The COMA report on nutritional aspects of cardiovascular disease:

the scientific evidence

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Recommendations and conclusions from the recent COMA report on the nutritional aspects of cardiovascular disease

Introduction

This report is the third COMA report[1] reviewing the relationships between diet and cardiovascular disease, following those in 1974 and 1984. There have been substantial advances in knowledge since COMA last reported on the relationship between diet and coronary heart disease (CHD) in 1984.

The review group started with three major propositions:

(1) Cardiovascular diseases (CVD) are a major cause of death and ill health. CVD causes about 40 per cent deaths in men and women and about 40 per cent of people aged 55-64 have symptoms of heart disease. Recommendations for their prevention should be aimed at the whole population.

(2) Rates of cardiovascular disease are falling in the UK but not as fast as in other countries. Premature mortality from CVD is therefore preventable and COMA's recommendations are aimed at redressing the difference between the UK and other countries.

(3) Prevention means reducing probability of disease, not eliminating an individual's risk and diet is only one aspect of any preventive strategy.

Nutrient recommendations

The report framed its recommendations in terms of nutrients and in terms of patterns of eating which would meet not only its own recommendations but also COMA's wider recommendations beyond cardiovascular disease. It confirms that the targets in *Health of the Nation*[2] for reduction in consumption of saturated and total fat and a reduction in obesity remain appropriate. The quantified nutrient recommendations are essentially the same as those in the dietary reference values (DRV)[3] report as no new evidence has come to light since then to suggest changing them. The nutrient recommendations are means for the population, not what everybody should eat. The major change required to meet these recommendations is a decrease in the proportion of energy as saturates and an increase in starchy carbohydrates. No change in the average consumption of monounsaturates or polyunsaturates is required.

Fat

The recommendations for fatty acids were primarily made because of their effect on serum cholesterol. Numerous epidemiological and clinical studies have demonstrated a positive and continuous relationship between serum cholesterol and risk of CHD. The atherogenic form of cholesterol is low density lipoprotein (LDL) cholesterol. Many studies have shown that saturates raise serum cholesterol – although not all to the same extent. The greatest effect seen with myristic acid and the least with stearic acid. Monounsaturates, when substituted for saturates lower serum LDL cholesterol but not high density lipoprotein (HDL) cholesterol. Evidence that they actively lower serum cholesterol when added to the diet is less certain. Polyunsaturates actively lower serum cholesterol. However, intakes of polyunsaturates have risen from about 4 per cent energy to about 7 per cent energy now and there is no need for any further increase. In addition, there are reasons to be cautious about population average intakes higher than about 10 per cent energy.

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In addition to their effect on serum cholesterol, the review group also took account of recent evidence that fat, *per se*, predisposes to positive energy balance and to weight gain. This appears to be particularly important in sedentary people.

Rates of obesity are increasing in this country and the group considered that it would not be prudent to merely change the composition of fat but that it was important to recommend a reduction in total fat as well as in saturates in order to help prevent further increases in obesity.

The review group considered recent evidence relating to trans fatty acids which shows that they have a similar effect on LDL cholesterol as do saturates. There is also evidence that they lower HDL cholesterol. Nevertheless trans fatty acids make up a much smaller proportion of the diet than do saturates (2 per cent vs 16 per cent). The group recommended that intakes should not rise above their current 2 per cent of energy and that consideration should be given to ways of decreasing the amount present in the diet.

The group also considered the effects of the long chain n-3 polyunsaturated fatty acids (PUFA), mostly from oily fish. There is good evidence that eating two portions of oily fish a day, or the equivalent amount of n-3 fatty acids reduces the severity of a heart attack in those who have already had one heart attack and it is reasonable to suppose a similar effect in people who have not had a heart attack. The report recommends that intake of long chain n-3 PUFA should double to about 0.2g/day. This would be achieved by doubling consumption of oily fish.

Salt

The recommendation on salt has generated some controversy. However, there is virtually unanimous agreement that salt reduction does decrease blood pressure. The debate is really over the magnitude of the effect.

