SESSION II

IMPLICATIONS FOR AGRICULTURE AND THE FOOD INDUSTRY

Chairman: MISS D. HOLLINGSWORTH

Dietary prevention at home and abroad

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Summary

The main dietary recommendations towards the prevention/postponement of coronary heart disease (CHD) made in the U.K. in the last decade are reviewed. There is substantial agreement regarding the need for a reduction in the intake of saturated fats. It is suggested that only moderate changes in dietary polyunsaturated : saturated ratio may be sufficient to achieve changes in the incidence of CHD.

Introduction

There is a list of references to 20 reports by various international committees, all concerned with recommendations for the general population and/or high-risk groups towards the prevention of coronary heart disease (Turner, 1980). As these have been well summarized in the accompanying table, they will not be discussed further but the recommendations that have been made in the United Kingdom, and some of the arguments and problems surrounding them will now be examined.

Attitudes to dietary change

Asher (1968) in providing some ideas for would-be-writers of medical papers entitled one section 'Do not write' and said the following:

'Please do not write any more articles about cholesterol and coronary disease and the diet and drugs which are supposed to influence them. The factors about coronary disease are these: the less atheromatous your ancestors, the harder your water, and the more habitual exercise you take, the less likely you are to be troubled by it. Do stop bothering about whether your fats are saturated or unsaturated, help yourselves liberally to butter and stop propagating erroneous legends'.

In many ways, this astute clinical observer was telling us something about the British attitude to dietary manipulations and the boredom that is often produced by discussion of dietary changes. Confronted with a host of conflicting views on the nature of a 'healthy' diet, it is perhaps not surprising to find apathy a commonplace. However, that was over a decade ago, and things may well have changed, even if only moderately.

The DHSS report on diet and CHD

In 1970, the Department of Food Policy (Nutrition) referred to as COMA, set up a panel under the chairmanship of Sir Frank Young, to advise 'on the significance of any relation between nutrition and cardiovascular and cerebrovascular disease, and on any indications for future action'. The report was to refer 'to the population as a whole'. In 1974, the panel reported with 4 major recommendations and with a special note of reservation by one member (who believed that the report had exaggerated the possible role of dietary fat in causing coronary heart disease (CHD) and had minimized the possible role of sucrose): 1. The avoidance of obesity. 2. A reduction in fat intake, especially saturated fat. 3. A reduction in sucrose. 4. A caution on the softening of water (DHSS, 1974).

The recommendations were not to be regarded as being placed in any order of priority but interestingly enough, started with obesity.

In the U.K., as in many countries, obesity has always been regarded as having special and critical significance for CHD, despite the considerable evidence to suggest that other factors are of more importance and that obesity *per se* is not a major risk factor. As no order of priority was suggested and as a reduction in sucrose intake is recommended

without dissection, it seems difficult to understand why the reservation by one member was allowed to appear in this report.

The majority of the members of the panel recommended that the amount of fat in the U.K. diet, especially saturated fat from both animal and plant sources, should be reduced. They unanimously agreed that they could not recommend an increase in the intake of polyunsaturated fats (PUFA) in the diet as a measure intended to reduce the risk of the development of CHD. Quite correctly, there was little direct evidence to support the use of PUFA as a measure that would reduce the risk of CHD, but the panel had equally little direct evidence that lowering total fat or saturated fat would lower the risk of CHD. And, of course, the panel provided no guide to a community used to a high-fat intake as to what substitutes they might safely use to replace some of the abandoned saturated fats. The panel accepted that an increase in the polyunsaturated : saturated (P/S) ratio would be followed by a fall in the mean cholesterol but they were unanimously unconvinced that this would lead to a reduction in the incidence of CHD in the U.K. 'In the present state of knowledge, any suggestion or claim to that effect, with respect to the nation or to an individual, would be unjustified'. For a scientific panel to suggest that the suggestion of a hypothesis is unacceptable seems a little strange!

In all fairness, the COMA panel did make a recommendation that the intake of total fat, and especially saturated fat, should be reduced in the general population, and although this was only a majority recommendation, it was made. It is more important to credit the panel with this positive decision than to criticize it for recommendations it felt unable to make.

