

Nutritional recommendations for people with diabetes

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Nutrition management is considered to be a cornerstone of therapy for patients with diabetes mellitus (DM). The prevalence of DM is increasing around the world at such a dramatic rate to be characterized as an epidemic.¹ Many factors have been postulated to contribute to the DM epidemic. This paper discusses nutritional recommendation related to the management of DM.

Introduction

The field of nutrition therapy in diabetes has undergone a series of transformations during the years – from starvation treatment in 1915 to current evidence-based recommendations. Over the years, generations of medical professionals have alternated between recommending high-carbohydrate and low-carbohydrate foods to people with diabetes. Most of the diets for diabetes were rigid and monotonous, making them barely edible as well as nutritionally deficient. Prior to 1994, all nutrition recommendations for diabetes attempted to define an ‘ideal’ nutrition prescription that would apply to

nearly everyone with the condition. Current nutritional recommendations from diabetes and nutritional associations around the world continue to identify ideal percentages of carbohydrate, protein, and fat. However, this approach needs to involve individualization if diet is to be effective in controlling blood sugar levels.

Composition of the diet

The existing nutritional recommendations of the European Association for the Study of Diabetes (EASD) and American Diabetes Association (ADA) on dietary composition^{2,3,4,5} are summarized, with minor changes, in Tables

1 and 2. Important differences from the previous UK recommendations^{6,7} are:

- greater flexibility in the proportions of energy derived from carbohydrate and from monounsaturated fat [MUFA] (Table 1). MUFA (Table 3) are promoted as the main source of dietary fat because of their lower susceptibility to lipid peroxidation and consequent lower atherogenic potential.⁸ Moreover, provided that energy intake is controlled, the use of monounsaturated fat instead of carbohydrate as a replacement for saturated fat causes an increase as opposed to a decrease in HDL cholesterol¹⁰, which is of particular benefit in type 2 diabetes;
- further liberalization in the consumption of sucrose from the previous 25g per day up to 10% of total daily energy, provided that this is eaten in the context of a healthy diet and distributed throughout the day.
- more active promotion of carbohydrate foods with a low glycaemic index (GI);⁹
- greater emphasis on the benefits of regular exercise.

The traditional rule for people with diabetes was to avoid sugar, and although reflecting a commonly accepted idea, the advice had little or no research to substantiate the claim. This belief was based on the assumption that sucrose and other sugars were more rapidly digested and absorbed than starch-containing food and would therefore aggravate hyperglycaemia. More than 20 years ago, investigators challenged this traditional theory. They found that the responses were not related to the popular theory of sugar versus starch; the total amount of carbohydrate was found to be just as important as the source of the carbohydrate.² The above recommendations emphasize the concept that it is the total amount of carbohydrate which matters most to blood glucose control. In practical terms, one day's supper could be a plate of pasta (complex carbohydrate) while the next day's supper could be syrup and milk (simple carbohydrate) – the choice is unlikely to affect the overall insulin needs and glucose control since it is TOTAL carbohydrate intake, rather than simple sugars which needs to be targeted. Nevertheless, careful use of simple sugars is important for everyone, with or without diabetes.

Table 1: The composition of the diet⁷

Component	Comment
Protein	Not >1 g per kg body weight
Total fat	<35% of energy intake
<i>Saturated + trans-unsaturated fat</i>	<10% of energy intake
<i>n-6 Polyunsaturated fat</i>	<10% of energy intake
<i>n-3 Polyunsaturated fat</i>	Eat fish, especially oily fish, once or twice weekly Fish oil supplements: not recommended
<i>cis-Monounsaturated fat</i>	10–20% (60–70% of energy intake)
Total carbohydrate	45–60%
<i>Sucrose</i>	Up to 10% of daily energy, provided it is eaten in the context of a healthy diet. Those who are overweight or who have hypertriglyceridaemia should consider using non-nutritive sweeteners where appropriate
Fibre	No quantitative recommendation Soluble fibre: has beneficial effects on glycaemic and lipid metabolism Insoluble fibre: no direct effects on glycaemic and lipid metabolism but its high satiety content may benefit those trying to lose weight and it is advantageous to gastrointestinal health
Vitamins and anti-oxidants	Encourage foods naturally rich in vitamins and anti-oxidants. With the exception of some patients e.g. malnourishment, cancer etc. there is no evidence for the use of supplements and some evidence that some are harmful
Salt	approx 6 g sodium chloride per day