Various reviews have come up with different estimates of the effect of salt reduction on blood pressure but all have found some effect. The reduction achieved depends to a large extent on the age of people in the trial and their starting blood pressure as the effect is greater in older people with higher initial blood pressures. This explains some of the differences between different reviews and studies.

The review group took the view that desirable and worthwhile reductions in blood pressure levels could be achieved by realistic and feasible reductions in the amount of sodium consumed in the diet. Its recommendation was to reduce salt consumption by an average of 3g/day. It has been estimated that this would reduce average systolic blood pressure by about 3.5mm Hg.

Small but wholescale reductions in blood pressure across the whole population would have a larger effect on heart disease and stroke rates than large reductions restricted to people with very high blood pressure. This is because a small reduction in risk for the majority of people translates to a greater reduction in disease rates than a large reduction in risk for a minority of people.

The Health of the Nation target is to reduce average systolic blood pressure by 5mm Hg and reductions in excessive alcohol consumption, obesity and salt consumption are seen as necessary contributors.

Fruit and vegetables and antioxidants

There is an increasing amount of evidence that suggests that antioxidant compounds, vitamins C and E and β-carotene can modify suceptibility to atherosclerosis by protecting against free radical induced oxidation. However, there is conflicting evidence as to whether this is seen at dietary intakes or whether high intakes, only obtained by supplements are required.

It is possible that when they are consumed in isolation as supplements, very high levels of individual antioxidants are required to achieve the same effect on heart disease as is seen in studies in which people consume the sort of diet, characterized by relatively high levels, though within the normal dietary range, of individual antioxidants but which, in fact, also contains a lot of fruit and vegetables with other antioxidants as well.

The report concluded that, though the evidence was persuasive, it was not yet conclusive and that the other compounds in fruit and vegetables might be important. In addition the recent trial in Finland which found higher rates of lung cancer in those given β-carotene supplements cautions against recommending high doses of purified compounds as a widespread public health measure.

The group recommended a diet high in fruits and vegetables which would increase intakes of these nutrients, and other compounds found in fruit and vegetables, and which is conducive to general health.

Dietary recommendations

The review group felt it was important to give its recommendations, not just in terms of nutrients, but also in terms of eating patterns. They wanted to show one way in which current consumption patterns might change to meet their recommendations so that people would know what sort of changes would be necessary to achieve their recommendations and how large they would need to be.

In order to give practical and realistic advice – as well as ensuring that their recommendations were feasible in the context of a recognizably UK diet – the review group

carried out a computer modelling exercise using the data from the National Food Survey[4] on average diets. Out of the many possible permutations, the group identified some general principles of the sorts of dietary changes which would achieve COMA's recommendations and which would be appropriate for most of the population. However, the illustrative diet in the report was not intended to be prescriptive nor was it intended to be taken as recommendations for individuals, although it was, unfortunately, misunderstood to be so by some.

The report's general recommendations are that the average consumption of vegetables, fruit, bread and potatoes should be increased by 50 per cent; that on average, people eat one portion of oily fish a week; that people continue to substitute low and reduced fat spreads and dairy products for the full fat varieties; and that people replace fats rich in saturated fatty acids with fats and oils low in saturates and rich in monounsaturates.

The report also recognized that the recommended reduction in salt intakes could not be achieved merely through individuals not adding salt to food at home, as salt added at home only contributes about 20 per cent or so to salt intakes. Compositional changes in the salt content of processed foods would also be necessary.

These recommendations were incorporated in the National Food Guide, the Balance of Good Health, to help people understand what a healthy balanced diet means in terms of amounts of foods. This shows the proportion of the diet, by weight rather than by energy, that the five different food groups should contribute to achieve a balanced diet. On average, the two food groups, fruit and vegetables, and bread, other cereals and potatoes should each provide about one third of the diet. Milk and dairy foods, meat, fish and alternatives and fatty and sugary foods should make up the remainder but in unequal proportions.

It is hoped that feasible recommendations, translated into realistic, practical and clear dietary advice will help people change their diets and so enable the UK to see the same reductions in heart disease and stroke rates as other countries have seen in recent years.

References

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