The Singapore Dietitian

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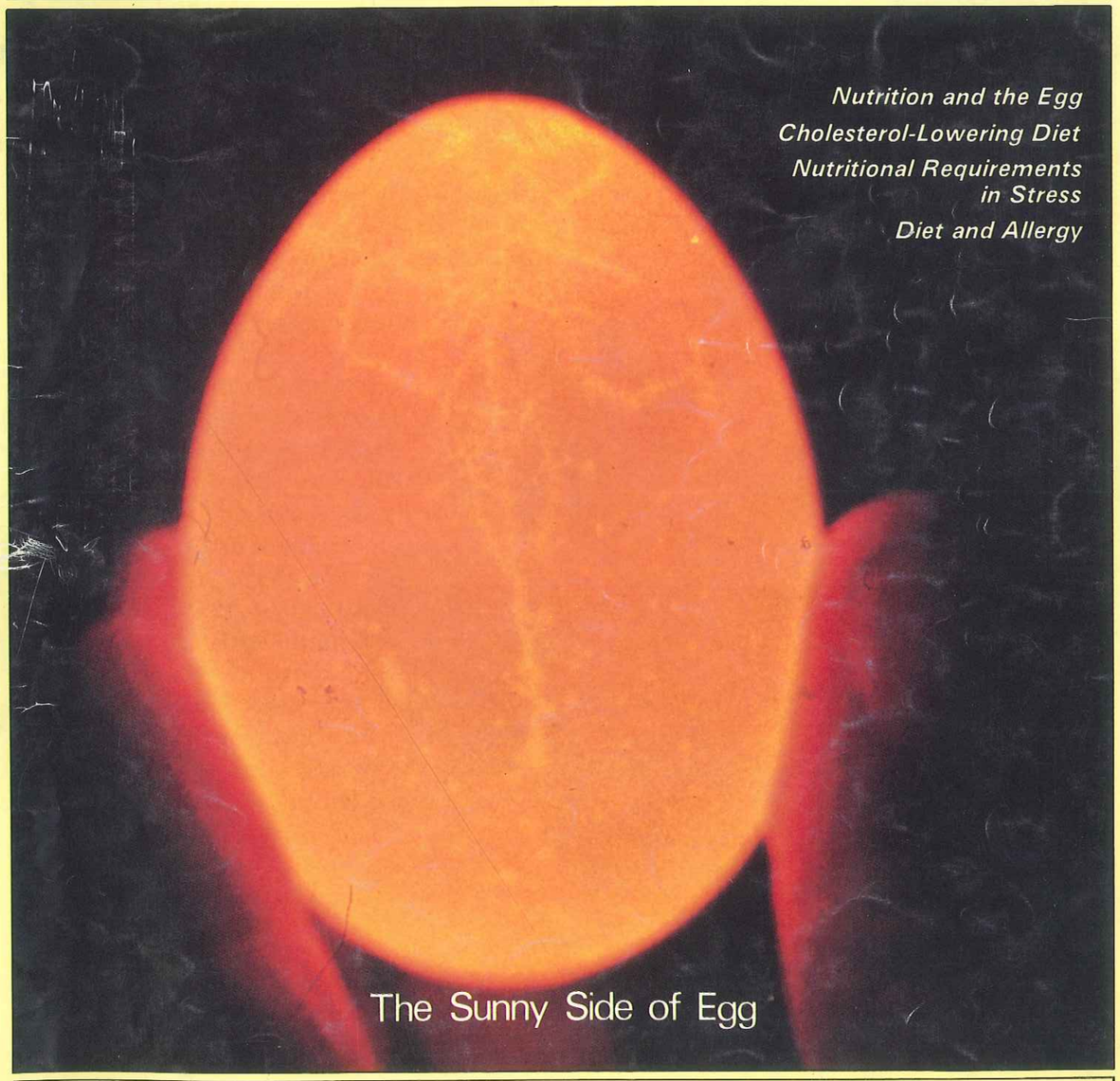

Nutrition and the Egg
Cholesterol-Lowering Diet
Nutritional Requirements in Stress
Diet and Allergy

The Sunny Side of Egg

MC (P) 170/3/86 $4

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From the President .....

As the newly elected President, I am encouraged to see a growth in the membership of our Association as well as an increased interest by our members as more have come forward to participate in the activities of the Association. With the help and support of our members I hope the objectives of our Association as set out in the Constitution will be further enhanced.

One of the objects of the Association is: "To spread the knowledge and further understanding of dietetics." It is an opportune time for dietitians to educate the population to the health risks which poor dietary habits incur, as there is much current interest in food for health. Bad dietary habits cause or contribute to many diseases which make heavy demands on our health services. Sound education of the population to eat wisely is to be welcomed, as it will lessen the future burden upon the health services. The process will inevitably be slow, as eating habits are deeply entrenched, and only amenable to gradual change.

Dietitians are the best placed of all the health professionals to achieve this objective, as their training is expressly geared towards the practical application of the principles of nutrition in health and in disease.

Dietitians should therefore make their skills and expertise more available as eventually it will be up to themselves to convince their fellow health professionals and the general public that **good nutrition needs a dietitian!**

Mrs Helen David
President
Singapore Dietitians' Association

CONTENTS

NUTRITION AND THE EGG

Susani K Karta, M.Sc., R.D.

The body needs many essential dietary nutrients to stay healthy. These include amino acids (the building block of proteins), essential fatty acids and micronutrients (vitamins and minerals). In addition, the body needs trace elements and energy-providing compounds such as carbohydrates and nonessential fatty acids. These compounds, along with non-nutritive substances such as fibre, are provided by the foods we eat.

