The Singapore Dietitian

Singapore Dietitians' Association

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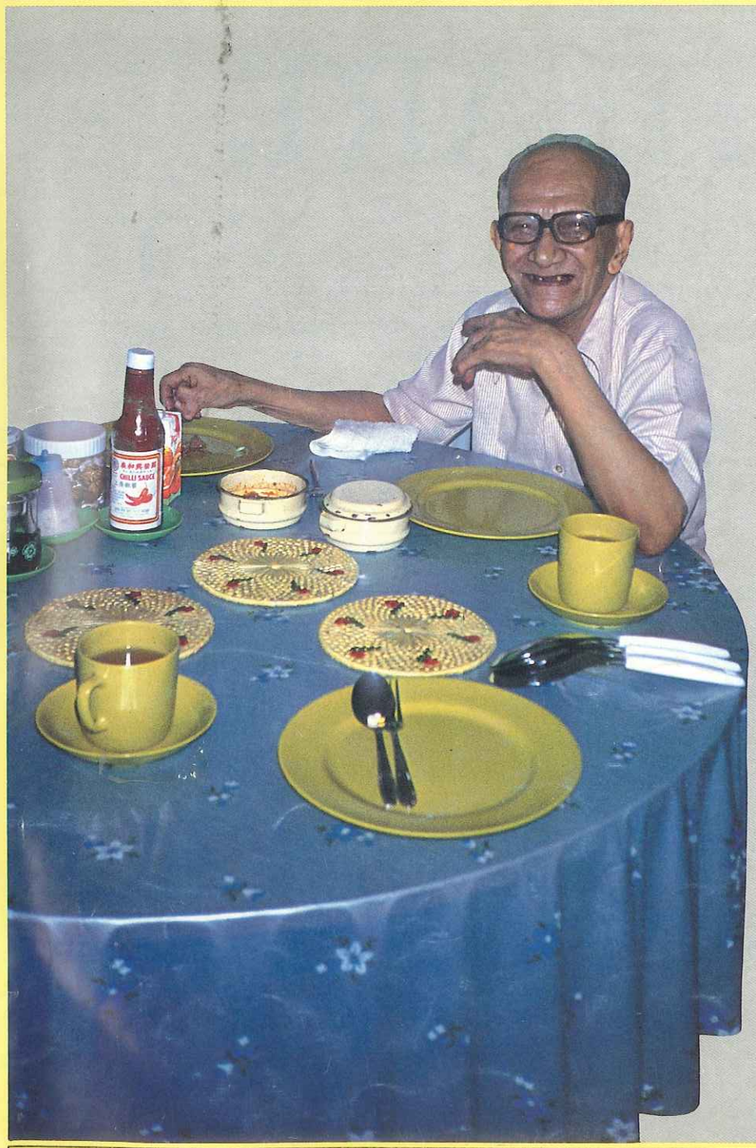

Nutrition and Ageing

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Singapore Dietitians' Association

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The Singapore Dietitian

VOL. 2 No. 2 March 1987

Editorial. . . .

Dietetics has joined the ranks of more than 20 other professions represented in the Singapore Professional Centre (SPC). SDA was formally incorporated into SPC as a member association four months ago, and this is seen as giving a tremendous boost to our professional image. To add further to this image the Association now boasts of its own logo, carried for the first time by the journal in this issue.

The aims of SPC include "promoting and enhancing the status of professional bodies in Singapore" and "ensuring higher standards of professional conduct and ethics". With regard to the latter, the article in this issue on "Legal Liability for Dietary Advice and Treatment" is topical.

It has been said of late that Singapore is a greying population. The elderly already constitute a sizeable proportion of our clientele, and the profession has always been aware of the special nutritional needs of this group. In light of this, we welcome the first of a two-part update on this subject by one of our members who recently attended an international conference on Nutrition and Ageing.

Meanwhile the Association continues its community service programme of writing articles for the press. To this end a new sub-committee has been formed. Another community service project underway is the production of a pamphlet for school children on Weight Control, in conjunction with the Training and Health Education Department, Ministry of Health.

Members are urged to take an active part in our various programmes. Make a start by setting aside the coming 25th April to attend the 3rd Annual General Meeting of the Association. See you there!

CONTENTS

NUTRITION AND AGEING:

1. Special Nutrient Needs of the Elderly

Anna Grace Jacob, B.Sc., M.Sc.

As the median age of a population shifts towards the middle of the life span and older people become an increasingly large percentage of the populace, interest in topics related to ageing and age related physiological changes grows.

In Singapore too, the decline in the population growth rate between 1947 and 1980 has resulted in a drop in the young population and a simultaneous increase in the adult and elderly population (Table 1) (1).

Table 1. Singapore Population by Broad Age Group, 1947 – 2030 (in thousands)

Age group (years)	Year		
	1947	1980	2030
0 – 14	337.2	653.1	670.4
15 – 64	538.8	1646.8	2078.0
65 & above	17.2	113.9	643.2
Young Dependency Ratio 15-64 : 0-14 yrs	1.7 : 1	2.5 : 1	3.1 : 1
Old Dependency Ratio 15-64 : 65+	33.9 : 1	14.5 : 1	3.2 : 1

Source: Singapore Family and Population Planning Board

This change in population patterns, has made demographers predict that there will be 3 adults for every elderly person in 2030, a drop from the original 34 adults per elderly person in 1947 (2).

In this context, it is imperative that we health-care professionals in Singapore gear ourselves to cater to the special needs of the elderly.

Are the aged well-nourished?

The maintenance of good health and the prevention and treatment of certain diseases by diet therapy is particularly pertinent for the elderly person.

The 1971 White House Conference on Ageing, estimated that one-third to one-half of the health problems of the elderly may be related to nutrition (3). It is therefore essential that research on Nutrition and Ageing be given utmost importance, to help relieve the burden of illness amongst the elderly.

When we consider the elderly there is always a fair proportion of them who maintain good health throughout old age, so are age-related physical disabilities and senility essential components of ageing, or are they in part influenced by the nutritional status of the elderly individual?

Recommended Dietary Allowances for the elderly

Studies to assess the nutritional status of the elderly have used the RDA of the National Academy of Sciences/ National Research Council as the standard of adequacy (4).

Published originally in 1943, these recommendations initially placed all people over 51 years in one group. The 1980 RDA, for the first time, provided energy intakes for those over 51 years, under 2 age classifications : 51 – 75 years and 76 and above (Table 2).

Table 2. Mean Heights and Weights and Recommended Energy Intake for the Elderly

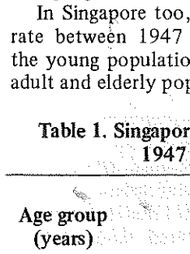
Category	Age (years)	Weight (kg)	Height (cm)	Energy needs (kcal)
Male	51 – 75	70	178	2400
	76+	70	178	2050
Female	51 – 75	55	163	1800
	76+	55	163	1600

Source: RDA, Ninth Edition, (1980 at press) National Academy of Sciences, Washington. D.C.

However, because the elderly are often not in good health and may not have access to a wide variety of food sources, the RDA may not be an appropriate benchmark of dietary adequacy for them (5). Malnutrition does not exist in all instances when the RDAs are not met. Moreover, ingesting all the nutrients in the amounts listed does not necessarily ensure optimal nutrition (3).

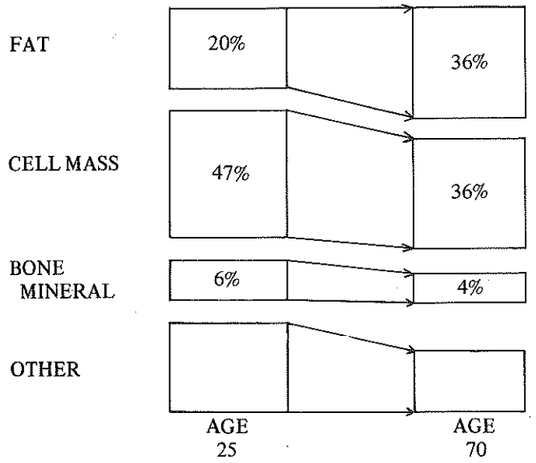
Schneider *et al* (6) presents 6 main considerations in deriving RDAs for the elderly:

1. Maintenance of optimal physiological function and the prevention of age dependent diseases and disorders.
2. Effect of nutritional factors on physiological function throughout the lifespan and on disease development in later life should be considered for all age groups.
3. The optimal serum or tissue levels of nutrients, as well as the balance of all nutrients should be determined.
4. The substantial heterogenicity of the older population should be examined.
5. Specific information on nutrient-nutrient interactions, and drug-nutrient interactions should be appended to RDA documents.
6. Recommendation should include attention to possible age-related changes in susceptibility to toxicity to and long term use of supplementary vitamins and minerals.



Anna Jacob graduated from the Women's Christian College, Madras, India, with a B. Sc. in Nutrition and Dietetics and an M. Sc. in Food Service Management and Dietetics. She represented the Gerontological Society of Singapore at the WHO/Indian Gerontological Association Conference "Nutrition and Ageing" in Hyderabad last November.

Figure 1. Body Composition and Age of Men:



Source: Text Book of Endocrinology, Gregerman and Bierman, 1974 (7).

Body mass index (BMI) of the elderly

With age the percentage of lean body mass declines, and the percentage of body fat increases. A body having a larger proportion of fat needs fewer calories to maintain itself, since fat tissue uses less energy than the same weight of muscle tissue (8).

Mattila *et al* (9), have shown that the mortality, of elderly individuals, over the age of 85, increased with lower BMI and decreased with higher BMI, indicating that in the very old, overweight is no longer a risk factor and may by a sign of good health.

CALORIES:

The RDA recommends that the energy allowance for those over 51 years be reduced. This takes into account a 2% decrease in basal metabolic rate (BMR) per decade, and a reduction in activity of 200 kcal for men and women between 51 – 75 years. For those over 75 years, a reduction of 500 kcal for men and 400 kcal for women is recommended (3).

In the Baltimore Longitudinal study of Ageing, a linear and extensive reduction in total energy intake over the years from 30 – 80 years of age is evident. The diminution over this time span of 600 kcal, can be assigned to a reduction of BMR (200 kcal) accompanying the reduced lean body mass, and (400 kcal) to the large decline in physical activity with ageing (10).

Bidlack *et al* (11) feel much experimental work needs to be done to establish well-defined norms for the healthy, active elderly population at each decade of older age (e.g. 65 to 74, 75 to 84, 85+).

PROTEIN:

The protein requirement of healthy elderly is the same as that of adults in most studies. However, due to illness the absorption of protein in the elderly is decreased, and there may be increased protein loss. The loss of active cellular metabolizing mass compensates for the loss of absorption in the elderly.

In the light that old age is rarely found without concomittant illness, some recommend an intake of 1g per kg of protein for all elderly (3).

Protein deficency amongst elderly individuals is common, either because the economic constraints of reduced income may lead to an avoidance of expensive protein foods, or because protein food preparation is more laborious and needs more equipment. Meals may be harder to chew and swallow for aged with poorly fitted dentures or poor oral hygiene. Milk is often rejected due to habitual avoidance or lactose intolerance.

When recommending protein intakes for elderly, it is wise to note that when energy intake is inadequate, protein may be utilized for energy rather than to build structural or enzymatic proteins.

Relevant to the diet concerns of the elderly, is the observation that as the calorie content of the diet is decreased, it is advisable that an increased proportion of the ingested calories be from protein (12-14%), compared to 12% in normal adult diets (3). However, in certain chronic illnesses, a low protein diet may be indicated as a therapeutic diet for the elderly patient.