The RCP/BCS report on prevention of CHD

The report on 'Prevention of coronary heart disease' by a Joint Working Party of the Royal College of Physicians of London and the British Cardiac Society (1976) was a completely different kind of document. The aim of that working party 'has been to formulate the best possible advice that can at present be given to medical practitioners towards the prevention of coronary heart disease'. It was concerned with a wide range of subjects and risk factors and the dietary recommendations were only one of the many areas covered. Dietary recommendations were made for the community as a whole and somewhat more specific and stringent advice was outlined for individuals who were regarded as 'hyperlipidaemic'.

Dietary recommendations for the community

Reduce dietary fat intake towards 35% of total

calories. This reduction to apply particularly to saturated fats.

Partially replace saturated fats by polyunsaturated fats.

The obese should reduce their total calorie intake.

The report attempted to provide simple guidelines regarding the implications of these recommendations in terms of ordinary foods.

Eat more poultry and fish. Eat less meat and fewer egg yolks; choose lean meat; remove visible fat; grill rather than fry.

Use butter sparingly; preferably use a soft margarine high in polyunsaturated fat (PUFA). In general, avoid cream and the top of the milk. Use PUFA oils for cooking; avoid hard margarine or lard.

Eat more vegetables and fruit.

In a study conducted in the early 1970s, Shaper and Marr found that the use of these simple guidelines was acceptable, cost-effective and easily maintained and that they did lower the serum-cholesterol concentration. However, it was felt that even these recommendations from the RCP/BCS were somewhat diffuse and that a short statement on dietary modification which was specific to the postponement/prevention of CHD should be produced (Shaper and Marr, 1977). In addition, a statement about the P/S ratio was needed as this was an area not specifically covered by the RCP/BCS report.

It was recommended that the whole community should be advised to reduce their intake of foods high in saturated fats and to replace these partially by foods that are relatively high in polyunsaturated fats. This will lower both total fat and dietary cholesterol intakes and will also increase the P/S ratio. The authors were concerned with the P/S ratio,

FIG. 1. Ratio of polyunsaturated to saturated (P/S) fats and mortality from CHD (per 100 000 population/year) in men aged 45-54 years in 20 countries. *Austria, Belgium, Denmark, France, Germany, Japan, Italy, Israel, The Netherlands, Norway, Sweden, Switzerland, Venezuela.

for when they looked at the data on CHD, they observed that many of the countries with high CHD mortality rates had P/S ratios around 0.2. Countries with a much lower CHD rate did not necessarily have a P/S ratio as high as Japan (1.0) with its very low CHD rate (Fig. 1, 2). Indeed, it seemed likely that the achievement of a P/S ratio of 0.5–0.6 in the community, which it was known from London studies could be achieved without undue difficulty, might be an adequate goal. This required no major changes

in the community diet and would be associated with fewer major changes in agriculture and industry.

The fatty-acid story

Shortly after the report of Shaper and Marr (1977), the results of the Edinburgh-Stockholm study of CHD risk factors in men aged 40 years emerged (Logan *et al.*, 1978). This study was initiated because CHD rates at this age were several times higher in Edinburgh than in Stockholm. The study showed that the men had similar mean total cholesterol concentrations and that there were many important differences in BP levels and smoking patterns. Of particular interest, however, were the fatty acid patterns in adipose tissue and blood. In brief, Stockholm men had higher levels of linoleic acid in their plasma cholesterol esters and triglycerides and also in the adipose tissue. It was realized that the findings were similar in many ways to those encountered in a group of middle-aged London civil servants before and after dietary changes based on the RCP/BCS recommendations. Before the London men altered their diets, their pattern of linoleic acid in plasma cholesterol esters and triglycerides was similar to that of the Edinburgh men. Four months after dietary modifications which altered their P/S ratio from 0.17 to 0.59, their linoleic acid patterns were similar to those obtaining in the Stockholm men (Shaper and Marr, 1978). The message to be derived from this information is that moderate dietary changes with a resulting moderate change in P/S ratio might be an important and easily achievable goal in the prevention of CHD (Table 1).

FIG. 2. Ratio of polyunsaturated to saturated fats and incidence of CHD (per 100 000 population/year) in men aged 40–59 years in the Seven Countries Study. (Greece=Corfu and Crete, but as data for polyunsaturated fatty acids for Crete were not reliable, data for Corfu by itself are also presented.)

TABLE 1. Effect of increasing dietary P/S ratio (polyunsaturated to saturated fats) on plasma-lipids ($\pm$ s.d.)

