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DIETARY SUCROSE AND CORONARY HEART DISEASE

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Serious students of the "coronary problem" must find it difficult to understand the publicity given, in the Spring 1969 and Autumn 1970 issues of NUTRITION TODAY, to Professor John Yudkin's assertions that dietary sucrose is a major factor in the etiology of atherosclerosis and its clinical complications. Propaganda pieces, sponsored by commercial interests in the daily press, periodically mislead the public into believing that Yudkin's theory is an important scientific issue. It is unfortunate to further this idea in a more responsible publication such as NUTRITION TODAY.

For the truth is quite different. Yudkin's views are not even mentioned in recent congresses and symposia concerned with coronary heart disease and its etiology, including dietary influences. Attached is a list of sixteen such meetings in the past three years, for which I personally can testify that Yudkin's views were not even debated. This is not a case of unjustly ignoring the teaching of a prophet; Yudkin's arguments so clearly lack substance and fly in the face of fact that experienced workers in the field are simply not interested.

Yudkin started out by reporting some crude statistical material from which he asserted that dietary sucrose rather than fat is a major factor in the etiology of coronary heart disease. Naturally, he was an instant hero of certain food industries which have continued to carry his message ever since. The argument of one dietary factor versus another as the villain continues to obsess him, as witness his so-called rebuttal to Dr. Stare in the Autumn, 1970, issue of NUTRITION TODAY. Attack may be the best defense in some military situations but an attack on one scientific theory does not qualify as evidence for another. A brief review of the sugar story is in order.

Yudkin made his entry into the field by stating that comparisons of official vital statistics from fifteen countries show a close correlation between mortality rate ascribed to coronary heart disease and the amount of sugar in the diet (1957 Lancet ii, 155). Actually, the data concerned sugar "disappearance," no correlations were calculated, and the nations selected did not include those with the highest sugar intakes, such as Cuba, Colombia and Venezuela which also happen to be characterized by a very low incidence of coronary heart disease. He did not comment on fatal discrepancies such as the fact that the per capita consumption of sugar in Sweden is far greater than in Finland while the age-specific mortality rate from coronary heart disease in Sweden is barely half that of its next-door neighbor with similar high medical standards. Finally, even with populations selected so as to support the sugar theory, such association as appears to exist between sucrose consumption and the incidence of coronary heart disease is readily accounted for by the correlations of saturated fatty acid consumption with coronary heart disease and with sugar intake. Yudkin has repeatedly made such assertions as "the prevalence of this disease is more closely associated with the level of sugar consumption than with the level of any other dietary component" (1969 Nutrition News 32, No. 3, p. 9, italics by Yudkin). That statement is not true nor was it ever justifiable. Neither Yudkin nor anyone else has ever produced data on

population mortality rates and dietary consumption to support that claim. Even for Yudkin's selected countries the most that could be said is that in the early 1950s mortality attributed to coronary heart disease appeared to be associated, to a similar extent, with national disappearance rates of sugar and of fat (nothing about saturated fatty acids in the data). Currently, Yudkin still seems to be unaware of, or unwilling to recognize, the differences between fatty acids.

Yudkin's second line of argument concerns the rise in sucrose consumption over the years and the fact that deaths attributed to coronary heart disease have increased dramatically. It is true that several centuries ago the per capita consumption of sugar in England and the United States was perhaps only a tenth of what it is today and that in those days coronary heart disease had not been discovered as a major disorder. But more than half a century ago the per capita consumption of sugar in England and in the United States was not much less than it is now and coronary deaths were still so rarely reported that they were not listed separately in national vital statistics. For the U.S., the Department of Agriculture reported yearly averages of 113.9 pounds of sugar per capita for the 1920s and only 110.5 for the 1960s. Vital statistics for those periods would indicate a 40-year trend of an enormous increase in coronary heart disease associated with a decrease in sugar consumption.

Actually, of course, only for recent years can credence be given to coronary mortality as reported in the vital statistics. Probably the incidence of the disease has actually increased much in the last 50 years but there is no way to estimate or allow for the failures to diagnose and report this disease in the past. What is clear, then, is that there are no factual bases on which to claim, for any country, a true trend in the incidence of this disease reflecting a long-time trend in the consumption of sugar--or of any other nutrient or factor in the mode of life.

The third argument, and the one most often repeated by Yudkin, is the claim that men who have heart attacks tend to be characterized by unusually high sugar intakes. In 1964 Yudkin stated that 20 men who had survived myocardial infarction had about double the average sugar intake of men with no health problems (N = 12) or orthopedic patients (mostly accident cases, N = 13). Patients with peripheral vascular disease (N = 25) were reported to resemble the coronary patients in high sucrose intake (Lancet ii, 6). In 1967, Yudkin compared 20 male coronary patients with 20 "healthy controls" and 13 men with orthopedic problems, the mean daily sucrose intakes being estimated as 148, 78, and 90 grams, respectively (Am. J. Clin. Nutr. 20, 503).

Yudkin estimated sugar intakes from simple questionnaires without validation. We may ask whether it is credible that 5 of the 25 coronary patients actually consumed, as reported, averages of over 230 grams of sucrose daily, i.e. nearly 1000 calories of sugar a day for hospital bed patients, or around 60 per cent of calories from sugar alone. It is interesting, too, that the coronary patients were said to get an average of more than three-fourths of their sugar in their average of over 8 cups of coffee or tea daily.

