

Obesity

Comparison of the effectiveness of low-carbohydrate diets vs low-fat diets



Jonathan Pinkney,
Senior Lecturer/
Honorary Consultant
Physician, University
of Liverpool
/University Hospital
Aintree

The 'Atkin's diet': The hottest craze in years. Should patients try it? Most dietitians and doctors are agnostic or frankly opposed. What should we believe? Studies suggested that low-carbohydrate diets achieve superior short-term weight loss, but weight is regained.

One group now reports 1-year data in obese subjects with a high prevalence of diabetes and metabolic syndrome (abstract below). Weight loss was no longer significantly greater on the low-carbohydrate diet than on the conventional diet at 1 year, although HDL-cholesterol was higher and triglycerides and HbA_{1c} lower in those on the low carbohydrate diet.

Where does this leave us? The questionable long-term weight maintenance in these studies is scarcely unique to low-carbohydrate diets, but is a general problem with dietary studies.

The data clearly suggest that some obese patients, including those with type 2 diabetes, benefit from carbohydrate-restricted diets, without any obvious compromise of the lipid profile or renal function.

In this commentator's view, at least, some obese patients – including those with diabetes – lose more weight and derive greater short-term metabolic benefit from a primary focus on carbohydrate restriction. Therefore, this approach should not be dismissed out of hand, although it is clear that larger and longer-term studies are needed on this important question.

ANNALS OF INTERNAL MEDICINE



Low-carb diet: long-term benefits

Readability	✓✓✓✓
Applicability to practice	✓✓✓✓
WOW! factor	✓✓✓

1 In a preliminary randomised trial, 132 severely obese adults (83% of whom had diabetes or metabolic syndrome) lost more weight and showed greater improvements in triglyceride levels, insulin sensitivity and glycaemic control after 6 months on a low-carbohydrate diet than on a conventional low-fat diet.

2 This follow-up study reports the results at one year.

3 After one year, the low-carbohydrate group still had more favourable triglyceride and HDL cholesterol levels than the low-fat group, but weight loss and other

metabolic parameters were similar.

4 In the small subgroup with diabetes (n=54), HbA_{1c} levels improved more in those on the low-carbohydrate diet.

5 Limitations of the study are the high drop-out rate (34%) and suboptimal adherence to the diets. Patients dropping out of the low-carbohydrate diet were less likely to lose weight whereas there was similar weight loss in those on the conventional diet whether they completed the study or not.

6 Findings indicate that restricting carbohydrates in obese people may have favourable effects, but caution is urged in recommending a low-carbohydrate diet as effects on the development of diabetes and cardiovascular disease are unknown.

Stern L, Iqbal N, Seshadri P et al (2004) The effects of low-carbohydrate versus conventional weight loss diets in severely obese adults: one-year follow-up of a randomized trial. *Annals of Internal Medicine* **140**: 778–85

ANNALS OF INTERNAL MEDICINE



Low-carbohydrate diet more effective than low-fat diet

Readability	✓✓✓✓
Applicability to practice	✓✓✓✓
WOW! factor	✓✓

1 Low-carbohydrate diets are currently very popular, despite limited evidence of their effectiveness.

2 This trial compared the effects of a low-carbohydrate ketogenic diet programme with those of a low-fat, low-cholesterol reduced-calorie diet in 120 volunteers from the community.

3 Participants were hyperlipidaemic, aged 18–65 years, with a BMI of 30–60 kg/m² and no serious medical condition, who wanted to lose weight.

4 They were randomised to either a low-carbohydrate ketogenic diet or a low-fat, low-cholesterol reduced-calorie diet, plus nutritional supplements, exercise recommendations and group meetings.

5 Bodyweight, body composition, serum lipid levels and adverse effects were examined over 24 weeks.

6 More of the low-carbohydrate group than the low-fat group completed the study (76% vs 57%).

7 The low-carbohydrate group lost more weight (mean change -12.9% vs -6.7%; P<0.001) and had a greater decrease in triglyceride levels and higher HDL cholesterol levels than the low-fat group.

8 Adverse effects were more common in the low-carbohydrate group.

9 Further research in other groups over longer periods is necessary to establish the safety of the low-carbohydrate diet.

Yancy WS Jr, Olsen MK, Guyton JR et al (2004) A low-carbohydrate, ketogenic diet versus a low-fat diet to treat obesity and hyperlipidemia: a randomized, controlled trial. *Annals of Internal Medicine* **140**: 769–77

RESPIRATION



OSA – an independent risk factor for insulin resistance?