Most foods contain more than one nutrient, and certain tyes of food contain the same ones in similar amounts. But no single food contains all. Foods with similar nutrient patterns have been traditionally grouped together for convenience in menu planning for a well balanced diet. In Singapore, the Ministry of Health's Training and Health Education Department has classified food into "3 basic groups" with the following recommended number of servings (see diagram):

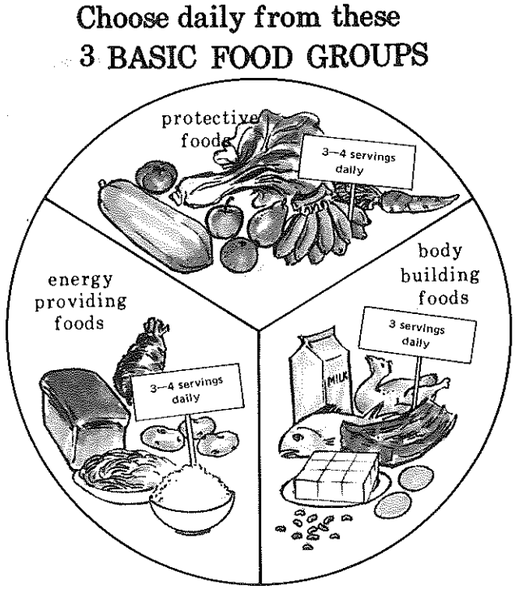
- **Energy-Providing Foods** (rich in B vitamins, complex carbohydrates and fiber such as rice, breads, potatoes, noodles etc) – 3 to 4 servings daily;
- **Body-Building Foods** (protein and mineral-rich foods such as poultry, eggs, fish, meat, soybeans, milk, etc) – 3 servings daily;
- **Protective Foods** (rich in vitamin A and C; comprises vegetables and fruits) – 3 to 4 servings daily.

Because there is no perfect food, it is always important to eat a variety of food from all 3 food groups which will provide nutritionally balanced meals.

Eggs contain many essential nutrients. They are recognized as one of the important foods in the body-building food group of the "3 basic food groups". Eggs are an excellent source of high-quality protein. In fact, egg protein is so nearly perfect that scientists use it as a standard to measure the value of protein in other foods. Egg protein has the ideal balance of essential amino acids. This is why eggs are classified under body-building foods and why egg protein is called a complete protein. Eggs have a high nutrient density because they provide excellent protein and a wide range of vitamins and minerals in proportion to a low calorie count.

What is nutrient density?

Nutrient density is the new way of explaining the nutrient contribution of a food. It compares the amount of essential nutrients to the amount of calories a food contains. This measure of nutritional value has become more important recently since many people need to consume low calorie diets to maintain their weight. For instance, a glass of milk provides calories as well as significant amounts of protein, calcium and riboflavin while a can of regular soft drink provides the same number of calories but no significant amount of essential vitamins, minerals or protein. Thus, the milk is "nutrient-dense" while the soft drink is not.



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Why is nutrient density important?

No matter how many calories consumed, one's essential dietary nutrient requirements remain relatively constant. At very high levels of calorie intake, it is not very difficult to obtain adequate amounts of all the needed nutrients, but at lower levels food selections must be made more carefully. The food eaten must be more nutrient-dense.

Among some subsets of the population, particularly the low income groups, infants, children, elderly people and dieters, calorie intakes may be lower than the recommended. Dietitians frequently find that the diets of these groups rarely supply the recommended amounts of iron, calcium and other essential vitamins and minerals for the simple reason that the foods most people eat in the course of an average day are not "dense" enough in these nutrients. Thus in order to stay healthy, people whose energy intakes are low must include more nutrient-dense foods in their daily diets.

Nutritive content of eggs

We have cited milk as an example of a nutrient-dense food. One of the reasons this is so is that Nature designed it to support the life of infants of the species until they are ready to eat customary foods. Similarly, the egg is one of Nature's better nutritional efforts, designed as a total life support system for the developing chick.

Table 1 lists the nutrients and the amounts of those nutrients found in eggs. When the values of these nutrients are compared with dietary recommended allowances it is found that one large egg supplies an impressive percentage of essential nutrients – an average of 5 to 20 percent for adults. Eggs are an especially rich source of high quality protein, vitamins (A, D, E, folic acid, riboflavin, B_{12} and pantothenic acid) and minerals (phosphorus, iodine, iron and zinc). Table 2 illustrates the nutrient density of eggs in the context of the recommended dietary allowances currently in use in Singapore.

Both the egg white and yolk contain protein, minerals and water-soluble vitamins. Fat is only found in the yolk. The yolk also contains lecithin, cholesterol, fat-soluble vitamins A, D, E and K, lipids and almost all of the iron. Eggs contain all the essential nutrients except vitamin C and niacin.

Nutritive quality of eggs

The nutritive or biological quality of egg protein is very high because it contains all of the essential amino acids (those that cannot be manufactured by the body) and because the protein is easily digested and utilized. Moreover, the pattern of essential amino acids in the egg is so ideal that it has been used for years as the standard against which other protein foods are judged. Protein with lower nutritive quality may lack some of the essential amino acids or contain smaller amounts. When the poorer quality protein foods are used, a wider variety or a larger quantity must be consumed in order to obtain the same amounts of essential amino acids contained in an egg.