Yudkin's small surveys paid no attention to the rudimentary requirements for proper sampling; there is no assurance that the groups were comparable in family status, occupation, social and economic class, physical activity, body fatness, place of origin and ethnic background. But whatever may be the explanation for the figures reported by Yudkin, the fact is that they are not confirmed by any of the six other groups of investigators who examined this question with more rigor.

In Toronto, Canada, a study of 170 military veterans, 86 with coronary heart disease and 84 "healthy" age-matched controls from the same population, indicated slightly more sugar intake by the controls than the coronary patients (Little et al. 1965 Lancet i, 933). In Montreal, Canada, the 7-day dietary recall method was applied to 20 coronary patients and 20 age-matched controls; mean daily sucrose intakes were indicated to be 121 and 117 grams, respectively (Papp et al. 1965 Lancet ii, 259). In Dublin, Eire, dietary data obtained by trained interviewers indicated a daily average of 66 grams of sucrose for 100 coronary patients, the corresponding average for 50 controls, matched in other respects, being 69 grams (Finegan et al., 1968, Am. J. Clin. Nutr. 21, 143). In England two studies, both technically and statistically better than Yudkin's, failed to find any significant difference in sugar intake between coronary patients and their controls. In one, 170 male coronary heart disease patients were compared with 1,158 age-matched men judged to be healthy (Howell, 1969, Brit. Med. J. 3, 145). In the other study, each of 80 men recovering from myocardial infarction was compared with two men matched by age and place of birth but judged to be free from coronary heart disease (Burns-Cox et al. 1969 Brit. Heart J. 31, 485).

The five negative reports cited above were, as in Yudkin's reports, based on studies of men after a diagnosis of coronary heart disease had been made. Only one prospective study has been reported, that of Paul et al. (1968 Lancet ii, 1049) on men in a Chicago factory. There was no significant difference in sugar intake between men who later developed coronary heart disease and those who did not. It is interesting, also, but not really of critical import, that community surveys in England fail to show any significant relationship between dietary sugar and the prevalence of coronary heart disease (Elwood et al., 1970, Lancet i, 1014).

Finally, consider the results of experiments. Dietary experiments on animals have been going on for over sixty years in the effort to understand the etiology and pathogenesis of atherosclerosis and coronary heart disease. In all that time no one has found that sugar in the diet influences atherogenesis. In man, direct experiments with measurements of atherosclerosis are not feasible, of course, but many experiments have examined effects of the diet on the concentration of cholesterol in the serum, the most firmly established risk factor for coronary heart disease. In the Laboratory of Physiological Hygiene three controlled experiments by Doctors J. T. Anderson and F. Grande have consistently failed to show any significant difference between sucrose and starch in the diet in effects on serum cholesterol. Others, including even Yudkin recently, agree on this point (Szanto and Yudkin 1969 Proc. Nutr. Soc. 28, 11A).

In summary, then, Yudkin offers no theoretical or experimental basis for his views about the role of dietary sugar in the etiology of coronary heart disease, his "evidence" from statistics on populations will not withstand the most elementary critical scrutiny, and his claim that people who have coronary heart disease tend to consume sugar excessively is refuted by six independent studies, each of which is superior in methodology and/or magnitude to his own.

Many of us will agree in deploring the high consumption of sugar by so many people in our society. We properly warn about effects on dental caries, we note the nutritional hazard of so many "empty calories," and so much sweetness offends our gastonomic sense. But as scientists we must object to publicity given to arguments based on non-existent or thoroughly discredited "evidence." The public is ill served by being exposed to Yudkin's personal gospel.

SUCROSE vs. CORONARY HEART DISEASE

WAS NOT AN ISSUE AT THE:

1) Annual Scientific Meetings, American Heart Association, Atlantic City, N.J. November, 1970.

2) 7th International Meeting on Nutrition and Cardiovascular Diseases, Rimini, Italy, September, 1970.

3) 6th World Congress of Cardiology, London, England, September, 1970.

4) International Symposium on Basic Factors in Arteriosclerosis, Lindau, West Germany, April, 1970.

5) Scientific Sessions, Council on Epidemiology, American Heart Association, New Orleans, Louisiana, February, 1970.

6) White House Conference on Food, Nutrition and Health, Washington, D.C., December, 1969.

7) Annual Scientific Meetings, American Heart Association, Dallas, Texas, November, 1969.

8) 2nd International Symposium on Atherosclerosis, Chicago, Illinois, November, 1969.

9) 8th International Congress of Nutrition, Prague, Czechoslovakia, September, 1969.

10) International Symposium on Atherogenesis, Tokyo, Japan, May, 1969.

11) Scientific Sessions, Council on Epidemiology, American Heart Association, Atlanta, Georgia, February, 1969.

12) Annual Scientific Meetings, American Heart Association, Miami, Florida, November, 1968.

13) European Congress of Cardiology, Athens, Greece, September, 1968.

14) Asian-Pacific Congress of Cardiology, Tel Aviv, Israel, September, 1968.

15) World Congress on Hygiene and Preventive Medicine, Rome, Italy, August, 1968.

16) International Symposium on Preventive Aspects of Cardiology, Rochester, Minnesota, May, 1968.

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