LIPIDS:

For the most part fat is an expendable part of the diet of older persons, who need to concentrate on more nutritious sources of calories.

The American Heart Association recommends that lipids should contribute no more than 35% of the calories in the diet. The minimum amount of fat per day is believed to be 15-25g; careful choice of foods is essential to maintain the essential fatty acid and fat soluble vitamin content of food (3).

ESSENTIAL FATTY ACIDS (EFA):

The National Research Council recommends that 1-2% of any adult diet should be from EFA (3). A high fat intake is undesirable in the elderly as it may lead to obesity and degenerative deseases. A high fat intake can cause indigestion, as malabsorption is caused by lowered G1 tract efficiency, pancreatic and liver insufficiency, characteristic of old age.

CARBOHYDRATES:

Blood glucose levels in the elderly tend to be somewhat higher than average. This may be largely due to inefficiency of the pancreas to secrete insulin in response to a rise in blood glucose levels.

The elderly must decrease the amounts of sugar in the diet as it is a non nutritious source of calories; and further, slower clearance of glucose from the blood would lead to fat deposition in the arteries.

Another major problem concerning carbohydrates in the diet of elderly is the absence or decrement of lastase. Thus milk may become an unacceptable food, causing bacterial fermentation of lactose in the large intestines which draws fluid into the colon, resulting in diarrhoea, flatulence and cramps. However, recent studies have shown that most elderly are able to tolerate and

digest the amount of lactose present in one glass of milk (12g) rather than 50g used in the traditional lactose intolerance test.

FIBRE:

As elderly subjects have a lesser ability to chew, they tend to eat less dietary fibre from fresh fruit, vegetables and whole grains (3).

Davies *et al* (12) in a 4 year longitudinal study, showed that there was little change in the dietary fibre intakes of adults in pre-and post-retirement stages (range: 7 – 34g per day).

The absence of dietary fibre slows down the activity of the bowels which may already be functioning inefficiently because of age and inactivity.

To correct the resulting constipation many elderly depend on laxatives, which, in long term usage hinder the absorption of the fat-soluble vitamins. Laxativies also hasten the passage of food through the digestive tract which decreases the absorption of vitamins and minerals. Thus, to avoid this vicious cycle the elderly must consciously incorporate dietary fibre into their diet.

VITAMINS:

The RDA for the elderly of vitamins and minerals is still grouped with those of adults. However, significant differences do occur in relation to nutrient absorption and utilization and these variations must be given emphasis.

Vitamin A

Well-nourished adults have been found to have large stores of retinol in their liver, enough to supply needs for this vitamin for years, without any dietary intake. This may not be true of all elderly persons, who may have deficiencies because of restricted diets, impaired ability to store vitamins due to liver disease, or to convert provitamins to vitamin A as in diabetes mellitus.

It has been reported that rats given four times the minimum amount of vitamin A had their lifespan extended by 10 percent, but that intakes of 8 times the minimum amount decreased their life span (13). Excessive intake of about 100,000 IU per day for 6 weeks results in liver degeneration.

Because of the potential for vitamin A toxicity, it is advisable to limit the intake to approximately the recommended allowance and certainly no more than 5 times that amount unless there is a medical indication.

Vitamin D

Osteomalacia is a common disorder in elderly women. This demineralisation of peripheral bones is caused by intestinal malabsorption, gastric surgery, renal disorders, insufficient dietary intakes of vitamin D and a lack of exposure to sunlight (14). Elderly persons who are housebound, may have inadequate intakes of vitamin D. Additionally, they receive no ultraviolet light irradiation since the light wavelengths necessary for the synthesis of vitamin D are screened out by glass windowpanes (14). It is therefore important to ensure adequate intake of vitamin D in the elderly, since the most common dietary source, fortified milk, may not be ingested regularly in sufficient amounts by elderly persons.

Vitamin E

The use of vitamin E supplements for numerous conditions ranging from heart disease, sterility to poor athletic performance have been studied with no clear conclusion. Until the role of vitamin E on human metabolism is more completely ilucidated it will continue to be tested as a remedy for many disorders.

VitaminK

Deficiencies can occur in the elderly due to malabsorption of fats or in cases of biliary obstruction. Antibiotic therapy kills the intestinal bacteria which synthesise the vitamin. The estimated safe and adequate daily intake (ESADI) for vitamin K is 70 – 140 mcg.

Vitamin C

Some studies have found lowered leucocyte levels of ascorbic acid in the elderly that can be increased with vitamin C supplementation (15). Some researchers have found low plasma ascorbic acid levels to be associated with an increased rate of morbidity. The survival rate of geriatric patients admitted to a hospital was found to be associated with vitamin C level in their blood (16).

The elderly do not absorb vitamin C as well as do younger people. Several studies suggest that higher than normal intakes of vitamin C appear to reduce aches and pains that the elderly are prone to, to lower mortality when the aged are ill and to increase their longevity.

Vitamin B_1

The suggested allowance for the elderly takes into account the fact that in the aged, gastric secretions (especially those lacking HCl) tend to inactivate thiamin. Additionally the intestinal flora characteristic of the elderly may bind ingested thiamine. Thus the elderly are apt to develop thiamine deficiency (13).

Tannin found in tea has antithiamine activity. This action can be reduced by the presence of ascorbic acid (17); however, elderly persons who subsist on marginal diets and consume large amounts of tea are prone to develop thiamine deficiency.

Niacin

Niacin has been reported to-be effective in helping some states of mental confusion in the elderly. The RDA for niacin is 6.6mg/1000 kcal.

Vitamin B_6

Diets deficient in vitamin B_6 have been reported to cause depression, irritability and a loss of sense of responsibility in adult subjects. SGOT levels in elderly are lower than in younger individuals, which may be caused by a lower level of serum pyridoxal phosphate level in the elderly. Vitamin B_6 may not be well absorbed by the elderly and intestinal synthesis may be reduced due to lowered intestinal acidity and decreases in intestinal mucus secretion (3).

Folacin

While the elderly do not often have megaloblastic anaemia, as a result of folacin deficiency, studies show that low serum folacin levels in the aged may be correlated with organic brain syndrome.

Folate deficiency, common in those over age 70, can cause progressively increased folate malabsorption (18).

Vitamin B_{12}

In the elderly, abnormal bacterial growth in the intestine decreases the amount of B_{12} absorbed. In a study of the aged who complained of fatigue, 89% of the subjects showed improvement with B12 supplementation (16). In some instances, disorientation and confusion in the elderly have been attributed to a deficiency of B_{12}.

MINERALS:

Calcium

It is generally accepted that long term dietary insufficiency of calcium is a factor in the aetiology of osteoporosis, which presents in old age. A daily supplement of 750mg of calcium and 375 IU of vitamin D provided to elderly females in one study, resulted in an increase in bone density of up to 12% (19).

One study showed a significantly lower decrease of bone density with age in vegetarians than in omnivores. Bone density too did not decrease with age after 69 as it did with the omnivores. These results suggest that vegetarians are less likely to develop osteoporosis in old age (20).

When elderly are confined to bed for a long time, this raises the amount of calcium that must be excreted in the urine. However, in patients with a history of renal stones, calcium intake must be monitored to prevent further complications.

Phosphorus

Foods high in phosphorus and low in calcium may be a predisposing factor in osteoporosis. Phosphorus is a frequent additive in processed food which forms a large part of modern convenience diets used by elderly in developed countries.

Iron

Iron deficiency in the elderly is common, due to decreased intake of iron rich foods. Protein foods are avoided because of difficulty in cooking and green leafy vegetables are taboo because of the difficulty to digest. Cognitive performance is definitely lowered with lowered plasma ferratin. Decreased work capacity is seen in iron deficient people.

Drug nutrient interactions

Most of the elderly are taking drugs to treat one or another disease. Drugs can affect the nutritional status of the elderly by:

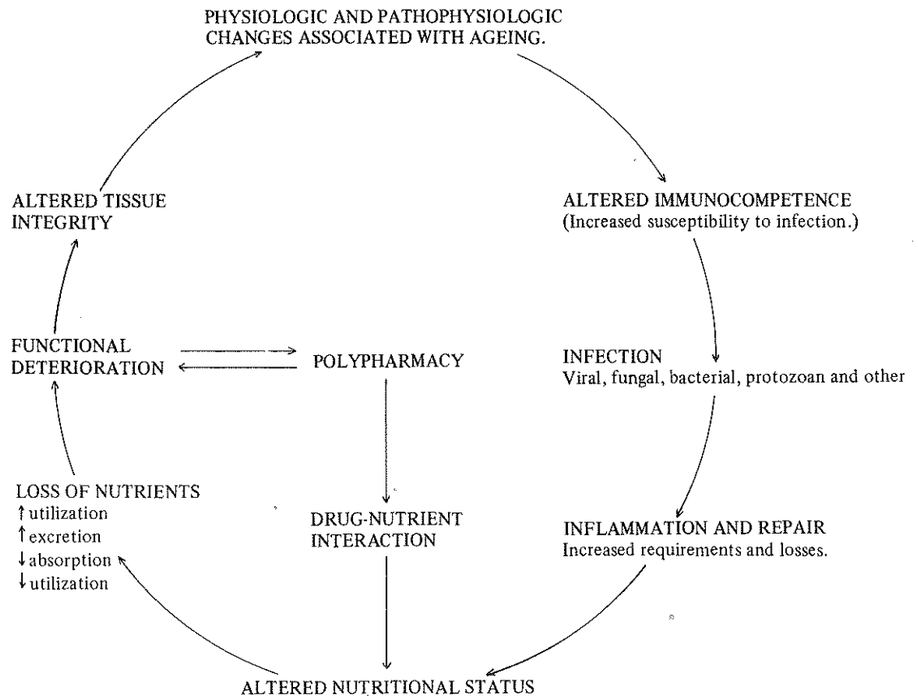
1. Influencing food intake directly – by causing side effects such as nausea, vomitting and decreased appetite.
2. Interfering with nutrient synthesis.
3. Causing diarrhoea, and thus inhibiting nutrient absorption.
4. Altering nutrient metabolism by interfering with distribution, transport, utilization or storage of nutrients.

Nutrition and immuno-competence in old age

The immune system provides a unique investigative model to examine the altered ability of the elderly to adapt to environmental stress. Much of the illness observed in old age, may be the result of immunological decline. Prospective studies have demonstrated that almost three-quarters of the elderly have impaired cell-mediated immunity and reduced function of macrophages and natural killer cells. It is interesting to note that at least 25% of individuals over the age of 70 yrs maintain immunologic vigour at levels seen in the young. These observations suggest that immunologic senescence is not an inevitable consequence of growing old, and in this context dietary intake and nutritional status may play an important role.

Figure 2 shows possible pathways by which the ageing process may alter nutritional and immune status, which in turn can increase susceptibility to infection.

Figure 2. Effect of the Ageing Process on Nutritional and Immune Status.



Nutritional supplements for the elderly?

In some pioneering studies by Chandra *et al (21)*, the malnourished elderly were given a nutritional supplement of 500 kcal extra each day, with at least two times the daily recommended intake of vitamins and minerals. Improved delayed cutaneous hypersensitivity responses, increase in T cell number and proliferative response, were shown.

There are several potential applications of these observations.

1. Reduction of the burden of illness in old age
2. Reduction in post operative complications
3. Response to immunization is enhanced, if nutritional status is improved before and during vaccination (22).