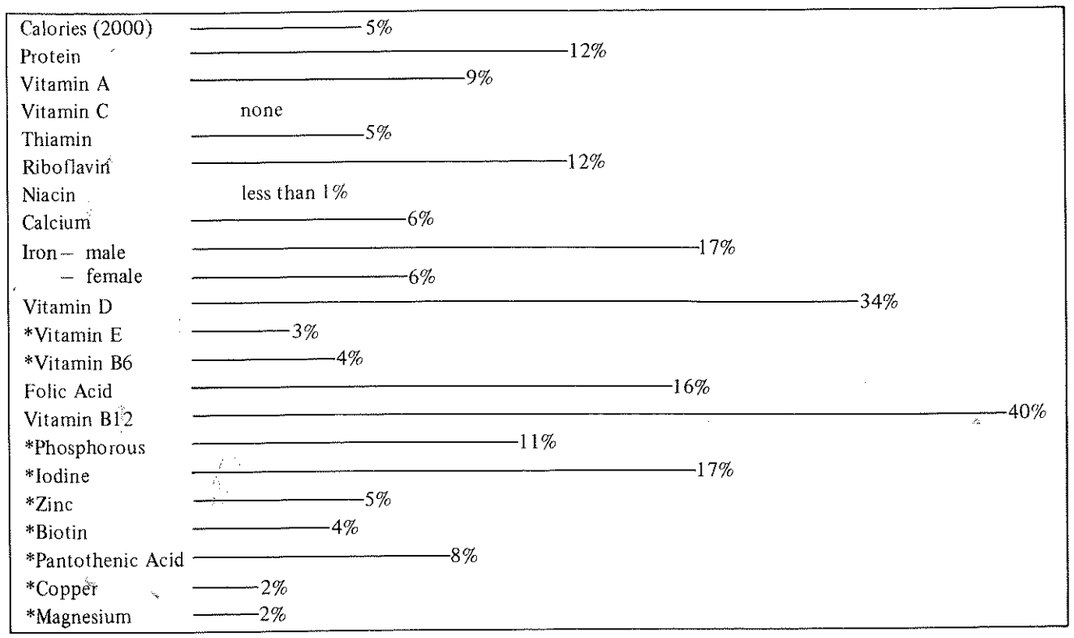
Table 1. Estimated nutrient values for a large egg*

Based on 60.9g shell weight with 55.1g total liquid whole egg, 38.4g white and 16.7g yolk.

Nutrients and Units	Whole	White	Yolk
Proximate			
Solids–g	13.47	4.6	8.81
Kilocalories	84	19	64
Protein (N x 6.25)–g	6.60	3.88	2.74
Total lipids–g	6.00	–	5.80
Ash–g	.55	.26	.29
Lipids			
Fatty acids–g			
Saturated–total	2.01	–	1.95
8:0	.027	–	.027
10:0	.082	–	.080
12:0	.027	–	.026
14:0	.022	–	.022
16:0	1.37	–	1.31
18:0	.462	–	.459
20:0	.022	–	.022
Monounsaturated–total	2.53	–	2.50
14:1	.005	–	.005
16:1	.214	–	.211
18:1	2.31	–	2.28
Polyunsaturated–total	.73	–	.72
18:2	.660	–	.650
18:3	.011	–	.014
20:4	.055	–	.051
Cholesterol–mg	264	–	258
Lecithin–g	1.27	–	1.22
Cephalin–g	.253	–	.241
Vitamins			
A–IU	264	–	260
D–IU	27	–	27
E–mg	.88	–	.87
B12–mcg	.48	–	.48
Biotin–mcg	11.0	2.58	8.35
Choline–mg	237	.46	238
Folic acid–mg	.033	.006	.026
Inositol–mg	5.94	1.52	4.35
Niacin–mg	.045	.035	.010
Pantothenic acid–mg	.83	.09	.73
Pyridoxine–mg	.065	.008	.057
Riboflavin–mg	.18	.11	.07
Thiamin–mg	.05	.004	.048
Minerals–mg			
Calcium	29.2	3.8	25.2
Chlorine	96.0	66.1	29.9
Copper	.033	.009	.024
Iodine	.026	.001	.024
Iron	1.08	.053	1.02
Magnesium	6.33	4.15	2.15
Manganese	.021	.002	0.19
Phosphorus	111	8	102
Potassium	74	57	17
Sodium	71	63	9
Sulphur	90	62	28
Zinc	.72	.05	.66
Amino Acids–g			
Alanine	.38	.24	.14
Arginine	.42	.23	.19
Aspartic acid	.65	.40	.25
Cystine	.15	.11	.05
Glutamic acid	.85	.52	.33
Glycine	.22	.14	.08
Histidine	.16	.09	.07
Isoleucine	.36	.21	.15
Leucine	.57	.33	.24
Lysine	.45	.25	.20
Methionine	.21	.15	.06
Phenylalanine	.35	.23	.12
Proline	.26	.15	.11
Serine	.50	.27	.23
Threonine	.32	.18	.14
Tryptophan	.11	.07	.04
Tyrosine	.28	.16	.12
Valine	.43	.27	.16

* Poultry Science 58: 131-134, 1979

Table 2. Percentage of recommended daily dietary allowances[1] provided by one large egg.



[1] Recommendations are by FAO/WHO except for those nutrients marked with an asterix (*) which are based on US RDA.

Nutritionists express the relative quality value of proteins in several ways, one of which is the Net Protein Utilization Score (NPU), the product of the protein's biological value and digestibility. The NPU of food proteins can be used to adjust the cost of various protein foods so that an economic evaluation can be made. Table 3 presents the cost of protein from various food sources adjusted for quality. The egg is clearly an economical source and is one of the least expensive of the animal proteins. The abundance of readily digestible protein containing large amounts of essential amino acids makes eggs the least costly source of high-quality protein. Eggs are rich in other nutrients too, so that adding eggs to meals based on their cost per gram of protein also yields other nutrients at low cost. Considering the full nutrient profile of the egg, not just protein, it would be difficult to design a food that compares as favourably, both in nutrients per calorie and nutrients per unit cost.

Eggs: cholesterol and fatty acids

There is a great confusion by the general public on the subject of eggs because eggs (yolks) are rich in cholesterol. It is very common for eggs to be viewed as "cholesterol". Moreover, recently cholesterol has been making headlines as the leading cause of coronary heart disease (CHD). This has caused many people to become cholesterophobics and eggphobics without fully understanding the subject.

Cholesterol is a soft fat-like substance found among the fats in the bloodstream and in every living cell in the body. It is a component of all animals including humans and is known to play a number of important physiological roles. It is a building block for cell walls and a part of the protective insulation around nerve fibres. Its dehydro-derivative is a precursor of vitamin D. Its acid salts aid in the absorption of fatty acids. Cholesterol is also the starting material in the synthesis of steroid hormones.

