing diabetes-related complications. (A)
- Nutritional management should be an integral part of the care package. (D)

→ British Renal Society: http://www.britishrenal.org
→ NICE (2008). Chronic kidney disease—early identification and management of chronic kidney disease in adults in primary and secondary care. Clinical guidelines CG73. National Institute for Health and Clinical Excellence, London.

5. Additional considerations

Nutrition support (consensus)
- Standard protocols for nutritional support should be followed and adjustment of medication should be prioritized over dietary restriction.

→ NICE (2006). Nutrition support in adults: oral nutrition support, enteral feeding and parenteral nutrition. Clinical guideline CG32. National Institute for Health and Clinical Excellence, London.

End-of-life care (consensus)
- Where palliative care is likely to be prolonged, meeting fluid and nutritional requirements should utilize non-intrusive dietary and management regimens.
- Avoid hypoglycaemia or symptoms of overt hyperglycaemia.
- Alterations to insulin doses or diabetes medications may be required because of changes in appetite and body weight or the use of glucocorticoids.

→ http://www.liv.ac.uk/mcpcil/liverpool-care-pathway
→ NICE (2006). Nutrition support in adults: oral nutrition support, enteral feeding and parenteral nutrition. Clinical guideline CG32. National Institute for Health and Clinical Excellence, London.

Disorders of the pancreas (consensus)
Nutrition support is essential and these guidelines have adopted the guidelines related to disorders of the pancreas produced by the European Society for Clinical Nutrition and Metabolism.
→ http://www.espen.org

Older person with diabetes (consensus)
Assessment of nutritional status and support for those who may be malnourished should be available to all elderly people with diabetes.
→ Nutrition Advisory Group for Elderly People (British Diabetic Association specialist interest group).
→ Diabetes UK (Jan 2010). Good Clinical Practice Guidelines for Care Home Residents with Diabetes.

Cystic fibrosis
- Standard nutrition management for cystic fibrosis should be applied to individuals with diabetes. (D)
- Dose adjustment of insulin should be prioritized over dietary restriction. (D)

→ http://www.cftrust.org.uk/aboutcf/publications/consensusdoc/diabetes.pdf

Coeliac disease
- An experienced dietitian should provide advice about a gluten-free diet and an individualized dietary plan for the person with diabetes. (D)

→ http://www.coeliac.org.uk

Pregnancy and lactation

Pre-conception care
- Women with pre-existing diabetes considering pregnancy, are recommended to take 5 mg folic acid

per day and continue until the end of the 12th week of pregnancy. (D)
- Women should be supported in positive health choices, including weight management where appropriate, and should seek pre-conception care as part of holistic care prior to subsequent pregnancies. (B)
- Women with pre-existing and gestational diabetes should be offered individualized nutritional education and have access to a multidisciplinary team, including structured education. (C)

Antenatal care
- Women should be encouraged to aim for normal glycaemia. (A)
- Encourage appropriate weight gain in relation to the pre-pregnancy BMI. (B)

Post-natal care
- Women who are breastfeeding and managing their diabetes with insulin should decrease their insulin dose, consume additional carbohydrate, test more frequently and have hypoglycaemia treatment close to hand. (D)
- Women should be encouraged to set realistic goals regarding dietary behaviour and glycaemic control that are safe and compatible with having a new baby. (D)
- Women with a history of gestational diabetes should be encouraged to follow a healthy lifestyle and consider weight management, if appropriate, after giving birth. (D)

→ NICE (2008). Diabetes in pregnancy. Management of diabetes and its complications from pre-conception to the post-natal period. Clinical guideline 63. National Institute for Health and Clinical Excellence, London.
→ Preconception information (video): http://www.diabetes.org.uk/RebelRebel

HIV and insulin resistance
- Diabetes pharmaceutical interventions are of limited value in HIV because of interactions with antiretroviral medication. (A)
- Lifestyle treatment guidelines for diabetes prevention and treatment for the general population should be applied in HIV. (D)

Nutrition provided by external agencies (consensus)
- All staff and carers should have sufficient training and understanding about diabetes and its dietary management.
- Education about food should be provided so that people can manage their own food choices where possible.
- All people with diabetes should be offered access to a registered dietitian and have a personalized assessment and nutritional plan as part of their regularly updated care plan.
- Menus, food trolleys, shops and vending machines should include snacks and meals that allow food choices that are in line with dietary recommendations for people with diabetes.
- Meals and snacks should be made available around appropriate timing of medications.
- People with diabetes who are carbohydrate counting should have access to the carbohydrate values of meals and snacks.