Readability	✓✓✓
Applicability to practice	✓✓✓
WOW! factor	✓✓✓✓

- 1 Obstructive sleep apnoea (OSA) and type 2 diabetes are both characterised by insulin resistance, and coexist in a significant number of people.
- 2 The most important determinant of insulin resistance in these patients is apparently obesity.
- 3 This small study sought to establish whether OSA is an independent risk factor for increased insulin resistance in people with diabetes.
- 4 Nine obese people with type 2 diabetes and OSA, and good

glycaemic control on oral antidiabetic agents or diet alone, were enrolled in the study.

5 Their insulin sensitivity index (ISI) was determined by euglycaemic hyperinsulinaemic clamp tests at baseline, after 2 days and after 3 months of effective continuous positive airway pressure (CPAP) treatment.

6 Two days' CPAP treatment produced no change in ISI, but 3 months' CPAP treatment produced significant improvements in ISI, without any significant changes in BMI.

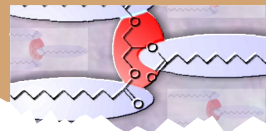
7 The improvement in insulin sensitivity was not associated with improved glycaemic control.

8 There was no significant change in fasting leptin levels.

9 The authors conclude that OSA is an independent risk factor for insulin resistance.

Harsch IA, Schahin SP, Brückner K et al (2004) The effect of continuous positive airway pressure treatment on insulin sensitivity in patients with obstructive sleep apnoea syndrome and type 2 diabetes. *Respiration* **71**(4): 252–9

JOURNAL OF ADOLESCENT HEALTH



Useful markers for diabetes screening in children

Readability	✓✓✓
Applicability to practice	✓✓✓
WOW! factor	✓✓✓

1 This study set out to determine the prevalence of type 2 diabetes and cardiovascular (CVD) risk factors in Mexican-American children at risk of type 2 diabetes, and their siblings.

2 Participants were divided into those with acanthosis nigricans (AN+) and those without (AN-), as AN is associated with insulin resistance.

3 Sixty-eight children had acanthosis nigricans and 71 did not. Both groups were assessed for type 2 diabetes and CVD risk factors.

4 Assessment included physical examination, family history, fasting serum and glucose, insulin, BMI, serum lipoproteins and oxidised lipids.

5 Age and birthweight were similar in both groups, but all parameters associated with obesity (weight, BMI, waist/hip ratio) were higher in the AN+ group ($P \leq 0.003$), as were insulin levels, insulin resistance, and blood pressure. Mean LDL and total cholesterol levels were similar but AN+ HDL was lower.

6 Siblings of probands were also found to be at risk.

7 The altered metabolic pattern seen in the AN+ group is characteristic of metabolic syndrome – a disorder linked with obesity and increased risk of type 2 diabetes and CVD in adults.

8 AN status and BMI would thus appear to be easily accessible markers for identifying children and nuclear families at increased risk of type 2 diabetes and CVD.

Urrutia-Rojas X, Menchaca J, Wadley W et al (2004) Cardiovascular risk factors in Mexican-American children at risk for type 2 diabetes. *Journal of Adolescent Health* **34**: 290–9

‘OSA is independently associated with insulin resistance.’

ARCHIVES OF INTERNAL MEDICINE



Increasing physical activity reduces risk of type 2 diabetes

Readability	✓✓✓✓
Applicability to practice	✓✓✓✓
WOW! factor	✓✓✓

1 Obesity, sedentary lifestyle, and impaired glucose regulation are all known to increase the risk of type 2 diabetes, but the joint associations of these risk factors are not known.

2 This study examined the single and joint association of physical activity, body mass index (BMI) and glucose levels with type 2 diabetes risk.

3 A total of 2017 Finnish men and 2352 Finnish women aged 45–64 years without a history of diabetes were followed up for a mean of 9.4 years.

4 During this period, 120 participants developed type 2 diabetes.

5 Physical activity was inversely associated with risk of type 2 diabetes, after adjusting for confounding factors, and had a protective effect in subjects with excessive BMI and elevated glucose levels.

6 Obese, inactive subjects with normal glucose levels had an increased risk compared with inactive subjects with normal BMI and impaired glucose regulation.

7 Impaired glucose regulation increased the risk of developing type 2 diabetes approximately fivefold compared with normal glucose levels.

8 Results confirm that increasing physical activity can reduce the risk of type 2 diabetes.

9 Physical activity and weight control are critical factors in diabetes prevention in people with either normal or impaired glucose regulation.

Hu G, Lindström J, Valle TT et al (2004) Physical activity, body mass index, and risk of type 2 diabetes in patients with normal or impaired glucose regulation. *Archives of Internal Medicine* **164**: 892–6

‘Physical activity and weight control are critical factors in diabetes prevention in people with either normal or impaired glucose regulation.’