Cholesterol can be classified into two categories, one present and produced in the body, known as *serum (blood) cholesterol* and the other present and consumed in all animal food products in the diet such as egg yolk, organ meats, meat, poultry, seafood and dairy products, known as *dietary cholesterol.* High serum cholesterol is one of several risk factors associated with CHD. There are many other risk factors that are related to heart disease in populations – smoking, high blood pressure, age, being male, obesity, sedentary lifestyle, diabetes, stress, heredity and raised blood triglycerides.

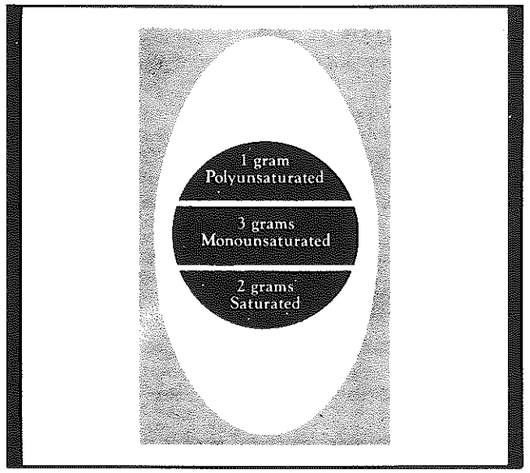
Table 3. Cost of 6g protein from selected animal foods, adjusted for quality.

Food	NPU	Weight of food to give 6g protein (g)	Retail cost (S$)	Cost adjusted for protein (S$)
Egg, one	94	50	0.16	0.17
Milk, fresh, whole, sterilized	82	23	0.26	0.32
Beef, lean	67	30	0.37	0.55
Pork, lean	66	30	0.22	0.33
Chicken wing, with bone	65	48	0.18	0.28
Fish, flesh (average of kembong, selar, kuning and cuttlefish)	86	40	0.27	0.34

Cholesterol is synthesized and metabolized daily in our bodies in amounts far greater than those usually consumed in the diet. The body produces about 80 per cent of the total cholesterol found in the blood and tissues and about 20 per cent comes from dietary sources.

Under normal conditions the body will maintain the balance between that cholesterol synthesized and that consumed in the diet. If the body does not obtain an adequate dietary supply it will manufacture more proportionately. However, each individual's serum level of cholesterol is influenced by heredity. Thus blood cholesterol levels are not simply a dietary issue. Elevated blood cholesterol is largely a result of genetics, age, obesity and lack of exercise. Diet plays a role but more and more scientific research indicates that the major dietary factor affecting blood cholesterol levels is not cholesterol, but the amount of fat and saturated fat in the diet.

A large egg typically contains about 6 grams of fat and 275 milligrams of cholesterol, all of which are contained in the yolk. There are three different types of fatty acids in the yolk; polyunsaturated (1g), monounsaturated (3g) and saturated (2g).



From research, it has been learned that saturated fats can raise blood cholesterol in some people, while dietary cholesterol itself does not seem to have a consistent effect on blood cholesterol. On the other hand, there is evidence that polyunsaturated fats can lower blood cholesterol. A high egg diet has been shown to contribute to elevated blood cholesterol in some people, but not in others. In fact, in research reported by Oh and Miller (2) about a third of the group had lower blood cholesterol levels after eating the high egg diet. These variable and highly individualistic responses have yet to be explained.

Monounsaturated fatty acids were once thought to be neutral in terms of their effect on blood cholesterol. However, new research reported by Grundy (5) indicates that monounsaturated fatty acids in a high-fat (40% calories) diet effectively reduces total and low density lipoprotein (LDL) cholesterol. The ratio of LDL/HDL was lower with the high monounsaturated fat diet than in the low-fat diet. It will be interesting to see if future research with actual foods confirms this finding. If it does, it may explain why many egg feeding studies showed no effect on blood cholesterol, since half the fat in eggs is monounsaturated (3g) with a total of two-thirds of fat being unsaturated (4g).

Recommendations

There is some controversy over what dietary recommendations are appropriate for healthy individuals, particularly regarding dietary cholesterol. There is no question that individuals with high levels of cholesterol in the blood should make every attempt to reduce those levels.

People with elevated blood cholesterol may benefit from modifying the total fat, saturated fat and cholesterol in their diet as part of a total treatment programme to lower all of their risks for CHD. People diagnosed as having elevated blood cholesterol should eat fewer egg yolks.

Dietary cholesterol can be reduced without eliminating eggs or depending on substitutes. The cholesterol content of egg dishes such as omelettes and scrambled eggs can be cut in half by using two egg whites for one whole egg for half the eggs in a recipe. At this time there is no proof that eating eggs will cause CHD or that refraining from eating them reduces the possibility of CHD. Many people have the recommended levels of cholesterol in the blood and may not need to reduce dietary cholesterol or limit egg consumption. The amount of cholesterol in the diet is not necessarily important to everyone.

The amount and kind of foods one chooses to eat are personal decisions and choices. No one can promise that eating more or less of any food will result in less risk of developing heart disease, especially if one does not have high blood cholesterol. Individuals should know what their blood cholesterol level is and control it if it is high; regular medical checks on blood cholesterol level are advisable. People should not self-diagnose but see a doctor instead for a risk profile. If an individial is found to have a cholesterol level that places him at high risk, his doctor will prescribe a cholesterol-lowering diet under a dietitian's care. The dietitian can help the patient learn about the nutritional content of foods. She can also help plan and prepare menus low in cholesterol and give tips on eating out and snacking.

It is commonly agreed among the medical profession that advice on dietary cholesterol should be individualized depending on a person's blood cholesterol level and other risk factors. The dietary guidelines which emphasize a balanced diet, variety and moderate consumption of fat, saturated fat and cholesterol but which do not set numerical levels for appropriate consumption are the best advice for the general public. Total fat and saturated fat are the most influential dietary components related to blood cholesterol levels.