Table 2: Food choices⁷

Choice	Comment
Nutritive sweeteners	
<i>Fructose</i>	No proven advantage over sucrose fructose in fruits, etc.
<i>Sugar alcohols</i>	Lower cariogenic effect but no other advantages over sucrose May cause diarrhoea
Non-nutritive (intense)	Useful in beverages Potentially useful in the overweight Safe if 'acceptable daily intake' not exceeded – heavy users should use a variety of different products
Diabetic foods	Unnecessary, expensive May cause diarrhoea Not recommended
Plant stanols and sterols	approx 2g/day can reduce LDL cholesterol by 10–15%
Fat replacers and substitutes	May facilitate weight loss Long-term studies needed
Herbal preparations	No convincing evidence of benefit

Concept of diet and lifestyle

Dietary and lifestyle education is essential to delay the onset, or even prevent diabetes in those at risk of type 2 diabetes and for the effective management of the condition in those with type 1 and type 2 diabetes. The aim is to provide those living with diabetes with the information required to make appropriate choices on the type and quantity of the food which they eat. The goals of dietary advice are as shown in Table 4. The advice must take account of the individual's personal and cultural preferences, beliefs and lifestyle, and must respect the individual's wishes and willingness to change. It must be adapted to the specific needs of the individual which may change with time and circumstance; for example, age, pregnancy, hospital admission, nephropathy, inter current illness such as coeliac or cystic fibrosis. The interaction between food intake, physical activity levels and diabetes medication and the relationship between exercise, energy balance and body weight are an integral part of nutritional counselling. Nevertheless, the practicality of these recommendations should not be underestimated for clinical effectiveness to be accomplished.

Translating theory into practice

There have been major changes in nutrition recommendations over the past decade for persons with type 1 and type 2 DM. The most recent set of nutritional recommendations for DM advocate flexibility in the distribution of caloric intake between monounsaturated fats and carbohydrates. The relative allocation of intake between carbohydrate and monounsaturated fats is not specifically delineated but instead it is recommended that this be individualized on the basis of eating preferences and other considerations. Several of these areas of revision have direct implications for the role of dietary sugars in the nutritional management of DM. Among these is the consideration that MUFAs can lower plasma triglycerides relative to isocaloric consumption of carbohydrates.¹⁰ Current recommendations are that intake of sugars can be appropriate for those with DM, provided the consumption of sugars is taken into account on the basis of calorie consumption. Although the nutritional

merits of low-GI compared with higher-GI carbohydrates continue to be examined and debated, numerous variables can alter the GI, even for a given source of carbohydrate, and this consideration limits the practicality of implementing patient education on this topic. Moreover, whether the GI is a meaningful determinant of metabolic control in DM continues to be challenged on the basis of the collective data of prior clinical trials.

A common issue occurring in clinic is the uncertainty newly diagnosed diabetic clients have regarding the food they should eat. A report by Diabetes UK on the needs of the newly diagnosed found that people with diabetes, particularly the recently diagnosed are confused about what to eat and they find diet, one of the most challenging aspects of diabetes self-care.¹¹ It takes considerable skill to apply the nutritional recommendations for diabetes management in a way which is practical. Many health professionals still suggest a

'diabetic diet' and strict removal of certain food which is perceived as solely affecting DM. For most patients, the actual goal will be to make specific dietary changes towards the ideal. These changes will vary according to individual nutritional and clinical priorities, habitual diet and lifestyle and prevalence of risk factors. The focus should always be on changing an individual's current eating habits (food choice and the timing of its consumption) in an acceptable and hence achievable way and make provision for ongoing support according to individual needs as part of integrated diabetes care.

