

NUTRITION AND HEALTH - THE NEED FOR RESEARCH AND ACTION

B.S. HETZEL*

Summary

Increasing evidence of the relevance of nutrition to the major health problems of modern man indicates the possibility of productive research in human nutrition using both animal models and epidemiological methods concerned with communities and groups.

Evidence relating diet to coronary heart disease, various forms of cancer and high blood pressure is reviewed.

The possibility of prevention arises by suitable modifications of the diet of children and young adults. Such changes require new initiatives in health education and health information using modern techniques to arouse motivation. More research and action in this area is urgently needed in view of the likelihood of successful prevention of much ill health in Australia today.

I. INTRODUCTION

I would like to begin by congratulating the Nutrition Society on its formation and wishing it a successful future. It is clear that the research in nutrition, especially in human nutrition, has taken on a new momentum in the last few years. This arises from the close relationship that has now been demonstrated between nutrition and the major causes of death in Western man.

The creation by CSIRO of a new Division of Human Nutrition recognises for Australia the importance of the research opportunity in the field at this time. In the past, human nutrition has been a neglected area - especially in Australia so that this decision can be regarded as timely in correcting a defect that is, however, not unique to Australia. The Division which has been reconstituted from the former Division of Nutritional Biochemistry will be pursuing a program of research in relevant animal models (sheep, pig, monkey) as well as epidemiological studies of the nutrition of groups and communities.

The major health problems of Australia are indicated by the major causes of death: coronary heart disease (30%), cancer (17%) and stroke (14%) which together with accidents (3.5%) make up a total of nearly two thirds of all deaths. (Aust. Govt. Dept. Health 1975)

II. CORONARY HEART DISEASE

Coronary heart disease is closely related to diet - extensive evidence relating coronary heart disease to cholesterol intake is available (Connor and Connor 1972). However, cholesterol is only one factor in the diet of Western man that may be significant - other factors include carbohydrate as pointed out by Yudkin (1972) and a deficiency of fibre as pointed out by Burkitt (1970). There is much controversy as to which factor may be important, possibly each of them plays a role. However, diet is of course not the only risk factor in coronary heart disease.

* Chief, CSIRO Division of Human Nutrition, Adelaide, South Australia
5000

Others include genetic background, psychosocial stress, hypertension and cigarette smoking.

Diet is an important aspect of life style. The atheromatous process, while not necessarily leading to myocardial infarction or angina, is clearly initiated during childhood and adolescence as indicated by elevated blood cholesterol (above 240 mg %) in 12% of a group of 613 adolescent boys studied in Sydney (Hickie *et al.* 1974). Reversal of this process in the middle-aged can hardly be expected - and a recent major study in the U.S.A. indicates the ineffectiveness of dietary modification following myocardial infarction. The major opportunity for prevention arises in childhood and young adult life by adoption of a suitable diet and research is needed on the possibility of this.

III. DIET AND CANCER

The relation of the various forms of gut cancer to diet has been well established by recent epidemiological studies (Wynder 1975). This applies to oesophageal cancer (alcohol and cigarette smoking), gastric cancer (geographical differences between Japan and U.S.A. correlated with diet) and colon cancer.

Colon cancer (the most common single cancer in Australia causing 5.7% of deaths) has been the subject of special studies - international comparisons reveal high rates in the West, but very low rates in Africa and Asia. The Japanese have a low rate (4 per 100,000, but this increases following migration to the U.S.A. with adoption of Western diet (the U.S.A. rate is 30.9 per 100,000; Cairns 1975). International comparisons reveal a correlation between meat intake and rectal cancer in women, while another international study reveals a correlation of rectal cancer with beer intake (Breslow and Enstrom 1974). This latter study is supported by a relation between the incidence of rectal cancer in different States in the U.S.A. and beer consumption.

It is also possible that fibre content is important as suggested by Burkitt (1970) - the fibre content would influence transit time and therefore the period of contact of the colonic mucosa with a possible carcinogen derived from bile salts. More research is clearly indicated to determine the precise factors involved.

There is also evidence indicating the importance of diet in relation to the endocrine related cancers - breast, ovary, endometrium and prostate (Wynder 1975). These cancers increase in Japanese on migration to the U.S.A. - this migration is associated with earlier puberty and a diminished estriol/estradiol ratio which may be a precursor of breast cancer (McMahon Cole and Brown 1973) and is probably correlated with changes in diet.

IV. STROKE

The common precursor of stroke is high blood pressure (hypertension) and recent experimental evidence indicates the importance of sodium intake in hypertension in rats in association with genetic factors. This is supported by epidemiological evidence relating salt intake to incidence (Weinsier 1976). The Japanese have a very high intake (26 g per day average, reaching 55 g per day in Northern Japan) correlating with the highest known national prevalence of hypertension and death from cerebral haemorrhage. The New Guineans have a very low intake (2-3 g per day) which may well account for their low blood pressure and failure of the

blood pressure to rise with age. Prevalence of hypertension in two ethnically similar Polynesian populations was correlated with sodium intake (Prior *et al.* 1968). In the U.S.A. and other Western countries in spite of a high salt diet not everyone is hypertensive indicating the importance of genetic factors.

The importance of childhood conditioning has been pointed out - as for example by the use of cow's milk (1.7 g per litre) instead of breast milk with its lower salt content (0.6 g per litre).

V. TRAFFIC DEATHS

There is an elevated blood alcohol in over 50% of drivers killed on the road. This rises to 75% in single vehicle accident deaths. These drivers, nearly all male, come predominantly from the age group under 30 years. This is shown also by the age range of casualties seen at hospitals and tested following the passage of compulsory legislation in South Australia and Victoria (80% are male and over half are less than 30 years of age; Ryan *et al.* 1976). These findings point again to the young adult and more particularly, the young male life style in Australia (Hetzl 1974). There is evidence of heavy and increasing alcohol consumption in the under 30 male age group (Krupinski and Stoller 1973).