A varied and well chosen diet of 1800 – 2000 kcals can provide all needed nutrients, but elderly are apt to consume inadequate diets. Additionally nearly all elderly persons are subject in some degree to interference with absorption, storage and utilisation of nutrients. Other physical, psychological and social factors operate to place the elderly at nutritional risk. Therefore, while it is true that it is possible for a normal individual to obtain all the necessary nutrients for good health from food, the elderly may not be able to do so. Nutrient supplementation is indicated when deficiency status can be clearly demonstrated. However there have been few studies to evaluate the use of nutrient supplements in the aged. While the advisability of routine nutrient supplementation for all elderly is debatable, the advisability of high doses or therapeutic intakes is clearly unwarranted in the absence of specific medical indications for their use.

The second part of this update on Nutrition and Ageing will appear in the next issue.

References

1. Vasoo, S. and Tan, B. H. Status of ageing in Singapore. Singapore Council of Social Service, 1985.
2. Tan, B. H., Demographic Characteristics of the Elderly in Singapore, in Ang P. C. (Ed), The Aged – Who cares? Singapore Gerontological Society, 1986.
3. Natow, AB, and Heslin, J. Geriatric Nutrition. CPI Publishing Co., Inc., Boston, 1985.
4. Food & Nutrition Board. Recommended Dietary Allowances, 8th ed, National Research Council, National Academy of Sciences, Washington D. C, 1974.
5. Harper, A. L. Recommended dietary allowances for the elderly. Geriatrics 33:73, 1978.
6. Schneider, E. L., Vining, E. M., Hadley, E. C., and Farnham, S. A. Recommended Dietary Allowance and the health of the elderly. N. Engl. J. Med. 313 : 157, 1985.
7. Gregerman, R. I. and Bierman, E. K. In Textbook of Endocrinology, Ed. R. H. Williams, p 105g. W.B. Saunders Co., Philadelphia, 1974.
8. Brody, J.E., Jane Brody's Nutrition Book. 1st ed., W.W. Norton & Co. Inc., New York, 1981.
9. Mattila, K. K, Haavisto, M., Rajala, S., B. M. J. 292:867, 1986.
10. Munro, H. N. Nutrient needs and nutritional status in relation to ageing. Drug Nutrient Interactions, 4(1/2): 55, 1985.
11. Bidlack. Nutritional requirements of the elderly. Food Tech. 40:61, 1986.
12. Davies, L., Holdsworth, M.D, and Macfarlane, D. Dietary fibre intake in the United Kingdom, before and after retirement from work. Hum. Nutr.: Appl. Nutr. 10:431-439, 1986.
13. Whanger, A.D. Vitamins and vigor at sixty five plus. Post Grad. Med. 58:167, 1973.
14. Corless, D., et al, Vit D status in long stay geriatric patients. Lancet 1:4044, 1975.
15. Bender, A. E. Nutrition of the elderly, Royal Soc. Health J. 91 (3):115, 1971.
16. Schlenker, E.D., et al. Nutrition and health of older people. Am. J. Clin. Nutr. 26:1111, 1973.
17. Rungruangsak, K., et al. Chemical interactions between thiamine and tannic acid. Am J. Clin. Nutr. 30:1680, 1977.
18. Baker, H. Jaslow, S P. and Frank, O. Severe impairment of dietary folate utilization in the elderly. Am J. Geriatric Soc. 26 (5): 218, 1978.
19. Albanese, A.A. Calcium nutrition in the elderly. Post Grad. Med. 63 (3): 167, 1978.
20. Ellis, F.R, Holesh, S, Ellis J. N. Incidence of osteoporosis in vegetarians and omnivores. Am. J. Clin. Nutr. 25:555, 1972.
21. Chandra, R. K. Nutritional Factors in the Immunological Decrement in Elderly. Who Workshop, Nutrition and Ageing, Hyderabad, India, 1986.
22. Vitale, Joseph, J. and Santos, J. I. Nutrition and the elderly, 2. The effects of diet on gastrointestinal related diseases. Post Grad Med. 78 (5), 1985.

SPECIAL REPORT:

The WHO/IAG/AGI Meeting on Nutrition and Ageing

Hyderabad, India

November 22nd-26th, 1986

The World Health Organisation/International Association of Gerontology/Association of Geronotology (India) meeting on Nutrition and Ageing was attended by 30 delegates from around the world. Anna Jacob represented the Gerontological Society of Singapore, sponsored by the Commonwealth Foundation. The main aim of the meeting was to review the present state of knowledge in nutrition and ageing and internationalise its study.

Nov 22nd: WHO Intercountry Workshop on the Epidemiological Studies of Ageing.

This workshop sought to bring to the attention of policy makers and health professionals the need to focus on the elderly, whose numbers are progressively increasing in every country. After presentation from each represented country on the status of the aged at home, the **4-Country Study** conducted by the IAG in Fiji, Malaysia, Thailand and the Philippines was presented by Dr G. Andrews and Dr N. Nair.

Group discussions were held on methods of field assessment of health and nutritional status with respect to the elderly.

Nov 23rd: This was a combined WHO/IAG workshop. The 30 research recommendations related to nutrition and ageing outlined in the WHO Scientific Meeting on Nutrition in the Elderly, Washington (1985) were discussed to promote international study of ageing. Prof. N. Scrimshaw delivered the keynote address on **Significant issues in Nutrition and Ageing.**

The discussion on **Culture, Religion and Diet** cast light upon the variety of social causes of malnutrition among the elderly, and in some cases the effect of three-tier families on the health status of the elderly.

Prof. N. Wahlquist presented a paper on **Assessment of Nutritional Status in the Elderly**, and the need for modification of traditional methods.

Nov 24th: The Patterns of Malnutrition Associated with Ageing in both Developed and Developing Countries were discussed, with special emphasis on protein, energy and iodine deficiency, famine and disasters. The influence of genetic and environmental factors on changes in old age were brought out.

Strategies for Prevention of Malnutrition in the Elderly, food fortification and risk factors associated with malnutrition were presented in the second session.

A **conducted tour** of the National Institute of Nutrition in Hyderabad was held in the afternoon.

Nov 25th: An exciting piece of research was presented by Prof. R. K. Chandra, On **Nutritional Factors in the Immunological Decrement in the Elderly.** Topics for discussion included anaemia, cancer, calcium and bone disease and infectious diseases.

Dietary Prevention of Disease in the Elderly discussed the requirements for vitamins and minerals with increasing age, and brought out the need to formulate Recommended Daily Allowances for Healthy Elderly and Aged.

Programmes to Prevent Nutritional Disease in the Elderly was presented by Dr N. Nair, and the importance of food accessibility, self-help, nutrition education and support systems were highlighted. The adverse effects of food aid were deliberated upon.

Future Directions in International Research on nutrition and ageing, especially for collaborative research, education programmes and prevention and management programmes were the final focus, motivating participants to use the ideas in creative ways at home. Closing on such a note, the workshop has opened avenues of research for many interested people.

Nov 26th: The inauguration of the Association of Gerontology (India) was held.

The report of the meeting and the speeches and deliberations will be prepared by WHO/IAG and sent to individual members of the workshop.

Anna Grace Jacob

Food For Thought — Legal Liability for Dietary Advice And Treatment

Keith R. Evans, LL. B. (Dal.), LL.M. (Syd.)

Of late, public attention has been drawn more and more to the concept of the legal responsibility of a professional for acts done in the performance of his or her duties. There are frequent reports in newspapers about spectacular legal claims, settlements and awards against professionals. While Singapore has been and still appears to be relatively non-litigious, most people will remember the public comments of former President Devan Nair in his call to make members of the medical profession more accountable for their actions.

When we who are engaged in a professional calling read such news reports, we often react smugly with the thought that that could never happen to me, or that my profession is not one which could be subject to legal claims. The latter may well be true of dietitians, and perhaps such a conclusion can be justifiably reached, as I have been unable to find a case in which a dietitian has been sued for professional negligence. The fact remains, however, that all who are engaged in, and who profess to exercise expertise in, any aspect of medical treatment, have the potential of being held liable in law for failure to do that which the law requires of them in the handling of their patients. The purpose of this article is to examine what the law would expect of the dietitian and the means by which she might be liable for professional malpractice.

In the vernacular, suits against professionals for malpractice are almost invariably said to be actions complaining of negligence. This tends to give the erroneous impression that there is only one basis upon which the law will provide a remedy to an injured patient, when in truth there may be liability under one of two broad heads of recovery. In the first place, there can be an action in contract, whereby the patient claims that the professional has failed to perform that which was promised under the contract between them. This type of claim requires a contract to exist between the two parties involved in the law suit, which would be the case if a dietitian were sued by a patient who came to her under a private consultation arrangement, whereby she treated or gave advice in exchange for a fee paid by that patient.

Keith Evans is currently a Lecturer in the Faculty of Law, National University of Singapore.

A duty of care

The other way in which such an action might be taken is under the branch of law known as tort law. Indeed, if you asked someone versed in law about a negligence claim, they would invariablely tell you about tort. There is a tort of negligence under which a professional may be liable for damage caused to another person. That liability will arise, however, only in circumstances where the professional owes "a duty of care" to the injured individual. The circumstances in which such a duty of care arises were outlined in the famous case of **Donoghue v. Stevenson**[1]:

> **"You must take reasonable care to avoid acts or omissions which you can reasonably foresee would be likely to injure your neighbour. Who, then, in law, is my neighbour? The answer seems to be – persons who are so closely and directly affected by my act that I ought reasonably to have them in contemplation as being so affected when I am directing my mind to the acts or omissions which are called in question."**

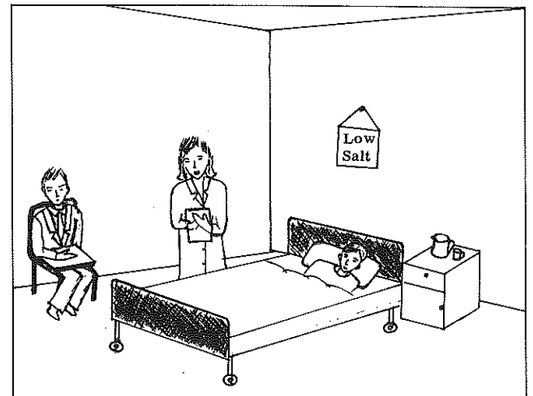
Obviously, if there is a contract between a dietitian and a patient, the patient would be the dietitian's neighbour, and a duty of care would arise. In such cases, there is direct overlap between tort and contract. For many years, it was felt that in such circumstances, all actions should be based in contract, but recent authority indicates that such an action may now be taken in either tort or contract[2]. There are some practical consequences of being able to make this choice, but details of those consequences go far beyond the scope of this article, and need not be discussed. Needless to say, however, an injured patient would not be able to recover twice (once in tort, once in contract) for any damage suffered.

The ability of a patient to sue in tort is very important. A contractual remedy is only available to a person who is party to the contract, and this requirement is missing in many cases. For example, assume that a dietitian is employed by a hospital, and gives treatment or advice to either an in-patient or an out-patient. In this case, the patient's contract is with the hospital, not with the dietitian. If the dietitian is negligent in giving the advice, and the patient suffers an injury as a result, the patient could sue the hospital in contract, as that is the party with whom he or she had a contract. The dietitian is not a party to that contract, and could not be sued in contract. However, as the patient in this case would come clearly within the concept of "neighbour" outlined above, the dietitian would owe a duty to that patient in tort and could be sued under that branch of the law[3]. Indeed, in such circumstances, the patient might sue the hospital in contract and tort, and the dietitian in tort alone, but would, once again, only be able to recover the total damage suffered once, leaving it for the court to apportion damage between the hospital and dietitian.