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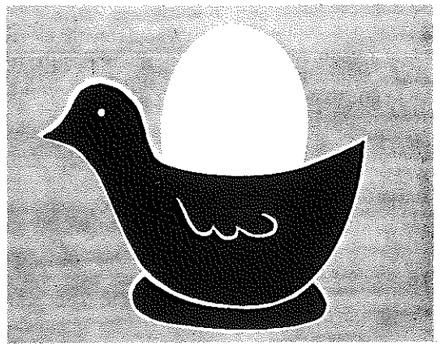

BASIC EGG KNOWLEDGE QUIZ

Questions

1. How many minutes does it take to be certain an egg is hard-boiled?
   (A) 10
   (B) 15
   (C) 20

2. Dying an Easter egg
   (A) makes it spoil more quickly
   (B) poses a risk because of hazardous food dyes
   (C) is a harmless tradition

3. After you decorate hard-boiled eggs, they
   (A) can be left out for 3 days before eating
   (B) can be left out for 24 hours before eating
   (C) should be refrigerated until you are ready to eat them

4. Which is the most nutritious type of egg?
   (A) brown-shelled
   (B) white-shelled
   (C) either

5. A raw egg is "bad" if it has
   (A) a blood spot
   (B) a dark ring around the yolk after it is cooked
   (C) a cracked shell

6. Which type of egg keeps longest?
   (A) fertilized
   (B) unfertilized
   (C) whether or not an egg is fertilized has nothing to do with how long it will keep

7. Raw eggs will remain fresh in the refrigerator
   (A) no longer than a week
   (B) in the box they came in
   (C) in the refrigerator's built-in egg tray

8. A sure sign that an egg has lost some of its freshness is that
   (A) the white is thick and cloudy
   (B) the white is runny and clear
   (C) the white separates easily from the yolk

9. The calories in an egg
   (A) are contributed primarily by the yolk
   (B) are contributed primarily by the white
   (C) increase when eggs are cooked

10. How many eggs would you have to eat to reach the FAO/WHO'S recommended daily limit for cholesterol?
    (A) one
    (B) two
    (c) three

Answers on P. 26

Nutritional Requirements In The Stressed State

Nancy Evans, B.Sc., RD

The physiological response of the body to stress manifests itself through hypermetabolic and hypercatabolic states. The exact mechanism by which this takes place is as yet unknown. However, it is known that stress results in a hypothalmo-pituitary reaction and stimulation of the sympathetic nervous system. As a result, we see a substantial increase in the catabolic hormones – catecholamines, glucagon, glucocorticoids (in particular cortisol) and growth hormone – relative to insulin, the major anabolic hormone (1).

This hormonal imbalance leads to a number of changes in carbohydrate, protein and fat metabolism. These changes include increased fat mobilization and turnover, nonsuppressible gluconeogenesis, elevations in lactate and pyruvate, hyperglycaemia, alterations in plasma amino acid levels, reduced total body protein synthesis, negative nitrogen balance and increased muscle protein catabolism (2).

Due to the increase in metabolism and catabolism in the stressed state, the major nutritional concerns are with supplying sufficient energy and protein to meet the body's increased needs. It is important to provide adequate kilocalories to prevent the use of body protein stores for energy. Likewise it is important to replace protein stores which are being depleted due to the hypercatabolic response to stress.

Vitamin and mineral requirments in the stressed state have not yet been clearly defined. For those patients who are either experiencing diarrhoea or have abdominal fistual drainage, zinc status may be of some concern (2).

Energy Requirements

The energy requirements of the stressed hypermetabolic patient are markedly increased from the non-stressed state. The extent of this increase is dependant upon the severity of the stress. As previously mentioned, sufficient exogenous energy must be supplied to prevent the use of body proteins as an energy source and to prevent protein-calorie malnutrition (5).

There are several methods which can be employed to determine the energy requirement of the stressed patient.

Nancy E. Evans, graduated from Mount Saint Vincent University, Halifax, Nova Scotia, Canada with a Bachelor of Science in Home Economics (distinction). She completed a one-year dietetic internship programme at the Victoria General Hospital in Halifax. Mrs Evans is presently employed as a Clinical Dietitian with Mount Elizabeth Hospital, Singapore.

Perhaps the most direct method is by weighing the patient to monitor any changes in body weight. A decrease in body weight would indicate an inadequate energy supply and a need to increase the patient's energy intake. Utilization of this method is dependant upon the availability of information regarding fluid balance (fluid input and output) and regular (preferably daily) weights being available (5).

As it is not always possible to obtain daily weights, a numerical estimation of daily energy requirements must be used. A simplified method for determining energy requirements is to allow 35 kcal/kg/day for maintenance of present body weight, 45 kcal/kg/day for anabolism and 50-55 kcal/kg/day for severly burned patients (4).

In 1919 Harris and Benedict formulated two equations for determining Basal Energy Expenditure (BEE), which takes into consideration sex, height, weight and age of the individual.

Harris-Benedict equations:

Daily BEE for men = 66.47 + 13.75W + 5.0H – 6.76A
Daily BEE for women = 665.10 + 9.56W + 1.85H–4.68A

Where W = weight in kg, H = height in cm and A = age in years

To determine daily energy requirements using the BEE calculated from the Harris-Benedict equation, two methods have been identified and either method can be employed. The first method is based on the type of therapy (Table 1) (3) and the second on the activity multiplied by an injury factor (Table 2) (5).

Table 1. Energy requirements based on type of therapy

Type of therapy	Kilocalories required per 24 hours
Parenteral anabolic	1.75 x BEE
Oral anabolic	1.50 x BEE
Oral maintenance	1.20 x BEE

Table 2. Activity and injury factors for calculation of energy requirements. (Kilocalories required per 24 hours = BEE x activity factor x injury factor)

Activity	Factor	Injury	Factor
Confined to bed	1.2	Minor operation	1.2
Out of bed	1.3	Skeletal trauma	1.35
		Major sepsis	1.60
		Severe thermal burn	2.10

Although the exact mechanism for increased energy requirements in the stressed patient is not known, the increased requirements in two particular stressed states, those of sepsis and severe burns, can be explained.