	Diet group (n = 79)		Control group (n = 68)	
	November	March	November	March
KCal	2650 (418)	2339 (381)	2703 (392)	2653 (406)
Protein (g)	87 (16)	84 (16)	88 (13)	88 (13)
Fat (g)	126 (25)	96 (21)	125 (23)	123 (23)
Carbohydrate (g)	269 (58)	265 (57)	288 (64)	280 (61)
Saturated fat (g)	63 (13)	37 (8.6)	63 (12)	61 (13)
Polyunsaturated fat (g)	11 (3.3)	22 (8.0)	10 (2.8)	11 (2.4)
Linoleic acid (g)	8 (2.9)	19 (7.9)	8 (2.5)	8 (2.1)
P/S ratio	0.17 (0.05)	0.59 (0.19)	0.17 (0.05)	0.18 (0.04)
Percentage of linoleic acid (C18 : 2) in plasma lipids:				
	(n = 81)		(n = 62)	
Cholesterol esters	45.7 (4.3)	53.8 (4.9)	45.9 (4.2)	47.1 (4.1)
Triglycerides	11.5 (2.5)	18.4 (4.9)	11.8 (2.7)	12.0 (2.9)
Percentage energy from:				
Protein	13.2	14.4	13.0	13.2
Carbohydrate	40.6	45.3	42.6	42.2
Fat	42.9	36.9	41.7	42.0
Saturated fat	21.4	14.4	20.9	20.9
Monounsaturated fat	17.7	13.8	17.2	17.4
Polyunsaturated fat	3.6	8.3	3.5	3.6

Prescription for a better British diet

A more recent attempt to look at a prescription for a better British diet has recently been made by Passmore, Hollingsworth and Robertson (1979), the first 2 authors having been members of the original COMA panel.

In their extremely interesting publication, they are concerned with the national situation rather than with specific diseases or diets. They use data on the total food supplies in the U.K., derived from statistics of agricultural production and imports and non-food uses. This corresponds roughly to food available for human consumption, while the National Food Survey data approximate to food as it enters family kitchens. Their recommended intakes of nutrients, except for energy, were defined as 'the amounts sufficient or more than sufficient for the nutritional needs of practically all healthy persons in a population'. They were derived, as far as possible, from experimentally determined physiological requirements of people of different ages, sex and physical activity, after the addition of suitable safety factors. The safety factors were presumably concerned with risks of deficiency and with nutritional adequacy and only to a lesser degree (if at all) with disease problems.

PRESCRIPTION FOR A BETTER BRITISH DIET

(Adapted from Passmore, Hollingsworth and Robertson, 1979)

Decrease (%)	No change	Increase (%)
Fat and oils 15	Dairy products	Potatoes 15
Meat 15	(except butter),	Other veg. 15
Sugar 15	fish, eggs,	Fruit 15
Alcohol 25	pulses and nuts	Grains 20

One of the important attitudes which emerges from this paper is the concern that nothing should be done which would disrupt agricultural or trade policies during the next decade. The authors are right to have such concern but are perhaps lacking confidence in the flexibility of agriculturalists, industry and trade.

The BMA booklet

The BMA have recently brought out a booklet entitled *Heart Attack Prevention and Treatment* (Portal, 1979). Opponents of dietary changes in the community will be delighted to see a statement which surely will be widely quoted: 'There is as yet insufficient evidence to justify a radical alteration in our present diet'.

The booklet then proceeds to recommend the use of corn oil, sunflower oil, reduced total fat intake, reduced dairy products and eggs, the use of a little butter and also margarine, wholemeal bread, plenty of fresh fruit and vegetables and fish, chicken and 'red' meat. One can only support their recommendations, despite their somewhat vague presentation and regret their inability to see that we are all agreed that a 'radical' change is not indicated.

Conclusion

The era of dietary studies specifically aimed at reducing the incidence of CHD is over and all studies in the future are likely to be multifactorial in design. Indeed, with the wisdom of hindsight and new knowledge, it might well be that the natural history of atherosclerosis and CHD militate against such studies and certainly against their clear success. Perhaps Francis Bacon, some 400 years ago, should have the last say in an approach to the primary prevention of coronary heart disease:

'Examine thy customs of diet, sleep, exercise, apparel and the like; and try, if anything thou shalt find hurtful, to discontinue it by little and little; but so if thou dost find any inconvenience by the change, then come back to it again'.

(Bacon, 16th Century)

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