In some circumstances, a tortious remedy may be the only remedy available. The classic instance of this would be where the dietitian renders advice gratuitiously to a friend or relative. That person does not pay anyone for the advice, and so would have no contractual remedy. However, if that advice leads to some form of personal injury, the general neighbour principle under **Donoghue v. Stevenson** applies, and as that principle would be satisfied on these facts, the dietitian may well find she is legally responsible for the damage which her advice caused.

Third person injury

Another example where tortious liability may be relevant is where a person, other than the patient to whom the advice is given, relies on the advice, and suffers injury as a result, For example, a dietitian may give advice to a patient in circumstances where another member of that patient's family, suffering from the same disorder, is present. If the advice is negligently given, and both individuals rely on the advice and suffer personal injury, the general tort rules outlined above would apply[4], and again the neighbour principle appears to be satisfied so as to give rise to tortious liability to both the patient and the family member. More difficult problems arise where the patient passes the advice on to friends or relatives without the dietitian knowing it. If those third persons suffer personal injury, there will be liability provided a court is satisfied that those persons ought to have been within the contemplation of the dietitian when she rendered the negligent advice. The answer to that may well depend on a wide variety of facts which cannot be discussed here. It is enough to note the potential for liability.



"Oh don't mind him, he's just my legal counsel!"

Economic damage

All of the comments in the last several paragraphs are premised on the concept that the type of damage a patient or third party suffers is personal injury. It is possible, however, for the only damage suffered to be economic in nature. For instance, if a dietitian negligently advises a patient to adopt a dietary regime requiring the purchase of expensive dietary supplements, and that regime is entirely unnecessary, there may be no physical injury caused, but the patient would certainly lose the money spent on purchasing the unnecessary supplements. Or the advice may be given to one member of the family, and another member of the family may rely on it and spend the money to purchase the supplements felt necessary for their relative. If they subsequently discover that the advice was wrong and negligently given, they might want to recover the money they have spent in reliance on that advice.

For complex legal reasons which need not be discussed here, the law of torts will allow recovery for such economic loss resulting from negligently given advice, but only if certain special legal rules are satisfied. Basically, such damage can be recovered in tort only if the party seeking its recovery reasonably relied on the advice, and the dietitian could, at the time the advice was given, have reasonably foreseen that the advice would be relied on by such an individual for the purpose for which the advice was used[5]. In the example given, either the patient who spends the money or the relative who does so, would no doubt be found reasonably to have relied on the advice, and to have been individuals who foreseeably would have relied on it for the very purpose for which the advice was given. Accordingly, there would be legal responsibility on the dietitian to reimburse these individuals the money they have spent needlessly.

As a result then, a dietitian may be potentially liable in either contract or tort to a patient with whom there is a direct contract, or in tort to patients with whom there is no such contract. Tortious liability could also conceivably apply to some individuals who are not their patients. The discussion to this point, however, only addresses circumstances in which liability might arise, but does not go on to indicate what the dietitian is liable to do. In other

words, the existence of the contract, or of a relationship sufficient to yield tortious liability, only tells us that the dietitian owes a duty of care to that individual, and does not indicate what is expected of the dietitian in fulfilling the duty of care the law imposes on her.

The concept of reasonable care

In the event that the action is contractual in nature, the contract itself might be a written one and it is possible for the express terms of that contract to clearly specify the nature of the duty which is owed by the dietitian. If that is so, that is the duty which the dietitian would have to meet[6]. However, in many cases, there will be no express contract between the patient and the dietitian or the hospital involved, and even if there were, the express contract would rarely have an express term dealing with the duty owed. If that is the case, the law will imply a term outlining the scope of the duty owed under the contract, and that implied contractual term will, in essence, require the dietitian to exercise essentially the same duty of care as that required under tort law. In both cases the law expects the dietitian to fulfill her functions by exercising reasonable care in the circumstances[7].

Some further explanation of the concept of reasonable care is required. The law does not really expect the dietitian in these circumstances to guarantee to the patient that strict compliance with her advice will yield the desired result. Nor does she warrant that her advice is correct. Indeed, the concept of reasonable care was explained in the case of **Bolam** v. **Friern Hospital Management Committee**[8] as follows:

> **"The test is the standard of the ordinary skilled man exercising and professing to have that skill. A man need not possess the highest expert skill at the risk of being found negligent. It is well established law that it is sufficient if he exercises the ordinary skill of an ordinary competent man exercising that particular art."**

This, in essence, means that a dietitian who gives advice which would have been given by an ordinary, skilled member of the profession, exercising reasonable care, will not be liable for any damage which that advice causes. In general, therefore, if the advice complies with standard practice and procedure with respect to that patient's complaint, there will be no liability. The only exception would be where a court were willing to say that the standard adopted by the whole profession was inadequate and negligent, and while that has from time to time happened[9], instances of it would be rare. In addition, where there are two generally accepted bodies of opinion as to the appropriate advice to give, following one rather than another would not generally be felt to be negligent[10]. However, if established research discredits one of these and clearly favours the other, it may be negligent to stick determinedly to the first. As a result, it is important for professionals to update their knowledge and incorporate new developments into their practice[11].

A shield against negligence claims

To this point, then, we have seen that dietitians owe a duty of care to a range of individuals they advise and treat, and that if they fail to exercise the reasonable care which the law expects of them, they are subject to a potential malpractice claim. That claim would succeed if their failure to exercise the care required actually causes injury to the claimant. In general, the law treats something as a cause if one can say that 'but for' the negligence in question, the injury would not have been suffered. While it is easy to see a causal link on this analysis in the example above concerning economic expenditure for an unnecessary and expensive dietary regime, it may not be so easy in other cases.

Again, this may best be illustrated by an example. A patient suffers from congestive heart failure, and his doctor refers him to a dietitian for dietary counselling. The dietitian is negligent in failing to advise on a low enough level of sodium in his diet. The patient's condition worsens and he dies. That death might well have resulted even if a low enough level of sodium had been prescribed, in which case there would be no causal link between the negligence and the injury. This sort of difficulty might shield the profession from negligence claims, but it does not foreclose them. In these types of situations, the law will generally attempt to determine whether the negligence in question increased the risk or liklihood of the death, and if that is so, then there would be liability and damages would be awarded on the basis of the extent to which the negligence increased that risk[12].

The employer's liability

Before concluding, there are a number of other points that should be made, stemming from the fact that most dietitians operate as employees of a hospital. As indicated above, the hospital will normally be the entity with which the patient has the contract, and can be sued in contract if a member of the hospital staff fails to exercise the reasonable care required under the implied terms of the contract. The dietitian can be liable personally in tort. Under a concept of vicarious liability, an employer is responsible for all torts committed by an employee in the course of employment[13], and if, therefore, a patient establishes a case against the dietitian, both she and the employer hospital can be held liable for the damage, the former in tort, the latter in contract and in tort through the application of vicarious liability. The patient might proceed against the hospital, since they may be more likely to be able to pay the damages awarded by the court, but the patient could seek recovery from the personal assets of the negligent dietitian as well.

Once again, however, the patient would only be able to recover the total amount of damage suffered once, although they could go against either the hospital or dietitian, or both. The dietitian might think the hospital would automatically pay, and while this might be so, there is an implied term in contracts of employment to the effect that the employee can be called upon to reimburse the employer for expenses incurred in paying such negligence claims[14]. While this right is rarely enforced by employers, the dietitian could well find that she has to pay the damages out of her own pocket. Many professional employees have insurance coverage to protect against such claims, but to my knowledge, there is no such coverage taken by most dietitians. Any damage awards might ultimately come out of their own pockets, should the victim choose to sue them, or should the employer exercise the right to reimbursement.

Conclusion

It is apparent that dietitians, as all other professionals, are subject to damage claims for professional malpractice. While there do not appear to be any recorded cases to date, there may be a number of reasons for this. The profession is relatively young, and as it expands, and the range of services undertaken expands, potential for liability might also expand. The fact that most services are rendered only after diagnosis and referral by a doctor may also lessen the potential of a law suit. To the extent that a dietitian engages in both diagnosis of a complaint and dietary treatment of it, there may be greater potential for error, and greater risk of suit. There might also be other areas where the risk is great. For example, failure to obtain enough background information before advising on a particular course of action might easily lead to an injury which could give rise to litigation. Hence, the potential for legal claims exists, and in such cases, liability would be determined in accordance with the law discussed above.

Footnotes and References

1. [1932] A.C. 562 at p. 580.
2. Both the older and more recent trends are dealt with in detail in two articles: Kreaver & Atkinson, "Professional Responsibility – Lawyers and Accountants", [1983] Special Lectures LSUC 445; Rafferty, "The Tortious Liability of Professionals to their Contractual Clients", **Issues in Tort Law**, 1983, p. 243.
3. A personal duty of care owed by the professional is not forclosed by the fact that the contract is with the employer. **Fairline Shipping Corpn.** v. **Adamson**, [1975] Q.8. 180.
4. The ordinary tort rules apply where such advice relied on leads to personal injuries. See, for example, **Clay v. A. J. Crump & Sons**, [1964] 1 Q.B. 533.
5. These rules stem from the leading case of **Hedley Byrne & Co. Ltd.** v. **Heller & Partners Ltd.**, [1964] A.C. 465, and the many subsequent cases building on this authority.
6. For a general discussion of the scope of contractual retainers, see Dugdale and Stanton, **Professional Negligence**, 1982, c. 9.
7. Jackson & Powell, **Professional Negligence**, 1982, para. 1.10.
8. [1957] 2 All E.R. 118, at p. 121 per McNair, J.
9. An instance of this happening in the field of solicitor's practice can be seen in the case of **Edward Wong Finance Co. Ltd.** v. **Johnson, Stokes & Master**, [1984] 2 W.L.R. 1 (P.C.).
10. McNair, J., goes on to make such an observation following the passage quoted, **supra**, note 8.
11. Dugdale & Stanton, **supra**, note 6, at para. 23.15.
12. **Monarch Steamship Co. Ltd.** v. **Karlshamns Oljefabriker**, [1949] A.C. 196.
13. Dugdale & Stanton, **supra**, note 6, at para. 36.01.
14. **Lister** v. **Romford Ice and Cold Storage Co. Ltd.**, [1957] A.C. 555.

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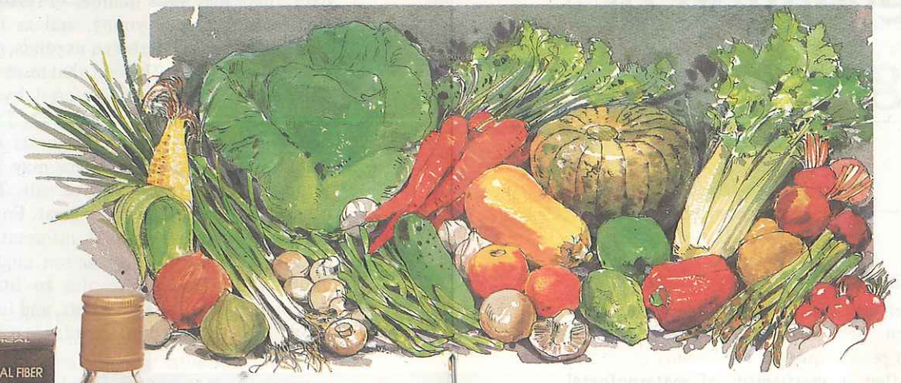

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Breastfeeding and the Prevention of Cow's Milk Allergy

Wang May Choo, M.A., M.P.H.

