

Nutrition in the medical curriculum: an Australian perspective

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'The primary need is to give medical students a systematic understanding of the elements of the subject which they can apply when they meet nutritional aspects of diagnostic, therapeutic or community medicine problems, first in training and later on in practice'.¹

Human and clinical nutrition have not, until recently, been regarded as formal scientific and medical disciplines in Australia. However, in 1975 a Division of Human Nutrition was established as part of the Commonwealth Scientific and Industrial Research Organisation and, in 1978, two chairs of human nutrition were filled at Australian universities. These developments have given considerable momentum to human nutrition research and teaching in Australia and it has been possible for them to build upon the long and substantial experience of Australian scientists in animal nutrition². There had only been a slow realisation of the emergence of several nutritionally-related disorders in contemporary Australian society^{3,4}. Although most of the problems appeared related to over-nutrition, there were those of under nutrition as well^{3,4}.

A consequential development has been the advent of the scientific societies, the Nutrition Society of Australia in 1975 and the Australian Society for Parenteral Nutrition in 1974. Also, in 1978, an educational body, the Australian Nutrition Foundation was formed.

In 1979, the National Health and Medical Research Council of Australia approved 'Guidelines for nutrition teaching in medical schools'¹. These guidelines were then endorsed by the Federal Council of the Australian Medical Association⁵.

The areas of nutrition relevant to medical practice which tend to be neglected in present courses for medical students were defined by the NHMRC in the following way:

1. 'Medical students should be made aware of the effects of nutrition disease — that is malnutrition in its widest sense arising from whatever cause — medical, surgical, social or psychiatric. They should be acquainted with modern methods of assessing the nutritional status of individual patients, or of whole communities or particular sections of communities, using clinical, biochemical, anthropometric and dietary methods.

2. 'Students should be given some introduction to and understanding of: (a) interaction between nutrition and other diseases and drugs; (b) principles of parenteral nutrition, tube feeding and nutrition for intensive care; (c) the relation of nutrition to chronic degenerative diseases such as obesity, dental caries, coronary heart disease, hypertension, diabetes, diverticulitis, gallstones, cancer, cirrhosis of the liver, urinary tract stones, etc.; (d) world food problems, particularly protein/calorie malnutrition; (e) the importance of food habits to groups of people and the possible effects of introducing new foodstuffs to a community; (f) emergency feeding and nutritional principles in a disaster.

3. 'Medical students should be shown how to handle food composition tables and metabolic data for themselves, since the services of a dietitian are not readily available to a general practitioner. Further, doctors ought to be capable of checking the instructions of the dietitian to the patient, and explaining matters in such a way that the patient's co-operation

is obtained. Doctors should be able to advise their patients how to choose food wisely in relation to food prices, external pressures of advertising, and the activities of various "food fad" movements'.

A detailed list of nutrition topics to be covered in the medical curriculum was devised (Table 1).

The recommendations made by the NHMRC were, in general, in line with those being developed elsewhere⁶⁻¹⁰.

Table 1. Check list of nutrition topics for medical schools: National Health and Medical Research Council of Australia, 1979

Alcohol — metabolism and effects on tissues	Megavitamin usage, 'orthomolecular medicine'
Assessment of nutritional status (food intake measurements, clinical signs, anthropometry, biochemical tests)	Metabolic adaption to fasting, starvation, overeating
Bacterial food poisoning	Metabolic balances
Carbohydrates in foods, and metabolism	Minerals
Deficiency disease (xerophthalmia, beri beri, Wernicke/Korsakoff, pellagra, nutritional anaemias, scurvy, rickets and osteomalacia, haemorrhagic disorders of the newborn)	Mycotoxins in foods
Diet and dental disease	Nutrition and coronary heart disease
Diet in prevention and management of diabetes	Nutrition and immunity
Dietary fibre	Nutrition and other degenerative disorders (gallstones, hypertension, diverticulosis, urinary tract stones)
Dietary goals and nutrition policies	Nutrition and pregnancy
Diets for inborn errors of metabolism	Nutrition and the brain
Electrolytes (nutritional aspects of Na, K, Mg, acid-base balance)	Nutrition education
Energy expenditure, balance and regulation	Nutritional deficiencies secondary to other diseases
Fats, essential fatty acids, effects of different fatty acids	Nutritional problems in Aborigines and other vulnerable groups
Fluoridation	Obesity (epidemiology, aetiology, complications, comparison of methods for management)
Food and cancer, cancer and nutritional status	Parenteral nutrition (nutrition for Intensive Care)
Food contamination and pollution	Protein — calorie (energy) malnutrition
Food habits in different groups of people	Protein quality in foods and amino acid metabolism
Food intolerances	Prevention of malnutrition
Food processing and additives	Recommended dietary allowances and requirements for nutrients
Food standards and legislation	Toxicants naturally occurring in foods
Fuels of the tissues	Trace elements
'Health foods'	Tube feeding (nutrition and intensive care)
Historical landmarks in nutrition	Use and understanding of food tables
Infant feeding	Use of diet modification in management of other diseases (renal, gastrointestinal, gout, hyperlipidaemias)
Interactions of food, nutritional status and drugs	Vitamins (A, D, E, K, thiamin, riboflavin, niacin, pyridoxine, [panthothenate], biotin, folate, B12, C)
Lactation and breast feeding	World food problems