Eating disorders
- Members of the multidisciplinary team should be alert to the possibility of bulimia nervosa, anorexia nervosa and insulin dose manipulation. (C)
- The risk of morbidity from poor metabolic control suggests that consideration should be given early to adults with Type 1 diabetes and where appropriate an urgent referral to local eating disorder units may be needed. (D)

→ NICE (2004). Eating disorders—core interventions in the treatment and management of anorexia nervosa, bulimia nervosa and related eating disorders. Clinical guideline CG9. National Institute for Health and Clinical Excellence, London.
→ NICE (2004). Type 1 diabetes—diagnosis and management of children, young people and adults. Clinical guideline CG15. National Institute for Health and Clinical Excellence, London.
→ National Centre for Eating Disorders: http://www.eating-disorders.org.uk
→ Beat Eating Disorders (B-EAT). National charity for people with eating disorders and their families: http://www.b-eat.co.uk

Fasting (consensus)
- Fasting can be safe if a specific individual care plan is put in place that considers adjustments to timing and dosing of medication, frequent blood glucose monitoring and food and drink choices when breaking the fast.
- Considerations should also be made to the carbohydrate and energy density of the food and drink choices.
- Education of the person with diabetes prior to, and possibly during, fasting is essential for successful self-management of fasting with diabetes.

Summary of changes from previous guidelines

The main changes to previous Diabetes UK guidelines are summarized below.

Macronutrients

Carbohydrate

Previous guidelines recommended that people with diabetes should obtain 45–60% of their total energy requirements from

carbohydrate. As there is little evidence for the optimum proportion of carbohydrate for people with diabetes [7], the 2011 guidelines recommend active carbohydrate management in terms of glycaemic control or weight loss rather than prescribing absolute intakes. The evidence for people with Type 1 diabetes using multiple daily injections or continuous subcutaneous insulin infusion supports the use of carbohydrate counting and insulin adjustment [9–11]. The efficacy of carbohydrate counting in individuals with Type 2 diabetes treated with insulin is largely unknown, with one randomized controlled trial showing that carbohydrate counting combined with insulin adjustment was as effective as a simple insulin dose algorithm based on blood glucose levels [12]. People on fixed doses of insulin have shown improved glycaemic control by having consistent portions of carbohydrate day to day [13].

The role of low-carbohydrate diets for weight loss and improving glycaemic control has caused much controversy [14]. Both a recent meta-analysis [15] and a review [16] suggest that they are more effective for weight loss and improving glycaemic control than low-fat diets and that there is no evidence of harmful effects in the short term. The Diabetes UK 2011 guidelines support the view that low-carbohydrate diets may be considered an option for weight loss in people with Type 2 diabetes when supported by a registered healthcare professional.

Fat and protein

There are no changes from previous recommendations for fat intake and no specific recommendations for protein intake.

Weight management

Weight management remains a key aspect of the management of Type 2 diabetes [17], although no guidelines could be formulated for Type 1 diabetes in the absence of evidence for effective treatment. Various dietary strategies have been employed to induce weight loss in people with Type 2 diabetes [18], including low-fat diets, meal replacements, very low-calorie liquid diets, commercial weight-loss programmes and low-carbohydrate diets. All show evidence of benefit and, although the lack of randomized head-to-head trials in people with diabetes means that it is impossible to identify the most effective approach, it has been suggested that very low-calorie liquid diets may be more effective than other strategies [19].

In terms of dietary strategies for weight loss, encouraging people to adopt their diet of choice may improve outcomes. It is the degree of adherence that will predict outcomes rather than type of dietary strategy [20]. It is intuitive that a diet an individual enjoys and finds acceptable is more likely to succeed [21]. For this reason, and in the absence of convincing published evidence for the most effective strategy for weight loss, these guidelines support the person-centred approach and recommend supporting each individual to follow the weight-loss programme they find most acceptable.

Alcohol

Current UK government guidelines for alcohol recommend 3–4 units/day for men and 2–3 units/day for women. The 2003 Diabetes UK guidance is set at the lower limit of 3 units/day for men and 2 units/day for women. This is a consensus guideline based upon the increased risk of hypoglycaemia in people with diabetes treated by insulin or insulin secretagogues. Epidemiological studies have shown that moderate intake of alcohol in people with diabetes is associated with improved glycaemic control [22]. Also, in terms of cardiovascular risk reduction and all-cause mortality [23–25], people with diabetes benefit from moderate intake to a similar degree to people without the condition.

In the absence of strong evidence to the contrary, and to reduce the risk of confusion, the 2011 guidelines recommend following UK government guidance for alcohol for people with diabetes.

Conclusions

The 2011 Diabetes UK guidelines have undergone peer review and aim to support self-management, promote healthy lifestyles and reduce the risk of Type 2 diabetes and the co-morbidities associated with diabetes. By encouraging healthy eating, effective strategies for weight management and glycaemic control, these guidelines can contribute to stemming the rise of obesity, diabetes-related complications and escalating costs to the National Health Service. A collaborative approach is required to raise awareness of the risks of sedentary lifestyle and unhealthy diet and to help people with diabetes to achieve effective self-management.

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Supporting Information

Additional Supporting Information may be found in the online version of this article:

Weblink S1. The Diabetes UK full evidence-based nutrition guidelines for the prevention and management of diabetes.

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