VI. COMMENT - THE NUTRITION OF THE YOUNG ADULT

In each of these major causes of death in Australia today recent research has recognised the young adult dietary pattern as a major determinant in the development of a disease in later life - this applies to coronary heart disease, gut cancer and hypertension.

We need therefore to research the genesis of dietary patterns in the young adult in Australia today. We need to understand this process if we are going to have any success in modifying these patterns to be more conducive to health and prevention of premature death.

The formation of dietary patterns clearly begins in infancy and childhood. Breast feeding or artificial feeding are clearly major influences although definitive evidence is not available as yet. Family patterns clearly will also be influential, followed by peer groups in the adolescent period. Food and drink intake is generally a pleasant experience, a tranquillizer at times of emotional disturbance, a social catalyst and source of much of our cultural traditions.

The period of adolescence is associated with much emotional disturbance as indicated by general community studies in metropolitan Melbourne and rural Victoria (Krupinski and Stoller 1971) where 30-40% of adolescents reported transient emotional disturbances during the preceding month. At Monash University, of a group of 1803 first year students, 38% of male and 48% of female students reported a significant emotional disturbance during their first year and a slightly higher number in their second year (McMichael and Hetzel 1975). Such periods provide opportunities for consolation with food or drink which can be powerful conditioning influences in eating and drinking habits. Modern advertising actively encourages young people to drink alcohol as well as consume refined carbohydrate as sweets and other "junk" foods (Hetzl 1974).

Increasing efforts to provide nutrition education are now being made. This may come through special programs or as part of the formal school curriculum as in the case of home economics (now renamed more appropriately "Human Development and Society") as a matriculation subject in Victoria. It is clear that such education should be part of the formal school curriculum for all - one neglected aspect of our education system is the aspect of "preparation for life" - nutrition and sex education should be seen as part of growth and development and taught as part of this and not by themselves. The same applies to that special common nutrient - alcohol.

However it is apparent that present courses are designed mainly to impart knowledge rather than modify behaviour. The limitations of formal health education teaching is that it often sounds like preaching, an experience to which the present younger generation are notably sensitive. It is clear that new methods are required.

It is obvious that adolescent life style is flexible, influenced greatly by peer group pressures and in turn, by mass media. The influence of television (experienced by most Australian youngsters in excess of 20 hours each week from an early age) is clearly very important. Recent reviews on the influence of television on violence indicate increasing concern about the effects of this powerful medium.

The image building concept (so vividly demonstrated by present cigarette and alcohol advertisements) cannot be ignored by modern health educators and all concerned with the health and nutrition of adolescents.

Indeed, it has recently been suggested that a suitable health education model is the election campaign (Ubell 1972) where a decision is sought and eventually obtained - using individual appeal aroused by clear presentation of a case with specific enumeration of all the benefits. I believe that health educators have to consider such an approach. The fact is that the adolescent lives in a social environment of which the school is only one important component. The family is another but in addition there are the mass media, the peer group and the community. The adoption of a healthy dietary life style will not occur without much more effort to promote it through the whole social environment and not just relying on the school and the family.

In this connection it is of interest that Norway is realising that ill health is so costly that an active approach to prevention is being adopted as a major part of social policy. Agriculture is being modified to provide a more prudent diet, the same is true of the food industry and import policies. Reduced costs of health care will enable the budget to be more readily balanced - a lesson we can certainly learn in Australia where the costs of health care are escalating so rapidly.

VII. REFERENCES

- AUSTRALIAN GOVERNMENT DEPARTMENT OF HEALTH (1975).
Ann.Rep.Director-General of Health, Canberra.
BRESLOW, N.E., and ENSTROM, J.E. (1974). J.Nat.Cancer Inst. 53: 631
BURKITT, D. (1970). Lancet 2 : 1229.
CAIRNS, J. (1975). Sci.Am. Nov. :64.
CONNOR, W.E., and CONNOR, S.L. (1972). Prev.Med. 1: 49

- HETZEL, B.S. (1974) "Health and Australian Society"
(Penguin Books, Australia.)
- HICKIE, J.B., SUTTON, J., RUSSO, P., RUYS, J., and KRAEGEN, E.W.
(1974) Med.J.Aust. 1: 825
- KRUPINSKI, J., and STOLLER, A. (1971). "The Health of a Metropolis",
(Heinman Educational, Australia.)
- KRUPINSKI, J., and STOLLER, A. (1973). "Drug Use by the Young Population
of Melbourne", Special Publications, No. 4, Mental Health Authority,
Victoria.
- MacMAHON, B., COLE, P., and BROWN, J. (1973).
J.Nat.Cancer Inst. 50: 21.
- McMICHAEL, A.J., and HETZEL, B.S. (1975). Med.J.Aust. 1 : 499
- PRIOR, I.A.M., EVANS, J.G., HARVEY, H.P.B., DAVIDSON, F., and LINDSEY, M.
(1968). New Engl.J.Med. 279 : 515
- RYAN, G.A., SALTER, W.E., COX, C.J., and McDERMOTT, F.T. (1976).
Med.J.Aust. 2 : 129.
- UBELL, E. (1972). Prev.Med. 1 : 209.
- WEINSIER, R.L., (1976). Prev.Med. 5 : 7.
- WYNDER, E.L., (1975). Prev.Med. 4 : 322.
- YUDKIN, J., (1972). "Pure White and Deadly". (Davis-Poynter, London.)