Cow's milk allergy (CMA) has been documented since the turn of the century when cow's milk began to be used as a substitute for human milk to feed infants. Symptoms include vomitting, diarrhoea, gastrointestinal pain, asthma, wheezing, dermatitis, urticuria, eczema and rhinitis. In more severe cases, CMA may lead to failure to thrive and anaphylactic shock. Symptoms are often manifested within the first two to three months of life (1). The reported incidence of CMA in the U.S./Canadian population varies from 0.3% to 7.5% (2,3). These wide variations partly arise from different age groups studied, and partly from different methods of diagnosis. In Singapore, the incidence of CMA is not known. However, a recent study of atopic disease among the Chinese in Hong Kong reports that the prevalence of rhinitis and eczema are respectively 18% and 30% (4).

CMA may be misdiagnosed as lactose or other milk intolerances. Unlike milk intolerances, CMA is not due to faulty absorption processes. Rather it involves specific immunological mechanisms known to give rise to allergic symptoms (5). Also, CMA is often the result of a reaction to the proteins in milk, and rarely to other substances. Goldman (6) has established four strict criteria for the diagnosis of CMA: 1) symptoms subside following milk elimination; 2) symptoms occur within 48 hours of a trial milk feeding; 3) three such challenges are positive and similar as to onset, duration and clinical features; and 4) symptoms subside after each challenge reaction.

The following article will explore the aetiology of CMA and the role of breastfeeding in CMA prevention. The treatment of CMA will also be briefly discussed.

Aetiology

The aetiology of CMA is not established. However, several hypotheses have been proposed. The more accepted ones include:

1. **Familial tendency**

   It appears that the development of CMA has a familial tendency. A study of 150 infants showed that about 17% of all infants born to mothers with a history of CMA developed adverse reactions when tested with cow's milk. If one baby in a family is born with CMA, the chances are one in two that subsequent babies will be similarly affected (7).

2. **Intrauterine sensitization**

   Infants have been found to have an allergic reaction to cow's milk on their first feeding. This is possible only if there was prior exposure to the antigen. It has been suggested that a mechanism of maternofoetal transfer is involved and sensitization to the antigen can take place in the uterus. This is not surprising since the capacity to synthesize immunoglobulins begins at 8-12 weeks of gestation (8).

3. **Role of gastrointestinal tract**

   Allergy to cow's milk and other foods is more common in infants than older children. There are indications that the physiologic immaturity of the gastrointestinal tract in the newborn allows the passage of intact macromolecules across the intestinal mucosa, and this may cause allergy. This is supported by the observation that most young infants are able to tolerate the offending foods by 1-2 years of age (9). Also, higher serum levels of specific antibodies to cow's milk or soy proteins have been found in infants fed milk or soy formulae from birth, than those fed these formulae only after three months of age (10).

4. **Role of secretory Immunoglobulin A (sIgA)**

   During the first few weeks of life, there is a transient deficiency of serum and secretory IgA (11). It is believed that sIgA interacts with antigens and prevent their adherence to or uptake by the intestinal epithelial cells (12). IgA deficiency has been observed in 3-month old infants of atopic parents, and IgA levels were especially low in those infants who developed allergic symptoms in the first year of life (13).

   It has been suggested that human milk sIgA antibodies may have a regulating effect against cow's milk proteins. Butte *et al* (14) determined the concentrations of sIgA in human milk over the first 4 months of lactation and showed that the daily amount of sIgA secreted into human milk and ingested by the infant gradually declines over time. This decrease appears to synchronize with the increase in the synthesis of immunoglobulin in the infant.

Breastfeeding and CMA prevention

From the discussion above, it would appear that breastfeeding in at least the first 2-3 months of life may play a role in the prevention of CMA. However, current literature does not completely support this hypothesis. While some studies (15, 16) indicate that breastfeeding reduces the risk of developing CMA in infants, others (3, 17) are unable to demonstrate any beneficial effects of breastfeeding on CMA. These differences in research findings may reflect poor and inconsistent study designs and the different methods of CMA diagnosis. The duration of breastfeeding; the definition of breastfeeding (exclusive or partial); the form in which cow's milk is fed; and the comparability of age and familial tendencies among subjects studied, are all factors that must be considered in a study of CMA.

At this point in time, the theoretical evidence and some empirical studies indicate that breastfeeding may indeed reduce the risk of CMA in infants. However, there is little information on the duration of breastfeeding necessary to achieve this benefit. It is hoped that improved studies will provide a more definitive answer to the role of breastfeeding in CMA prevention. Meanwhile, it would be prudent to encourage exclusive breastfeeding for at least 3 months, among infants with a family history of CMA.

Treatment

When CMA has been established, the usual treatment is to remove all cow's milk products from the diet until the child is at least 1.5 to 2 years old (1). In mild to moderate cases, cow's milk formula is often substituted with soy-based formulae. If the infant is also allergic to soy milk, formulae with casein hydrolysates may be tried. When CMA is diagnosed within the first few days of life, and the mother has not been given medication to stop the flow of her milk, breastfeeding can be encouraged. In some cases, the infant may not be able to even tolerate breastmilk unless the mother also eliminates cow's milk products from her own diet (18). The dietitian should then ensure that the mother's diet is adequate in calcium. When the infant suffers much intestinal damage and is severely hydrated, intravenous therapy may be initially required. The transfer to oral feeding is then best done with slowly increasing volumes of breastmilk. Once weight gain is satisfactory, the patient can be gradually placed on soy milk formula. At the age of 1.5 to 2 years, the child is again given an oral challenge of cow's milk. If he no longer shows symptoms, cow's milk products may be gradually reintroduced into his diet.

Conclusion

CMA is not often a fatal disease. However, it can cause much discomfort and physical suffering to infants and young children. There is also a cost attached to medical visits and treatment. Since breastfeeding may help to prevent CMA, it should be encouraged as much as possible, especially when there is a family history of CMA. No doubt, breastfeeding also provides many other benefits.

The promotion and support of breastfeeding presents a great challenge to the dietitian and the rest of the medical community. Like many industrialized countries, Singapore has made efforts to promote breastfeeding. In 1980, a survey showed that 65% of mothers had initiated breastfeeding. At the end of 8 weeks, however, the incidence of breastfeeding had fallen to 13%. This rate included both exclusive and partial breastfeeding (19). The structure of female employment and maternity leave, inadequate support from family and the medical community, and cultural attitudes are some of the deterrents to the maintenance of breastfeeding beyond the first one or two weeks of life. The dietitian, in supporting her client in her breastfeeding attempts, should be aware of these obstacles, and be sensitive, creative and resourceful in her counselling approach.

Formerly from Singapore, May Wang qualified with an MA in Nutrition Science at University of Texas, Austin, and later completed her MPH at University of California, Berkeley. She has been involved in the planning and management of public health programmes with particular interest in infant and child nutrition.

References

1. Savilahti, E. Cow's milk allergy. Allergy 36:73, 1981.
2. Collins-Williams, C. The incidence of milk allergy in pediatric practice. J. Pediatr. 48:39, 1956.
3. Gerrard, J.W., Mackenzie, J.W.A., Goluboff, N., et al. Cow's milk allergy: Prevalence and manifestations in an unselected series of newborns. Acta Paediatr. Scand. Supp. 234:1, 1973.
4. Fung, Y.M., Mayberry, J.F., Rhodes, J., et al. Atopic disease in the Hong Kong Chinese. Postgraduate Med. J. 58:673, 1982.
5. Gell, P.G.H., Coombs, R.R.A. Clinical aspects of immunology, 2nd. ed., F.A. Davis Company, Philadelphia, 1968.
6. Goldman, A.S., Anderson, D.W., Jr., Sellers, W.A., et al. Milk allergy. I. Oral challenge with milk and isolated milk proteins in allergic children. Pediatr. 32:425, 1963.
7. Gerrard, J.W. Milk allergy: Clinical picture and familial incidence. Can. Med. J. 97:780, 1967.
8. Singer, A.D., Hobel, C.J., Heiner, D.C. Evidence for secretory IgA and IgE in utero. J. Clin. Immunol. 53:94, 1974.
9. Bahna, S.L., Heiner, D.C. Allergies to milk. Grune & Stratton, Inc., N.Y., 1980. p. 28.
10. Eastham, E.J., Lichauco, T., Grady, M.I., et al. Antigenicity of infant formulas: Role of immature intestine on protein permeability. J. Pediatr. 93:561, 1978.
11. Matthew, D.J., Taylor, B., Norman, A.P. et al. Prevention of eczema. Lancet 1:321, 1977.
12. Walker, W.A., Isselbacher, K.J., Intestinal antibodies. New Eng. J. Med. 297:767, 1977.
13. Taylor, B., Norman, A.P., Orgel, H.A., et al. Transient IgA deficiency and pathogenesis of infantile atopy. Lancet 2:111, 1973.
14. Butte, N.F., Goldblum, R.M., Fehl, L.M., et al. Daily ingestion of immunologic components in human milk during the first four months of life. Acta Paediatr. Scand. 73:296, 1984.
15. Stintzing, G., Zetterstrom, R. Cow's milk allergy, incidence and pathogenic role of early exposure to cow's milk formula. Acta Paediatr. Scand. 68:383, 1979.
16. Hide, D.W., Guyer, B.M. Clinical manifestations of allergy related to breast and cow's milk feeding. Arch. Dis. Child. 56:172, 1981.
17. Jakobsson, I., Lindberg, T. A prospective study of cow's milk protein intolerance in Swedish infants. Acta Paediatr. Scand. 68: 853, 1979.
18. Jakobsson, I., Lindberg, T. Cow's milk as a cause of infantile colic in breast-fed infants. Lancet 1: 437, 1978.
19. Chen, A.G. Breastfeeding practices among postnatal mothers in Singapore. Singapore Comm. Health Bull. 21:32, 1982.

Dietary Management of Diabetes

– a case study –

Tai Yee Fui, B.Sc., SRD

Lily Tan is a 29-year-old married woman. In early 1983, she always complained of tiredness and loss of weight. This complaint was thought to be due to anaemia, until later, in May that year, she was found unconsious one day and was admitted to hospital. Many investigations were carried out and she was found to have glycosuria She was in diabetic coma on admission. Her condition was thus diagnosed as **diabetes mellitus.**

She is an insulin-dependent diabetic (Type I) and needs insulin injections everyday. She must also follow a diabetic diet.

Diet therapy is the cornerstone of diabetic treatment. The purposes of the diet are to keep blood sugar level within normal physiological limits, to attain and maintain ideal body weight and to improve overall health.

DIET COMPOSITION

Lily's nutritional requirement is similar to that of a non-diabetic young woman. Her diet must be a balanced one which provides all the nutrients essential for life. Basically, it should consist of 50 to 60% carbohydrates, 25 to 30% fats and 15 to 20% protein.

a) **ENERGY:**

Lily is 151cm tall with small bone frame. She is an accountant and is moderately active. Her ideal body weight ranges from 43 to 46kg and she was actually slightly underweight (42kg) when diagnosed. The calculation of her energy requirement is based on her ideal body weight and physical activity: each kilogram of her ideal body weight requires 33 calories. Therefore a 1,500 calories diabetic diet is prescribed for her.