Nutritional knowledge of Australian medical students and graduates

Few formal assessments are available of the level of food and nutrition knowledge of Australian medical graduates. However, some index of how the community views the medical graduate in this regard can be gathered from a consideration of the sources of nutrition information or misinformation in the Australian community (Table 2). The doctor is only one

Table 2. Sources of nutritional information or misinformation in the Australian community

A. Health professions	B. Teaching professions
1. Medical	1. Pre-school
2. Dietetic	2. Primary
3. Nursing	3. Secondary
4. Pharmacists	4. Tertiary
C. Media	D. Other people
1. Print — Newspapers, Women's magazines, specialist	1. Family
2. Radio	2. Friends
3. Television	
E. Food advertising	F. Food labelling
G. Alternative medicine	
1. Naturopathy	
2. Herbalist	
3. Orthomolecular	

of many sources. The proliferation of alternative nutritional advice services in the community through health food shops, practitioners of alternative medicine, and pharmacies bears witness to the ineffectiveness of nutrition education in medical schools. Pharmacists themselves

are poorly trained in nutrition and yet are called upon to give nutritional advice and, of course, this is usually accompanied by the sale of a nutritional supplement or a slimming product. Whilst medical schools struggle for formal recognition of nutrition, one 'orthomolecular medicine' program in Sydney alone will apparently graduate over 400 a year!

Dugdale & co-workers^{11,12} have assessed the food and nutrition knowledge of medical graduates, clinical medical students, student nurses and theology students in Brisbane, Australia. They found that, on questions related to the composition of common foods, there were some noticeable gaps in knowledge. Ten per cent of doctors did not know that cheese was a good source of protein, while only 64 per cent knew that breakfast cereals were high in carbohydrate. On the broader nutritional properties of food, scores were even lower. There was considerable misinformation about the energy value of butter and margarine, and also about the efficacy of natural and synthetic vitamin C. Questions about the energy value of commonly used foods showed gross ignorance. Doctors tended to reflect the current community view that potatoes are fattening, but that meat has a low energy value.

In 1978, the family medicine program of the Royal Australian College of General Practitioners enlisted the aid of dietitians to prepare a programmed course of instruction for general practitioners¹³. Thus, there is a growing perception amongst medical practitioners of the need for nutrition teaching.

The undergraduate curriculum – present and future

Medical studies in Australia are pursued for five or six years after 12 years of primary and secondary education combined.

The traditional approach to the teaching of nutrition at the undergraduate level has been to integrate it with existing subject matter (Table 3). The NHMRC referred particularly to

Table 3. Nutrition as part of traditional undergraduate medical courses: N.H.M.R.C. Australia, 1979

