

Diet and risk of CHD in type 2 diabetes



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Diverse opinions have been expressed on the role of diet in the aetiology, prevention and management of coronary heart disease (CHD) and type 2 diabetes. This controversy has been based on unconvincing epidemiological and experimental evidence, underpowered intervention trials and the development of many classes of effective drugs leading to reduced enthusiasm on the role of nutritional treatments.

In an attempt to clarify the confusion, this excellent review article summarises the epidemiology of CHD and type 2 diabetes. Food and nutrient contents which potentially are protective or promote CHD are identified and evidence for each group represented.

Likewise, epidemiological studies identifying lifestyle factors as potential protectors or promoters of type 2 diabetes are discussed. The article clarifies the change of cardiovascular risk and type 2 diabetes brought about by a change in diet. These include lifestyle modification resulting in

weight reduction, such as that in the Finnish study with a reduction of 5% or more resulting in a 58% reduction in the risk of developing diabetes in patients with impaired glucose tolerance. Similarly, results were obtained in the US Diabetes Prevention Programme.

Current evidence suggests that lifestyle modification reduces the risk of CHD and development of type 2 diabetes. The cornerstone is reduction of saturated fatty acid intake and increase of the intake of vegetables, fruit and wholegrain cereals (increasing high fibre content). Appropriate sources of protein include fish and lean meats. Unsaturated vegetable oils, including those rich in oleic, linoleic and alpha-linolenic fatty acids are preferred. Most importantly, excess weight gain should be avoided. Weight loss in those overweight is an essential prerequisite for prevention of CHD in type 2 diabetes.

The article concludes that the principles of lifestyle and dietary intervention in CHD and type 2 diabetes have been clearly established and should now form the basis of large scale intervention.

AMERICAN JOURNAL OF CARDIOLOGY



Increased arterial stiffness in diabetic subjects

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

- This study examined functional and structural changes of the artery in subjects with diabetes in India.
- 50 subjects with diabetes and 50 non-diabetic (control) subjects were assessed for arterial stiffness (using the augmentation index [AI]), for flow-mediated dilation (FMD) and carotid intima-media thickness (IMT).
- The mean AI was significantly higher in subjects with diabetes.
- FMD values were significantly lower in subjects with diabetes.
- In the total population, AI and FMD showed a correlation with age, fasting plasma glucose, glycosylated haemoglobin and IMT.
- People with diabetes have decreased FMD and increased arterial stiffness compared with controls. These functional changes correlate well with the structural changes of the arteries measured by IMT.

Ravikumar R, Deepa R, Shanthirani CS, Mohan V (2002) Comparison of carotid intima-media thickness, arterial stiffness, and brachial artery flow mediated dilatation in diabetic and nondiabetic subjects (the Chennai Urban Population Study [CUPS-9]). *American Journal of Cardiology* **90**: 702-7

and prevalence of diabetes is halted, the declining rates of CHD are likely to stop and may even increase again.

- If the numbers of people with type 2 diabetes and CHD are to be reduced, then lifestyle interventions aimed at lowering rates of obesity, such as reducing the intake of saturated fatty acids, are most likely to be successful.

Mann JI (2002) Diet and risk of coronary heart disease and type 2 diabetes. *The Lancet* **360**: 783-9

Reducing obesity could cut rates of CHD and diabetes

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

- A diet high in saturated fat is a risk factor for coronary heart disease (CHD) and type 2 diabetes.
- The rate of CHD is declining in many affluent countries, but is increasing in parts of Eastern Europe and Asia.
- In contrast, the prevalence of type 2 diabetes is increasing worldwide.
- This suggests that these important causes of serious morbidity and

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premature mortality have differing risk or protective factors worldwide.

- The increase in prevalence of diabetes is thought to be due to increasing rates of obesity in many countries.
- The decrease in CHD could be partly explained by improved management of acute events and hypertension, and other risk factors such as changed macronutrient composition and reduced cigarette smoking.
- Since diabetes is a risk factor for CHD, unless the increase in obesity

‘Cardiovascular effects of sibutramine do not attenuate the reduction in left ventricular mass brought about by weight loss.’

‘Research has shown that statins also contribute directly to the stabilisation of coronary plaque...’

‘Data indicate that upregulation of the bone morphogenic protein-2 (BMP-2) gene in bone cells by statins, leading to an increase in osteocalcin concentrations, might be beneficial in reducing fracture risk in osteoporosis.’