Sepsis

The increased energy requirement in the septic patient is attributed to the knowledge that for every one degree increase in body temperature there is a 10% increase in energy expenditure. If chills accompany the fever, the energy requirements would be further increased as any increase in muscular activity will result in increased energy expenditure (5).

Burns

In burns, probably the most severe stressed state, the increase in energy requirements is due to the loss of skin covering. This results in an uncontrolled loss of fluid from the body surface. The normal individual loses approximately 1 litre of water per day through the skin and respiratory tract. With ½ kilocalorie required for the latent heat of evaporation of every millilitre of water lost at a body temperature of 37°C, the result is a daily energy expenditure of 500 kcal. Water losses of up to 5-6 litres per day have been measured in burns patients. If we take 4 litres as an average daily water loss for the burns patient, the result is a daily energy expenditure of 2000 kcals (5). In addition to this, energy is required for Basal Energy Expenditure.

Energy requirements for the burns patient can be determined using the Harris-Benedict equations or the Curreri Formula which has been formulated for the calculation of energy requirements in burns patients. This formula determines energy requirements on the basis of body weight and the percentage of total body surface area burned (7).

Curreri Formula:

25 kcal/kg body wt + (40 kcal x % total surface area burned)

Protein Requirements

The requirement for protein in the stressed patient varies with the degree of stress and the patient's previous nutritional status. The previously well-nourished patient with adequate protein stores will require less protein daily than the stressed patient who was previously malnourished (2).

This increased protein requirement is due to an increase in urinary nitrogen losses. The elective post-surgery patient loses from 8-10g nitrogen per day, while the septic patient loses between 15-20g nitrogen per day. Losses of between 20-30g nitrogen have been measured in cases of severe burns. This can increase to 40g if the burns patient was on steroid therapy (5).

Protein requirements can be determined in a number of different ways. For the healthy individual, daily protein requirements are calculated on the basis of 0.7–1.0g protein/kg body weight. A moderately stressed patient (infection, fracture, major surgery) would require 1.5–2.0g protein/kg body weight. The severely stressed patient's protein requirements are in the range of 2.0–4.0g protein/kg body weight per day (4).

A second method which can be used to determine daily energy requirements is to provide protein as a ratio between energy and grams of nitrogen. In the normal diet this ratio is in the range of 300–350 kcal: 1g nitrogen (6.25g protein), whereas in the stressed state the ratio should be in the range of 100–150 kcal: 1g nitrogen (2).

The most accurate method of determining daily protein requirements in the stressed patient is the Nitrogen Balance Study. This requires the analysis of a 24 hour urine collection for urinary urea nitrogen. In addition, a calorie count (food intake record) must be carried out for the same 24 hour period and analyzed for total protein intake (6).

Nitrogen balance (g)

$$= \frac{\text{protein intake (g)}}{6.25} - (\text{urinary urea nitrogen (g)} + 4\text{g})$$

If the patient is found to be in negative nitrogen balance, that is, nitrogen lost is greater than nitrogen taken in through food, then the patient's diet should be adjusted to supply the additional protein required.

Conclusion

Adequate nutritional support is a vital part of the stressed patient's treatment and recovery. Both dietitian and doctor play key roles in the assessment of the patient's nutritional needs and in ensuring that these needs are being met through proper nutritional support. It is important to remember that a patient's protein and energy requirements do not remain stagnant during the recovery period, therefore readjustments in calorie and protein requirements must be made periodically during this time.

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Cholesterol-Lowering Diet

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There is a growing awareness of the threat to healthy living posed by the excessive consumption of fats and cholesterol. With this awareness comes a greater focus on, and need (whether voluntary or prescribed) for low fat and low cholesterol (more correctly called cholesterol-lowering) diets. This article is a summary of the principles of the cholesterol-lowering diet, but before this is discussed some clarification with regard to the two types of diets is pertinent. In particular, what is the difference between a low fat and a cholesterol-lowering diet? To the uninitiated these two diets are often mistakenly assumed to be similar. In fact, they are two different diets altogether.

A low fat diet is one often prescribed for conditions such as cholecystitis, steatorrhoea and Crohn's disease. Total fat intake must be reduced, thus all foods rich in fat, including butter, margarine, lard, vegetable oils, fat on meat, chocolate, cake, biscuits and fried foods are restricted (1).

On the other hand, a cholesterol-lowering diet is prescribed for people with elevated blood cholesterol levels (6mmol/l or 20mg/dl) or certain hyperlipidaemias (2).

Hyperlipidaemias

The three main chemical constituents of fats are triglycerides, phospholipids and cholesterol. These substances are collectively called lipids and the two we are most concerned with are the triglycerides (TG) and cholesterol. It is pertinent to note that TG are synthesised in the liver **partly** from carbohydrate (CHO) entering the intestine, **partly** from fatty acids mobilized from adipose tissue and **also** from chylomicron remnants. (Chylomicrons are the chief vehicle for the carriage of lipids from the alimentary canal.) Lipids only occur in plasma carried on lipoprotein molocules. Each lipoprotein particle consists of cholesterol and TG as well as phospholipids and protein. Increases in the concentration of one or more of the lipoproteins constitutes a particular type of hyperlipidaemia (See Table 1).

Table 1. Types of hyperlipidaemias

Type	Lipid increased in plasma	Diet prescription
I	Triglycerides (cholesterol may be elevated)	• Low fat 25-35g
IIA	Cholesterol	• Cholesterol-lowering
IIB + III	Cholesterol and triglycerides	• Cholesterol-lowering • Controlled refined carbohydrate • Low calorie if necessary
IV	Triglycerides (cholesterol may be elevated)	• Controlled carbohydrate about 45% of energy (decrease concentrated sources of refined carbohydrate and sugars) • Moderate cholesterol-lowering • Low calorie if necessary • Restricted fat (30% of energy) • Controlled carbohydrate (50% of energy) • Moderate cholesterol-lowering • Low calorie if necessary

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Dietary considerations in the cholesterol-lowering regime

In the cholesterol-lowering diet, total fat intake must be lowered, to 30% or less of the energy intake (8).