Tai Yee Fui graduated from University of Surrey, Guildford, England with a Bachelor of Science in Nutrition and a Diploma in Dietetics. She worked as the only dietitian for the State of Sabah, E. Malaysia for two years and has been the dietitian of Mount Alvernia Hospital, Singapore, since 1981.

b) **CARBOHYDRATE (CHO) :**

CHO foods rich in dietary fibre are ideal for Lily. Dietary fibre helps in blood sugar control by slowing down the absorption of CHO. It makes the intestinal content more viscous, delays gastric emptying and so slows down the rate at which starch and sugar are absorbed. Dried beans which are rich in fibre have the least dramatic effect on blood sugar, followed by corn, rice (preferably unpolished rice) and wholegrain breads and cereals.

Concentrated sources of sugar such as cakes, sweet biscuits and desserts and soft drinks are high in calories and will raise blood sugar rapidly. They should be avoided. However, there is no objection to Lily including some of these foods occasionally provided it is at a time of peak insulin activity.

Fruits and milk contain sugars – fructose, glucose and sucrose in fruits and lactose in milk. However, Lily should include them in her diet because fruits provide vitamins A and C, potassium and fibre while milk is the best source of calcium and phosphorus. It is best to have fruits or milk towards end of the meal, so that the fats, protein and fibre from other foods will help to slow down the digestion and absorption of the sugars. It is also suitable for Lily to eat a piece of fruit or drink some milk when there is a peak action of insulin injected. If her blood sugar is high before a meal, she should avoid fruit for that particular meal; otherwise, her blood sugar level will be even higher.

Refined starches such as cornflour, white flour, custard powder and refined cereals such as cornflakes, if eaten alone or with simple sugars may raise blood sugar rapidly for they have little or no fibre. Potato is like simple sugar and will be absorbed rapidly.

c) **PROTEIN:**

Protein requirement for Lily is one gram per kilogram of body weight. Lily is advised to use protein sources which are low in cholesterol and saturated fats. These include egg whites, fish, skimmed milk, cottage cheese, very lean meat, lean and skinless poultry, soya bean products, lentils and nuts. All internal organs, yolks, fatty meat, full cream milk and cheese, cuttlefish and shell fish are rich in cholesterol and saturated fat and should be used less frequently.

d) **FATS:**

Fat sources which are low in cholesterol and saturated fats are recommended to Lily. These include pure corn or soya bean oil, sunflowerseed oil, seasame oil and polyunsaturated margarine. Butter, chicken fat, lard, ghee, cream, coconut and palm oil should be avoided.

e) **FREE FOODS:**

The following foods may be taken freely in Lily's diet: all vegetables except root vegetables, water, mineral water, Chinese tea, plain tea or coffee, unsweetened lime or lemon juice, clear soup, seasonings, spices and herbs, essence, artificial sweeteners, Worcestershire sauce, Tabasco sauce and gelatin.

f) **ALCOHOL:**

Alcohol has high calorie value. Since Lily is not overweight and has no other medical complication, a small quantity is permitted and can be incorporated occasionally in her meal plan. Since alcohol inhibits the release of glycogen from the liver, it can be consumed only with or after a meal or snack in order to avoid low blood sugar reaction.

Liqueurs and sweet wine/sherry should be avoided because of their high sugar content.

It is better to drink spirits (e.g. brandy, whisky, gin or vodka) which are free of carbohydrate and have approximately 70 kcal/30ml. Very dry wine contains a small amount of sugar and has about 70 kcal/100ml.

Beer contains carbohydrate and can only be taken in measured quantities to exchange with other carbohydrate foods. A can of beer contains approximately 10g carbohydrate and 100 kcal.

A small quantity of spirit or dry wine can be used in cooking – the alcohol evaporates but the flavour remains (1).

g) **SPECIAL 'DIABETIC' OR 'DIETETIC' FOODS:**

They are not necessary. They are usually expensive and contain calories. Diabetic jam, chocolate and biscuits are usually sweetened with sorbitol. Sorbitol is chemically related to ordinary sugar and is absorbed by the body slowly. However it is eventually metabolised to sugar in the body. Hence special foods cannot be eaten in unlimited amounts.

Lily's desirable goal is to eat normal foods, and control portion sizes.

The only advantage of special foods is to give variety to the diet. They can be taken moderately for a thin diabetic like Lily.

h) **ARTIFICIAL SWEETENERS:**

If Lily cannot do without her cup of sweet coffee, she can use artificial sweeteners to substitute sugar. The two commonly used sweeteners are saccharine and aspartame. Both are non-carbohydrate sweeteners.

Saccharine is a chemical substance with no calorie value and is about 400 times as sweet as sugar. Its disadvantage is that it has a bitter after taste.

Aspartame, made from amino acids, has a natural sugar taste. It is 180 to 200 times sweeter than sugar. Unlike saccharine, it yields an energy value of about 4 calories per gram. The calorie content of it is negligible since one tablet, which has the sweetness of one teaspoon of sugar, gives only 0.07 kcals. It does not have a bitter after taste.

MEAL PATTERN

Lily's insulin regime is a twice daily mixture of a short- and intermediate-acting insulin, i.e. Actrapid and Monotard (Novo insulin). She normally injects 12 units Actrapid and 9 units Monotard before breakfast and 5 units Actrapid and 4 units Monotard before dinner. Table 1 shows the activity of these two types of insulin.

Table 1. Action of Actrapid and Monotard Insulins

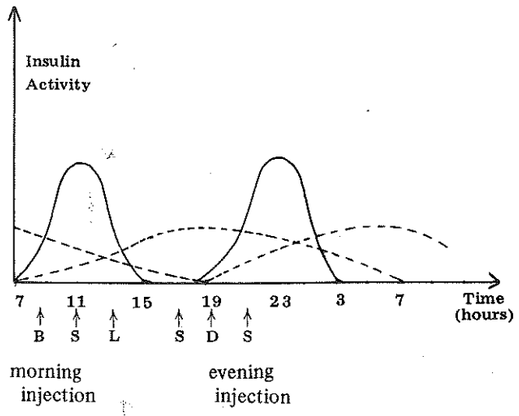
Insulin	Onset	Peak Action	Duration
Actrapid	½ hr	2½ – 5 hr	7 – 8 hr
Monotard	2½ hr	7 – 15 hr	22 – 24 hr

Lily's daily food intake is distributed into three main meals and three small in-between snacks in order to complement the actions of her injected insulins (Fig. 1). She must have her meals and snacks at regular times. She should not skip or delay a meal or snack. This meal pattern is very important; otherwise, hypoglycaemia will occur if food is not taken to cover times of peak insulin activity, and blood sugar levels will be unacceptably high if food is taken at times when insufficient insulin is available (2).

Table 2. Lily's whole day blood sugar profile

Time	Blood glucose level (mmol/l)
7.30 am	8 – 10
10.30 am	6 – 8
12.30 noon	4 – 5
3.00 pm	6 – 8
7.00 pm	4 – 6
10.30 pm	8 – 10
3.00 am	3 – 5

Fig. 1. Meal Pattern Matched with Insulin Activity



Key: B – Breakfast
L – Lunch
D – Dinner
S – Snack

Insulin: —— Monotard
—— Actrapid

SAMPLE DAILY MEAL PLAN

Approximate calories = 1,500

Total CHO = 180g, distributed as follows:

Breakfast	30g	Midmorning	10g
Lunch	50g	Midafternoon	20g
Dinner	50g	Bedtime	20g

BREAKFAST

A boiled egg or 1 thin slice cheese or 1 small piece lean ham

2 small thin slices wholemeal bread with 1 teaspoon polyunsaturated margarine

One cup milk made with 8 level teaspoons low fat/skim milk powder

Tea or coffee

MIDMORNING

2 pieces wholemeal crackers
water or plain tea

LUNCH

Clear soup
60g lean meat or chicken or 90g fish
salad or vegetables
1 Chinese rice bowl brown rice or 4 small thin slices wholemeal bread
one serve fruit

MIDAFTERNOON

1 piece wholemeal cracker
one cup low fat/skim milk made with 8 level tea spoons milk powder

DINNER

same as LUNCH

BEDTIME

1 slice bread
one cup skim milk

This sample meal plan is just a guideline for Lily. She can juggle wth the amounts; for instance, if her blood sugar is very high before lunch, she can eat less than usual OR eat later. The carbohydrate exchange system is also introduced to her. Knowing CHO exchanges helps her to eat the correct amount of CHO needed at each meal and snack. It also gives variety to the diet and makes her meal planning easier.

PATIENT'S MANAGEMENT

After being diabetic for nearly three years, Lily is familiar with her diet.

Generally speaking, Lily exercises control in what she eats but allows for occasional indiscretions. She never eats excessive amounts, however, and steers clear of the obviously 'forbidden' foods.

Lily does not test her urinary sugar. Instead she has been using Glucometer/Ames test strips or Haemoglukotest strips to test her blood sugar. Home blood glucose monitoring is done almost everyday before each injection. Sometimes a whole day profile is also done. Table 2 shows one of her recent whole day profiles.

Lily usually has a high blood sugar level in the morning. It is still not certain whether it is due to insufficient evening insulin or so-called 'dawn phenomenon'. Because of this, she has shifted to three injections a day recently – split dose in the evening i.e. 4 to 5 units Actrapid before dinner and 4 units Monotard before bedtime.

OTHER INFORMATION

Hypoglycaemia

If hypoglycaemia occurs, Lily should ingest any of the following which is a source of readily available sugar containing 10g of carbohydrate:-

2 heaped teaspoons of glucose or sugar

2 Dextrosol tablets

½ cup fruit juice or soft drink

If she fail to feel better in 10 minutes, she must repeat the procedure. The planned meal or snack should be consumed if the hypoglycaemia was due to a missed meal or delayed meal or snack.

She is advised to carry some sweets or Dextrosol with her in case of hypoglycaemia.

Illness

Lily must not stop her insulin and eating during illness. If she cannot tolerate her usual diet, she should change to a liquid or semi-soft diet. She should consult her doctor if she is unable to take even liquids. If vomiting of a meal occurs, adequate amounts of foods or beverages must be taken to replace half of the amount of carbohydrate taken in the meal. Replacement can be taken at half-hour intervals.

Emergency diet should contain at least 150g of carbohydrate per day. If only fluids can be tolerated, the following, each of which supplies 10g carbohydrate, can be used:

2 heaped teaspoons glucose in water

2 heaped teaspoons sugar or honey in water

80 ml soft drink

3 level teaspoons Milo, Ovaltine or Horlicks mixed with water

8 level teaspoons Ensure, Sustagen or Complan mixed with water

240 ml milk

Exercise

Regular exercise is part of Lily's normal routine. She normally walks for at least 20 minutes after every meal, and does not need to eat extra food for this. Sometimes she plays tennis, when she will eat a bigger snack before the game. Exercise is basic to diabetic control, acting like invisible insulin (3). It promotes uptake of glucose into the cells and increases the storage of glycogen in the muscles and liver. Exercise also reduces the risk of cardiovascular disease and relieves stress and depression.

Conclusion

There is no cure for diabetes yet. The aim of treatment is to control it by keeping the blood sugar within normal physiological limits, so that the complications of diabetes may be largely prevented or minimized. With her successful management of the disease, Lily is leading a normal life. She has recently become a mother and her daughter is a normal, healthy baby.

References

1. Manual of Clinical Dietetics 2nd Edition. Chicago Dietetic Association & South Aubunban Dietetic Association of Cook & Will Counties. W.B. Saunders Co. Philadelphia, 1981.

2. Mann, J., and the Oxford Dietetic Group, The Diabetics' Diet Book, Martin Dunitz, London, 1982.

3. Blood Glucose Monitoring : For the Phases of Your Life. Ed. Barbara Reeves – Ellington. Health Education Technologies, N. Y., 1986.