1. Biochemistry	4. Pathology	7. Surgery
2. Physiology	5. Internal medicine	8. Community and preventive medicine
3. Pharmacology	6. Paediatrics	9. Dentistry

the current problems in teaching nutrition in biochemistry. First, with the expansion of biochemistry had come a greater emphasis on molecular biology and enzymology and relatively less on nutritional biochemistry. Secondly, clinical chemistry, with its nutritional component, has become a separate discipline. It is interesting, then, to see the emerging role of undergraduate programs in social and preventive medicine as a vehicle for nutrition education at the undergraduate level. Another approach to upgrade nutrition teaching has been to introduce an elective in nutrition¹⁴ (Table 4). The University of Newcastle Faculty of Medicine in New South Wales probably has the least traditional approach to medical education with a problem-based organisation of the medical course. Efforts have therefore been made to integrate the nutritional input with the particular problem studied by students. Clinical work is undertaken from the beginning of the course. However, more and more, the traditional medical schools with their pre-clinical and clinical structure, are moving clinical material back into the pre-clinical years. At both Monash and Melbourne Universities in Victoria, the clinical correlative sessions in pre-clinical years have taken nutritional themes. At Monash University, teaching in the skills of nutritional assessment and the techniques of nutritional support is developed as the clinical years progress.

The dilemma for nutrition teaching in medical schools is that the discipline is not organ-based or exclusively age-group based so that it will always be necessary to integrate it with traditional subject areas. But having done so, this will leave important subject areas such as food consumption, food technology, world food problems, the assessment of nutritional status and the interactions of nutrients with one another and with diseases relatively uncovered¹⁵. For these reasons, it will almost certainly be necessary to develop a human nutrition unit in each medical school. Ideally, there would be a chair of human nutrition occu-

Table 4. Nutrition in Australian medical schools

State	Name of School	Nutrition taught as part of other subject areas	Undergraduate food and nutrition course available	Nutritionist on academic staff
Victoria	Melbourne	Yes		
Victoria	Melbourne	Yes	—	Dietitian as associate
	Monash	Yes	In Social & Preventive Medicine Program	Professor of Human Nutrition as associate
New South Wales	Sydney	Yes	—	Professor of Human Nutrition
	New South Wales	Yes	Community Nutrition	Dietitian as associate
	Newcastle	Yes	—	—
Queensland	Queensland	Yes	—	—
South Australia	Adelaide	Yes	—	—
	Flinders	Yes	Elective	Lecturer in nutrition
Tasmania	Tasmania	Yes	—	—
Western Australia	Western Australia	Yes	—	—

ped by a clinician. Such a unit would not only co-ordinate nutrition teaching in the medical school, but also stimulate nutrition research and, thereby, provide a more satisfactory milieu in which nutrition education would take place.

Links with other health professionals. It will not be possible for all medical graduates to have comprehensive food and nutrition knowledge. Within the medical profession, it can be anticipated that there will be sub-specialist clinical nutritionists (Table 5) who can act as

Table 5. Areas of involvement by the clinical nutritionist

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|------------------------------------|---|
| 1. Food intake patterns | 6. Nutrition policy |
| 2. Nutritional assessment | 7. Nutrition education |
| 3. Nutritionally-related disorders | 8. Links with agriculture, food science and food technology |
| 4. Nutritional support systems | |
| 5. Special groups | |
| Children | |
| Elderly | |
| Ethnic minorities | |
| Alcohol abusers | |

resource persons. The dietitian, too, is increasingly better trained to manage food supply systems, engage in counselling individuals with nutrition problems and to initiate nutrition programs in the community; with time constraints on the medical graduate, the dietitian must be considered as an important resource person.

Links with agriculture, food science and technology. It is interesting to reflect on how isolated medical graduates are from agricultural science, food science and food technology. Each of these areas has considerable potential importance for human health. A better understanding of food and nutrition by the medical graduate will allow these important links to be forged.

For the future medical graduate, several factors could facilitate nutrition teaching: (1) Accordance of academic status to nutritionists within the faculties of medicine by development of human nutrition units. Such units would integrate and contribute to nutrition teaching throughout the faculty and would create an environment for nutrition research. (2) The development of teaching resource material in human and clinical nutrition. This will include the provision of a comprehensive range of nutrition journals in medical libraries and

of nutrition texts¹⁵⁻¹⁷. (3) The instigation of examination and assessment procedures suitable for testing food and nutrition knowledge.

There will be many presently practising medical graduates who cannot hope to benefit from these innovations and, for this reason, nutrition teaching must be built into continuing education programmes. As an aid to such education for professionals, we have made a submission from Deakin University to the Australian Tertiary Education Commission, that a Graduate Diploma in Human Nutrition, which could be taken part-time and off-campus over two years, be made available.

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