In particular, the types of fats to be shunned are those of animal origin. Animal fats are predominantly made up of saturated fatty acids (SFA). These saturated fats have a cholesterol-raising effect (3) and should be limited to 10% of the energy intake.

As dietary cholesterol does not appear to influence the blood levels of cholesterol as markedly as saturated fats (4), foods rich in cholesterol such as butter, eggs, prawns, duck, liver and kidneys (see Table 2) need not be totally excluded but can be consumed in limited amounts. Moderate cholesterol-lowering would require that less than 300mg per day be consumed; more severe restriction to 150-200mg per day would be required in unresponsive cases.

Polyunsaturated fats, however, have a cholesterol-lowering effect (3) and can still be included in the cholesterol-lowering diet in normal or increased amounts (at least 10% of energy) provided the patient is not overweight. Obesity has been shown to have a positive correlation with raised blood cholesterol and reduction to ideal weight is an important part of the cholesterol-lowering diet (5).

Recent reports suggest that monounsaturated fats, of which olive and peanut oils are rich sources, may have a cholesterol-lowering effect (6). Furthermore, certain dark-fleshed cold-water fish oils, rich in omega-3 fatty acids, may have cholesterol-lowering properties (7). Two final dietary factors to be considered in the cholesterol-lowering regime are fibre intake and intake of refined carbohydrate and sugar. There is evidence that dietary fibre, particularly that from legumes, fruits and oats, has a cholesterol-lowering effect (3) and it may thus be beneficial to increase its intake. Starch and sugar, since they contribute to triglyceride synthesis (3) are required to be reduced in conditions where both blood cholesterol and triglycerides are raised.

Table 2. Cholesterol content, per 100g, of some common foods

Food	Cholesterol (mg)
Milk	14
Butter, salted	230
Cheese, cheddar	70
Eggs, whole, raw	450
Liver, pig, stewed	290
Crab, fresh	100
Lobster	150
Prawns	200
Shrimps	200
Chicken, light meat boiled	80
Chicken, dark meat boiled	110
Duck, roast, meat only	160
Kidney, pig, stewed	700
Beef, cooked, lean only	82

Source: Paul, A.A. and Southgate, D.A.T. McCance and Widdowson's The Composition of Foods. HMSO: London, 1978.

Summary of dietary management

The basic principles of a cholesterol-lowering diet are:

1) Reduce total dietary fat, especially saturated fats.

2) Increase intake of dietary fibre especially fibre from legumes and fruits.

3) Limit refined carbohydrate and sugary food as this many contribute to triglyceride formation.

4) If overweight, reduce total food intake so as to decrease energy intake, but at the same time ensure that diet is balanced.

Sample daily meal plan for a cholesterol-lowering, low calorie diet

kilocalories = 1300
total fat = 40g (27% of energy)
cholesterol = 150mg

Breakfast

½ cup (120ml) unsweetened orange juice
2 slices wholemeal bread
1 teasp. polyunsaturated margarine
1 slice lean ham
coffee or tea with skimmed milk

Mid-morning

1 apple

Lunch

clear soup
1 bowl plain boiled rice
75g boiled chicken (meat only) or lean pork
cucumber and tomato
1 piece fresh fruit
plain water or unsweetened cold drink

Afternoon tea

tea or coffee with skimmed milk
or unsweetened cold drink

Dinner

clear soup
85g steamed or grilled fish
mixed vegetables
1 slice papaya
Chinese tea or plain water

Supper

tea or coffee with skimmed milk
2 plain biscuits

Table 3. Patient guidelines for a cholesterol-lowering diet

Food Group	Foods to Avoid	Foods Allowed
FATS	Lard, suet, butter All meat fats Most margarines	Cornoil, soybean oil, sunflower oil, peanut oil, olive oil, polyunsaturated margarine.
MEATS	Fatty meat Skins on poultry	Lean pork, beef, lamb, ham, chicken.
OFFAL	Liver, kidney, heart, tripe, brains, sweetbreads	–
FISH	Shellfish (eg. prawns and crabs) Fish canned in oil	–
EGGS	Whole eggs or egg yolks, extra to allowance	Only 2 – 3 eggs per week. Egg whites.
CEREALS	Cream and chocolate biscuits	Rice bread, noodles, chappati, oats, yam, sweet potato. Breakfast cereals, plain biscuits.
CHEESE	Whole milk cheese eg. cheddar Processed and cream cheeses	Low fat cottage cheese.
OTHER MILK PRODUCTS	Whole milk, cream, condensed or evaporated milk, ice-cream	Skimmed milk Low fat yoghurt
NUTS	Coconut	All other types
BEVERAGES	Malted milk or chocolate drinks	Tea, coffee, unsweetened fruit juices
SWEETS	Chocolate, toffees	–
FRUITS AND VEGETABLES (including pulses – peas, beans and lentils)		All types

Rules to remember:

1) Have fewer fried foods. Fried foods contain huge quantities of fat. Grill, steam, boil or poach the food instead, where possible.

2) Eat less meat. To meet one's protein requirements, it is not necessary to eat large portions of meat. Cereal products and pulses should also provide some of the protein.

3) When buying meat, choose a leaner cut and always trim off visible fat.

4) Choose chicken more often. It has less fat than other meats, but avoid skins.

5) Eat fish more often in preference to meat.

6) Try more vegetable based dishes. Wholegrain cereals, beans, peas, lentils or soya products with a little meat for flavour are ideal dishes. This way, the diet has less fat and more fibre.

7) Go easy on cakes, pastries and biscuits as they are rich in fat as well as sugar.

8) Cut down on butter/margarine by spreading them thinly on bread.