BOOK REVIEW:

Diet Books — An evaluation

1. Weight—loss plans

Yeong Boon Yee, B.Sc., SRD,
Evelyn Fong, B.Sc., RD
and Anna Grace Jacob, M.Sc.

Every year marks the advent of new diet books, hailing miraculous, rapid and unique weight-loss regimens. These books sell well in Singapore, reflecting the concern people have about the health risks associated with obesity. Among fashion-conscious folk slimness is also the "in-thing", creating a further demand for these books.

When it comes to diets, it seems that Singaporeans are extremely gullible. It is important therefore to evaluate the diet books available in the bookstore as to their effectiveness and the potential health risks they may pose.

Of the recent publications available, we have tried to select a varied group of books, representing the major types of diets in vogue today. The benefits and hazards of each are discussed.

The Carbohydrate Cravers Diet

by *Judith J. Wurtman, Ph.D.*
Ballantine Books. New York. 1983. Price: S$10.00

The Carbohydrate Craver's Diet offers a 1,100 kcal, high carbohydrate diet, designed "only" for those overweight persons who are acutely aware of a craving for carbohydrate and cannot succeed on any other diets. The diet is based on a research programme conducted at Massachussetts Institute of Technology, USA. The diet principle is based on the claimed "discovery" that a refined carbohydrate snack at a peak craving period promotes the production of serotonin, a neurotransmitter which turns off the hunger for carbohydrate, thereby enabling the person to stay on the diet for a long time.

The snacks comprise of sweets and starches and readers are advised to confine themselves to a suggested list, most of which are commercial products of particular packaging size (mostly not available in Singapore). The author claims that her diet is nutritionally complete except in iron.

Her "Pre-menstrual Sweet Tooth Diet" for two days every month, consisting only of refined carbohydrate at 1,100 kcal is nutritionally unsound. The slow rate of weight loss attained through this diet plan, approximately 1-2 lbs a week, however, falls within the recommended rate.

Carbohydrate craving is caused by a low blood glucose level, and this problem can be surmounted by including complex carbohydrate in the diet, which the author has omitted in the diet plan. The slower absorption of complex carbohydrate helps to maintain blood glucose at normal levels for longer periods of time, thus eliminating craving for refined carbohydrate. The majority of snack items recommended are high in calories but of low nutrient density. These would be better replaced by more nutrient-dense, low calorie items.

The All New F Plus Diet

by Audrey Eyton
Bantam Books. Toronto, New York. 1984. Price: S$13.45

This diet book promotes an unusually high fibre intake of between 35-60g per day within a restricted caloric intake of 1000-1250 kcal. As expected, the fat and protein allowance of such a diet is relatively low. Analysis of a typical sample menu reveals a protein content of 15% and a fat content of 9% of the total calories. The ace up the author's sleeve is a so-called "Fibre-Filler" made up of bran, dried fruits and nuts, which provides 15g dietary fibre per day in addition to the fibre provided by the salads and sandwiches in the menu plans.

Strict adherence to the diet plan given is recommended in order that the high fibre intake is maintained and essential amino acids patterns are complete everyday, as a large amount of the protein intake is of vegetable origin.

Anyone embarking on the diet should be forewarned of the unpleasant flatulence that will follow as a result of consuming such a large amount of dietary fibre. Nutritionally, one should be wary of the possible mineral deficiencies, especially of iron, magnesium and to some extent zinc and copper which may occur after prolonged use of such high fibre diets.

The diet plan is rather rigid and quite unpalatable, especially to Asian tastes. A more palatable one would contain about 20-30g dietary fibre as is now recommended by some authorities. On the other hand, this book provides excellent ideas as to means of increasing fibre content of home-cooked foods, even though the author seems to go overboard with the beneficial effects of fibre. Increasing fibre in the diet does not cause weight loss unless there is a simultaneous reduction in calories. It does however, improve the satiety value of food, thus encouraging reduction in food intake.

The Pritikin Permanent Weight Loss Manual

by Nathan Pritikin
Bantam Books. Toronto, New York. 1985. Price: S$15.30

In this book Pritikin has made an effort to appear more credible than in his first book "The Pritikin Maximum Weight Loss Diet", by offering a more moderate and respectable diet regimen.

Pritikin is one of the better known advocates of the high complex carbohydrate diets now in favour among health professionals. The principle of the high carbohydrate diet is based on the protein-sparing effect of carbohydrate, so that the small intake of protein can be used for essential purposes rather than energy expenditure.

This diet offers a plan within the range of 700-1200 kcal. It provides 70-75% of its calories from carbohydrate, 8-10% from fat and 15-22% from protein. The diet has a high water content and greater bulk to appease hunger while the very low fat content makes it rather bland.

Pritikin claims that his diet meets the RDA (US Department of Agriculture 1978) level for essential fatty acid and other major nutrients.

There are a large variety of interesting recipes including desserts, most of which are Western oriented, although a few Eastern ones have been included.

This is a well-written book, with up-to-date scientific backing, and for the most part sound dietary advice. The appendix of the book provides valuable nutritional analysis of a typical menu plan, and a caloric density table for easy reference by the dieter. However, the chapter on weight maintenance is brief and quite disappointing to those looking for suggestions and guidelines on how to maintain their ideal weight once it has been achieved. The lower calorie end of his diet plan is rather drastic and the 1200 kcal plan would be more acceptable.

The Mandells It's Not Your Fault You Are Fat Diet

by Marshall & Fran Gare Mandell
Signet Books. New York. 1986 (first published 1983).
Price: S$13.45

According to the Mandells, excessive calorie intake is not a causative factor in obesity. Overweight to them is a result of the "Allergic-Addictive Syndrome", which causes a person to crave the very foods he is allergic to, leading to over-eating. The Mandells claim that abstinence from the food allergen alone will control the addictive hunger, resulting in reduced appetite and weight loss.

The diet consists of a four-day fast supposedly to clear the 'poisons' in the body, followed by a complicated three-week rotation diet. No single food item is repeated within a four-day span, preventing the accumulation of food allergens. However, the time factor for allergic reactions is not specified, making identification of the specific food allergen ambiguous.

On the "every meal is a test meal" diet postulated by the Mandells, the dieter could run into severe nutritional deficiencies, as only four foods are allowed per day for a minimum of three weeks. Naturally, to counter this effect megadoses of "allergen-free" vitamin and mineral supplements are prescribed.

To cite an example from the book, "if after a single food meal of either tuna fish or lettuce, consumed within twenty minutes, you suddenly become very hungry, you know that an allergic hunger reaction to tuna or lettuce is stimulating your appetite and is causing you to over-eat."

The many similar such "allergy-addictive" responses described throughout this book obviously rely heavily on the Mandells' word alone, as no scientific references are cited to back their claims. We do not recommend this method of weight loss, as such a syndrome may hold true in very rare cases of obesity if at all.

The Richard Simmons Never Say Diet Book,

by Richard Simmons Warner Books. New York. 1980.
Price: S$27.05

A very entertaining book, written by a renowned television personality on the fitness and diet scene. He claimed to have lost 130 lbs as a youth, almost jeopardising his life through improper and extremely dangerous methods that he would never advocate to others.

In this book Richard Simmons emphasizes the behavioural modification that must be incorporated in the dieter's lifestyle to achieve success on any weight-loss plan. He develops quite an extensive range of psychological quizzes and tests for the reader to examine his/her own self-image, food motives and eating habits. He proposes a three-pronged plan combining exercise, mental attitude and a food-plan which should become an integral part of one's life. It consists of three programmes, one for those needing to lose 50 lb and over, another for those 20-40 lb overweight and lastly for those 1-15 lb above ideal weight.

The chapter devoted to the diet plan is very brief. The diet is neither revolutionary not does it contradict any dietary principles. The blatant omission of quantities of the menu items allowed and calorie ranges stands out as a major drawback of the book. This makes the distinction between the three diet plans unclear. For those who enjoy quizzing themselves, it is fun reading; as a diet book, it offers little solid dietary information.

The 4-Day Wonder Diet

by Margaret Danbrot
Bantam Books. Toroto, New York. 1986. Price: S$7.20

Margaret Danbrot puts forward a very low carbohydrate, high protein diet, eliminating two major food groups — cereals and dairy products. This, she says, will enable you to lose 10 lb in four days.

The author claims that for maximum effect, the given menu plans for each day must be strictly adhered to in their particular sequence, but the reason for this is not explained. She permits unlimited consumption of protein food, in effect increasing calorie intake without control.

The author, in trying to summarize the reasons for the effectiveness of the so called "wonder diet", feels that "very high protein content shifts the body metabolism into overdrive, thus speeding up the rate at which fat is burned off." She admits the diet is nutritionally unbalanced, and recommends the use of other balanced diets for longer periods of dieting.

It is the omission of the carbohydrate in the diet, which the author does not explain, that is the crux of the 4 Day Wonder Diet. Such a diet promotes ketosis, which is the incomplete oxidation of fat in the absence of carbohydrate, leading to the accumulation of ketone bodies. This can cause nausea, vomitting, diarrhoea, fatigue, dizziness and low blood pressure. Large amounts of water must be consumed in order that the ketone bodies can be washed out of the system. The drastic weight loss on the diet is the result of immediate loss of body water. The diet also promotes drastic loss of salt, potassium and is deficient in vitamins and minerals.

In our view, which coincides with that of the author, this diet is dangerous if followed for more than four days. We are surprised that she, realising the pitfalls of the programme, propagates it at all.

Fat to fit
by Geoffrey Cannon
Pan Books. London and Sydney. 1986. Price: S$12.00

The message from Geoffrey Cannon is that nutritious and wholesome fresh food coupled with adequate physical activity is the key to a fit and slim you. He emphasises the concept of nutrient-dense food selection. To fully illustrate his motto, various meals whether taken in or out of home are compared using his catchy "wheel of life", where nutrients supplied (protein, starch, essential fat, fibre, twelve vitamins and twelve minerals) are presented. The fuller the wheel, the more nutrient-dense a meal or food is, and thus more desirable. He puts forward a moderate diet plan of 1500-2000 kcal depending on one's size or eating capacity and incorporating an extra 300-400 kcal energy expenditure to be selected from one's choice of physical activity. A breakdown of different exercises and the energy expenditure they incur is provided. By improving the quality of food and increasing activity, Cannon explains, one can lose weight slowly (½ to 1 lb per week) but surely. Professional support is advised for those who are very fat (30 lb and over).

This book is an educational guide as to everyday choice of good, nutrient-dense food. Cannon's up-to-date dietary recommendations follow the most recent guidelines set by Western health authorities. A very interesting and informative book for those who want to know what healthy eating is all about. A book for everyone, not just the dieter.

Our suggestion for successful weight loss

Losing weight is a long and arduous task, whether done for medical or cosmetic purposes. Most fad diets are deceptive because there is only one way to lose weight and it is far from effortless. A nutritionally well-balanced, low caloric regime remains the foundation of any successful weight reduction programme.

The dieter, in order to succeed, must keep caloric intake below caloric expenditure. To lose one pound a week one must maintain a negative caloric balance of 500 kcal a day.

Generally, a low caloric diet between 1200-1800 kcal per day, including all the major food groups – cereals, dairy, products meat/vegetable proteins, fruits and vegetables – will achieve this. In addition, regular exercise helps increase calorie expenditure and hasten weight loss. In conclusion, certain books may be very helpful to inform and educate the dieter, but individual counselling by a dietitian will offer the best guidance in selection of personal weight-loss regimens.