Conclusion

Achieving good metabolic control of postprandial hyperglycemia remains one of the most challenging aspects of attaining good overall glycaemic control. It is essential that all team members understand nutrition issues and guide the patient's efforts by reinforcing basic and important

messages, referring patients with diabetes for dietetic consultation, promoting the importance of lifestyle changes, and providing support for the nutrition intervention process. Nutrition remains essential for effective diabetes management and successful medical nutrition therapy involves an ongoing process of problem solving, adjustment, and readjustment. Patients must learn how to anticipate and deal with the wide variety of daily decisions they must make regarding food choices and physical activity. Healthy food choices and regular physical activity also improve overall health, an added benefit for people living with a chronic disease such as diabetes.

References

1. Boyle J.P., Honeycutt A.A., Narayan KMV *et al.* Projection of diabetes burden through 2050: impact of changing demography and disease prevalence in the US. *Diabetes Care* 2001 Vol 24: 1936-40.
2. Ha T.K., Lean M.E. Technical Review. Recommendations for the nutritional management of patients with diabetes *European Journal of Clinical Nutrition* 1998 Vol 52: 467-81.
3. Franz M.J., Bantle J.P., Beebe C.A., *et al.* Evidence-based nutrition principles and recommendations for the treatment and prevention of diabetes and related complications. *Diabetes Care* 2002 Vol 25: 148-98.
4. Diabetes and Nutrition Study Group of the European Association for The Study of Diabetes Recommendations for the nutritional management of patients with diabetes mellitus *European Journal of Clinical Nutrition* 2000 Vol 54: 353-5.
5. American Diabetes Association Position Statement Evidence-based nutrition principles and recommendations for the treatment and prevention of diabetes and related complications. *Diabetes Care* 2002 Vol 25: S50-S60.
6. Nutrition Sub-Committee of the British Diabetic Association's Professional Advisory Committee Dietary Recommendations for People with Diabetes. An Update for the 1990s *Diabetic Medicine* 1992 Vol 9: 189-202.
7. Connor H, Annan F., Bunn E *et al.* The implementation of nutritional advice for people with diabetes *Diabetic Medicine* 2003 Vol 20 p. 786-807.
8. Kratz M., Cullen P., Kannenberg F., Kassner M. *et al.* Effects of dietary fatty acids on the composition and oxidizability of low density lipoprotein. *European Journal of Clinical Nutrition* 2002 56: 72-81.
9. Diabetes UK Glycaemic index www.diabetes.org.uk Accessed 20/10/2006.
10. Garg A. High-monosaturated fat diets for patients with diabetes mellitus: a meta-analysis *American Journal of Clinical Nutrition* 1998 67: 577S-82S.
11. Diabetes UK Needs of the Recently Diagnosed - Listening Project Report and Recommendations London: Diabetes UK 2002.

Table 3: Sources of fatty acids

<i>cis-Monounsaturated</i>	<i>trans-Unsaturated</i>	<i>polyunsaturated</i>
Olive oil	Hydrogenated vegetable oils (hard margarine)	<i>n-6</i> Corn, sunflower, safflower, soya bean oils and seeds Fat spreads derived from these oils
Some rapeseed oils	Manufactured foods containing hydrogenated vegetable oils (e.g. pies, pastry, biscuits, cakes)	<i>n-3</i> Oily fish and marine oils
Fat spreads derived from olive oil		

Table 4: Goals of dietary advice

1. To delay onset/reduce risk of developing diabetes in high risk groups such as women with a history of gestational diabetes
2. To maintain or improve nutritional health by facilitating the adoption of healthy food choices
3. To achieve and maintain optimal metabolic and physiological outcomes, including reduction of risk for microvascular disease by achieving near normal glycaemia without undue risk of hypoglycaemia; reduction of risk for macrovascular disease, including management of bodyweight, dyslipidaemia and hypertension
4. To optimize outcomes where diabetic complications already exist, e.g. in diabetic nephropathy
5. To maintain or improve health where any concomitant disorder such as coeliac disease or cystic fibrosis