AMERICAN HEART JOURNAL

Sibutramine does not increase LV mass during weight loss

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

1 The haemodynamic alterations enhanced by obesity predispose to an increase in left ventricular (LV) wall stress, leading to LV hypertrophy, which is a cardiovascular risk factor.

2 Weight reduction in obese subjects leads to a regression of LV mass.

3 Sibutramine is an effective agent for weight loss, but can increase blood pressure and heart rate.

4 It is therefore important that the cardiovascular effects of sibutramine do not attenuate the reduction in LV mass induced by weight loss.

5 This 6-month study examined the effects of sibutramine on 184 obese subjects randomly assigned to once-daily double-blind treatment with sibutramine 10 mg or 20 mg or placebo for 6 months.

6 LV size, status and function of the valves, weight loss, blood pressure (BP), heart rate and ECG were assessed.

7 Reductions in LV mass in the sibutramine groups were significant compared with baseline but not compared with placebo.

8 There was no difference between the groups in overall status of the cardiac valves, BP and ECG intervals, but pulse rate for patients receiving sibutramine was increased (7 bpm).

9 Weight loss was significantly greater for patients receiving sibutramine.

The cardiovascular effects of sibutramine do not attenuate the reduction in LV mass brought about by weight loss.

Zannad F, Gille B, Grentzinger A et al (2002) Effects of sibutramine on ventricular dimensions and heart valves in obese patients during weight reduction. *American Heart Journal* **144**(3): 508–15



JOURNAL OF EPIDEMIOLOGY AND COMMUNITY HEALTH

Hyperglycaemia on admission for MI worsens prognosis

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

1 Patients with diabetes who have a myocardial infarction (MI) have a worse short-term prognosis than non-diabetic patients.

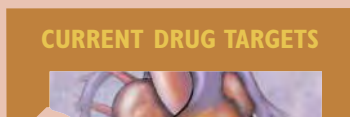
2 This study assessed whether hyperglycaemia on or during admission was associated with worse 28-day mortality in patients with MI.

3 Glycaemia >6.67 mmol/l was taken as hyperglycaemia. Of 652 patients with MI, 29.7% had previously known diabetes, but 69.0% had glycaemia >6.67 mmol/l on admission.

4 Patients with hyperglycaemia were older, more often female, more frequently had a previous diagnosis of diabetes, developed more complications and had a higher 28-day mortality.

5 The effect of admission glycaemia >6.67 mmol/l on 28-day mortality was independent of major compounding factors, particularly previous diagnosis of diabetes.

Sala J, Masia R, Gonzalez de Molina FJ et al (2002) Short-term mortality of myocardial infarction patients with diabetes or hyperglycaemia during admission. *Journal of Epidemiology and Community Health* **56**: 707–12



CURRENT DRUG TARGETS

Statins stabilise coronary plaque

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

Statins are used to lower cholesterol and treat cardiovascular disease.

Research has shown that they also contribute directly to the stabilisation of coronary plaque (vascular

statins). Plaque destabilisation is considered to be a major factor in the development of acute coronary syndrome.

3 This article reviews the direct action of statins on the blood vessel wall.

4 These statins are classified by their different action on the blood vessel wall (hepatic vs vascular statins).

5 A number of mechanisms for their action are identified.

Morishita R, Tomita N, Ogihara T (2002) HMG-Co A reductase inhibitors in the treatment of cardiovascular diseases: stabilisation of coronary artery plaque. *Current Drug Targets* **3**: 379–85

Research into the role of statins

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

1 Atherosclerosis is the underlying disorder in most patients who develop cardiovascular disease.

2 Among other factors, raised plasma cholesterol levels have been linked to the development of atherosclerosis.

3 Statins are the current treatment of choice due to their proven benefits in lowering plasma LDL cholesterol.

4 Recent research has indicated that statins may also have other cholesterol-independent benefits which impact on various aspects of cardiovascular disease.

5 These include improving endothelial function, decreasing vascular



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inflammation and enhancing plaque stability.

6 Data also indicate that statins upregulate the bone morphogenic protein-2 (BMP-2) gene in bone cells and increase serum osteocalcin concentrations. These effects might be beneficial in reducing fracture risk in osteoporosis.

7 It is difficult to separate these additional effects from the lipid-lowering benefits of statins and it might be that they complement or are directly related to these benefits.

Liao JK (2002) Beyond lipid lowering: the role of statins in vascular protection. *International Journal of Cardiology* **86**: 5–18