The second part of this review, to be published in our next issue, examines a selection of "eat to stay well" diet books on the market.

In Brief . . .

Striking changes in food availability in Singapore

Singapore food supplies have changed considerably over the past 25 years, according to a recent report published by the Singapore Cancer Registry's Dietary Research Group *(Food Nutr. Bull. 8 (2) : 50-54, 1986).* Based on national food disappearance data compiled by FAO since 1961, the report shows that supply of all the major food groups, with the exception of pulses, has increased.

The most remarkable change has been in the supply of meat and offal, which increased by two and a half times. Egg supply has increased by 79%, animal oils and fats by 72% and fruits by 61%. On a nutritional basis this translates to a 25% rise in calories, a 34% rise in protein and a 67% rise in total fat.
Fat from animal sources has increased by 92%, and the proportion of calories from fat rose from 16 to 22%.

Riboflavin and retinol, however, are still available in quantities below the current recommended daily allowance (RDA) and calcium supply is borderline. Since deficiency diseases are not seen, this perhaps suggests that RDAs should be reviewed.

While food availability is a crude indicator of actual consumption, it is a valid guide to trends in the dietary pattern. The question which must now be posed is can these striking dietary changes be related to changes in prevalence of cardiovascular disease and diet-related malignancies? To this end, two case-control studies of diet and cancer have been initiated by the Cancer Registry, results of which should be known soon.

Food and mood

It began with hyperactive children, who were found to respond to additive-free diets, but has now expanded to include juvenile deliquents and criminals. The link between what people eat and how they behave has become a hot topic.

The most bizarre application of the theory that food affects mood was the "Twinkie" case in San Francisco in 1978. A jury accepted the defense's claim that the defendant's habit of overeating sugary snack foods, potato chips and soft drinks had produced his violent reaction. The charge was reduced from murder to manslaughter.

Medical researchers in the field, however, caution that the evidence linking food and mood is not ready to be put to use. Dr John Crayton of University of Chicago, who has documented mood swings coincidental with changes in the immune system on exposure of volunteers to certain foods, says that the work is in its infancy and not yet understood.

True allergies are thought to affect less than 2% of the population. To give a better guide to the extent of the problem, the Food and Consumer Association (FDA) of the United States has established an allergic reaction reporting system. An advisory committee has also been set up on hypersensitive reactions to food constituents. This committee will make recommendations for research in the field and look into methods of protection for the minority of genuine food allergy sufferers.

Abstracts

PREVENTIVE NUTRITION INTERVENTION IN CORONARY HEART DISEASE : RISK ASSESSMENT AND FORMULATING DIETARY GOALS. *B. M. Posner, P. A. DeRusso, S. L. Norquist, and M. A. Erick. J. Am. Diet. Assoc. 86: 1395, 1986.* The criteria for evaluating an individual's risk of coronary heart disease at various ages are presented. Emphasis is placed on the major nutrition-related risk factors, including lipid levels, weight, blood pressure, and blood glucose levels. The goals of preventive nutrition intervention in heart disease are discussed.

DIETARY FIBRE AND ITS COMPONENTS IN SOME SOUTHEAST ASIAN FOODS. *L. Gourley, H. P. Lee and S. M. Lee. Asia Pacific Comm. Biochem. 1:13-17, 1987.* Dietary fibre was analysed in 63 Southeast Asian foods comprising fruits, vegetables, nuts, seeds, fungi and seaweed. The best sources of fibre included stinkbean (5.5g/100g) lady's finger (4.9g/100g), chiku (8.6g/100g) and guava (5.2g/100g). The proportion of cellulose, non-cellulosic polysaccharides and lignin was also analysed in each food and a comparison made of "crude" and "dietary" fibre contents in fruits and vegetables. It was recommended that crude fibre values should not be used indiscriminately as a guide to dietary fibre contents of foods.

FOOD GLYCAEMIC INDEX OR MEAL GLYCAEMIC RESPONSE? *A. L. Calle-Pascual, E. Bordiv, S. Romeo, C. Romero, P. J. Martin-Alvarez and J. P. Maranes, Hum Nutr. : Appl. Nutr. 40A, 282-286, 1986.* Three types of CHO : rice, potatoes, lentils, each at 50g CHO portions, were incorporated into 4 types of standard meals with different energy distributions. The increase in postprandial blood glucose levels at 30 mins was lower when lentils were given than with rice or potatoes in all 4 types of energy distribution used. No differences were found at the other times studied. Similar glycaemic responses were obtained with all 4 types of energy distributions even though the 3 types of CHO have different glycaemic indices. The results suggested that it would be more appropriate to plan the use of high-carbohydrate foods in the diabe-

Meetings

Mar 5-7, 1987

10th Annual American European Dietetic Association Conference

London

Apr 4, 1987

National Foundation for Digestive Diseases Food and Health Day

A public seminar on "Eating In and Eating Out" and a scientific meeting on "Food and Disease."

2.30 pm, Mandarin Hotel, Singapore

Contact: Miss Y. L. Lam,
Tel: 2238968

Apr 8-11, 1987

ProPak Asia 87 International Conference and 2nd Asian International Food Processing and Packaging Technology Show
World Trade Centre, Singapore

Contact: L. Chan, Tel. 3384747

May 5-7, 1987
R&D Associates for Military Food and Packaging Systems, Inc. 41st Annual Meeting

Norfolk, Va

June 16-19, 1987

Institute of Food Technologists Annual Meeting and Food Expo

Las Vegas, Nevada

July 8-11, 1987

Annual Meeting, Society for Nutrition Education

San Francisco, CA

Sept 28 – Oct 2, 1987

7th International Congress of Food Science and Technology

Raffles City Convention Centre, Singapore

Contact: Mr Theng Chye Yam,
Chairman,
Organising Committee
c/o Singapore Professional Centre,
Blk 23, Outram Park,
03-129, S(0316).

Oct 26-29, 1987

5th Asian Congress of Nutrition

Osaka, Japan

Oct 19-23, 1987

70th Annual Meeting of the American Dietetic Association

Atlanta

Books

Nutrition Education in US Medical Schools
Committee on Nutrition in Medical Education, Food and Nutrition Board, National Research Council.
National Academic Press: Washington D.C., 1985, softcover, 141pp, US $13.50.

This report reviews the current status of the teaching of nutrition in US medical schools and concludes, that in most it is "inadequate". The committee found that faculty responsible for nutrition varies widely and there is a lack of organizational structure and administrative support for nutrition programmes. This is an important document which will hopefully have some impact on deans and curriculum committees of all medical schools.

Food Allergy
ed P. Scowen, G. Medhurst, J. Leslie and D. N. Challacombe. Edsall and Co. Ltd.: London, 1985, softcover, 93pp, £3.90.

A fairly well-balanced review of the controversial field of food allergy. It covers prevalence, implicated foods, diagnosis and forms of therapy. Specific issues such as cow's milk allergy, additives and hyperactivity and tension-fatigue syndrome are dealt with. A good introduction to the topic for medical and dietetic students.

Abstracts

tic diet in relation to their glycaemic response when included in a standard meal, rather than in relation to individual glycaemic index.

UPDATED NUTRITIONAL ASSESSMENT AND SUPPORT OF THE ELDERLY. *M. Shuran and R.A. Nelson, Geriatrics 41 (7), July 1986.* Nutrition's role in maintaining health and aiding recovery from disease or surgery is well recognized in older patients, particularly where depression, chronic disease, and fixed income result in decreased nutrient and energy intake. Therefore, knowledge of nutritional status is essential if morbidity and mortality are to be reduced. This review outlines current practical techniques in a five-step process for identifying types of malnutrition, establishing therapeutic goals, and evaluating nutritional therapy.

A DIET HISTORY METHOD FOR RESEARCH, CLINICAL, AND COMMUNITY USE. *J. H. Hankin. J. Am. Diet. Assoc. 86 : 868, 1986.* A structured quantitative diet history method has been developed and used in several cancer epidemiological studies in Hawaii. It was used successfully to test dietary hypotheses in those studies and to distinguish eating patterns among the multiethnic population. The methodology may be used for research concerning the aetiology of other diet-related diseases for dietary counselling, and for identifying community nutrition programmes.

SERUM LIPIDS AND EGGS. *M. A. Flynn, G. B. Nolph, Y. Osio, G. Y. Sun, B. Lanning, G. Krause, and J. C. Dally. J. Am. Diet. Assoc. 86 : 1541, 1986.* Results of this crossover study suggest that moderate amounts of dietary cholesterol within the range that individuals ordinarily consume in their self-selected diets do not generally affect serum cholesterol levels. The number of eggs eaten can influence serum cholesterol, but slightly. There was great individual variability in the response of the 70 subjects in the study.

THE SINGAPORE DIETITIAN

Notice to Contributors

The following policies will be implemented in an attempt to attain a reasonable standard and format for the Journal and at the same time encourage submission of manuscripts from professionals in fields allied to nutrition and dietetics.

When there is sufficient and suitable material available, the *Journal* will include articles on research, major feature articles, short clinical papers, reviews and correspondence.

Research articles must conform to the standard practice of scientific research methods.

Major feature articles do not need to be research based. However, they must make a substantially new contribution based on validated information.

Title

The title should summarise the main idea of the paper in a concise statement. Its principle function is to inform readers about the nature of the paper, thus it should be self-explanatory when standing alone.

Abstract

An abstract is a brief summary of the content and purpose of the article. It should allow the reader to survey the contents of an article quickly.

An abstract of a research paper should contain statements of the problem, method, results and conclusion. The subject population should also be specified.

The abstract should be typed immediately below the title and should not be labelled.

Method

This should clearly describe how the study was conducted. It should be detailed enough to allow an investigator to replicate the study. This will also allow the reader to assess the appropriateness of the methods and the probable reliability of the results.

Results

The results should summarise the collected date and any statistical treatment of them. The use of graphs or tables will clarify information.

Discussion and conclusion

This should present an evaluation of the implications of the results. It should examine, interpret and qualify the results and draw inferences from them. Similarities and differences between these results and the work of others should be cited.

References

In text cite references in arabic numerals in parentheses ( ). All references cited and other relevant woks should appear in a bibliography, on a separate page, appended to the article. The following convention should be followed:

In the case of books: author's surname and initials; title of book; name of publisher; place of publication; year of publication. See example 1 below.

In the case of a chapter of a book: author's surname and initials; title of chapter; name of editor; book title (in italics); publisher's name; place of publication; year of publication. See example 2.

In the case of a paper from a journal; author's surname and initials; title of paper; anme of journal; volume, number, page numbers, year of publication. See example 3.

References should be numbered in the order in which they appear in the text.

Example 1

Smith, A.B. Chapter title. In Tropical medicine, 2nd edn, J.Doe ed. Blackwell: Oxford, 1981.

Example 2

Brown, C.D. & Green A.T. Influences on eating habits of Asians in London. Hum. Nutr: Appl. Nutr. 40:107-15, 1985.

Tables, photographs and illustrations

Each table and illustration must appear on a separate page. They should be numbered and labelled.

Reproduction tends to soften contrast and detail in photographs. It is therefore necessary to ensure that all photographs are in black and white and have sharp contrasts.

Preparing the manuscript

Type the manuscript on A4 heavy white bond p-per. Typing should be double spaced. Leave a margin of 2.5 to 4cm, at the top, bottom and sides of the page to allow for editorial markings.

The cover page should bear the manuscript title, the author's name, affiliation and address for publication.

Two copies, including the original should be submitted to the Editor.