9) Substitute cooking fat such as lard or blended vegetable oil with suitable pure vegetable oil such as corn or soybean, which contains chiefly polyunsaturated fats.

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Conclusion

Raised serum cholesterol is partly determined by inheritance and partly by a rich diet. It usually responds promptly to treatment unless complicated by other conditions. Most people with high blood cholesterol have no symptoms and often the condition is detected only after a coronary episode. It is therefore vital that this biochemical abnormality be detected early, by routine medical check-ups, and appropriate treatment prescribed in order to avoid any chance of late complications such as narrowing or thickening of the arteries. In most cases, the cholesterol-lowering diet is the major and sometimes the only necessary treatment for raised serum cholesterol.

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Diet And Allergy

An increasing awareness of food allergies and sensitivities within the medical community has led to an increase in the number of diagnosed cases. Individuals who have a casual acquaintance with some of the available information about food allergies might perceive that those illnesses are increasing in frequency.

Food allergies and sensitivities have been around for quite a while, although some types, such as sulphite sensitivity, were recognized only recently. Any increases in frequency have probably been associated with the increased use of particular foods or ingredients (1).

Immunological basis for allergic reactions

There are many adverse reactions to the ingestion of food, including allergic, idiosyncratic, toxic, metabolic, and pharmacologic reactions. *Food sensitivity* is used to refer to all of these reactions. The features that distinguish food allergy from other types of adverse reactions are the following:

1. It is mediated by an immunological mechanism;
2. It can be consistently reproduced by a blinded food challenge;
3. It causes functional changes in the target organs (4,5).

In general, the intestinal tract provides an effective barrier against the excessive absorption of bacteria, food antigens, and large molecules that normally exist in the intestinal lumen (6). When that mechanism is ineffective, antigens are allowed to enter the system in excessive amounts, which leads to the sensitization of the immune system in some individuals (7).

The immune system produces two types of lymphocytes – the B- and T- lymphocytes. The former are responsible for humoral and latter for the cell-mediated responses (8).

In response to an antigen, B-cells produce the immunoglobulins (antibodies) IgA, IgD, IgE, IgG and IgM that bind the antigen, leading to neutralization, opsonization, complement achration, phagocytosis or hypersensitivity reactions (22). IgD, IgG, and IgM protect the body against bacteria. IgA in saliva prevents the absorption of macromolecules. IgE attacks parasites and is the immunoglobulin responsible for the classic allergic reaction (3, 4, 8).

The four basic types of immunologic reactions are summarized in Table 1.

An allergic reaction results from the combination of the antigenic allergen with IgE within the tissues (22). Sensitized IgE binds to mast cells. An allergic reaction occurs when an allergen bridges 2 molecules of sensitized IgE, causing the cell to release chemical mediators (including histamine) and the cell membrane to release phospholipids (8). Some individuals are more liable to form IgE antibodies and this tends to be inherited. Previous exposure to the antigenic allergen in small sensitising amounts is a predisposing cause. If the initial dose of antigen is large, it provokes a large response of IgG which circulates in the blood and is likely to take up the antigen before it can reach the small amount of IgE in the tissues. The clinical type of allergic reaction depends on the tissue in which the IgE is localized (22).

Common food allergens

When the number of foods available is considered, the list of foods commonly reported to cause allergic reactions are very similar. Problem foods in the paediatric population include cow's milk, chicken eggs, peanuts, soybeans, wheat and fish (9-11). In adults shellfish, peanuts, nuts and grains frequently cause reaction (12-13). Patients are often allergic to foods in the same biological family (14).

Allergens are usually acidic proteins of very specific size and configuration (18,000 to 40,000 molecular weight) (15). Antigenic activity is believed to reside in a specific series of amino acids that bind with the IgE antibody. Denaturing a protein does not seem to reduce allerginicity if the sequence of the amino acids is linear, but has an effect when the sequence is caused by folding of the protein molecule (16).

Symptoms of food allergy

Symptoms of IgE-mediated food allergy can occur within seconds or up to 2 hours after eating a food. In delayed hypersensitivity reactions, symptoms may not occur for several hours or several days (17). The symptoms of food allergy are outlined on the next page.

Diagnosis of food allergy

In no instance does the result of a single test determine a conclusive diagnosis of food allergy. The diagnosis of food allergy is based on accumulated evidence that includes the history, physical examination, appropriate immunological and other tests, trial elimination diets and food challenges.

Diagnostic tests and their reliability in pinpointing an allergen are summarized in Table 2.

Symptoms of food allergy

Gastrointestinal tract

pruritis of lips, oral mucosa, pharynx
swelling of throat
nausea
cramping pain
abdominal distention
vomiting
diarrhoea
protein-losing enteropathy
occult faecal blood loss

Skin

urticaria (hives)
atopic dermatitis (eczema)

Respiratory tract

asthma
rhinitis

Anaphylaxis (symptoms are controversial)

cerebral/neurological
behavioral disorders
allergic tension, fatigue
schizophrenia
epilepsy
arthritis
otitis media

Table 1. Types of allergic reactions (7)

Reaction classification	Mechanism	Comments
TYPE I		
immediate hypersensitivity, anaphylactic, IgE-mediated or reaginic reaction	Allergen binds with sensitized IgE antibody on mast cells. This results in the release of mediators (histamine, eosinophilic chemotactic factor, bradykinin). IgG has been identified as being involved in this reaction.	Hay fever, anaphylaxis, most food allergies. Symptoms occur within seconds or up to 2 hours. Symptoms are laryngeal oedema, vomiting, diarrhoea, eczema, itching, bronchospasm and shock.
TYPE II		
cytotoxic	IgG antibody reacts with cell membrane or antigen associated with cell membrane.	No food reactions have been demonstrated.
TYPE III		
antigen-antibody complex Arthus reaction	Antigen-antibodies (IgG and IgM) form a complex called "precipitating antibody". It is an Arthus reaction when it occurs in soft tissues and is serum sickness when the complex circulates.	Milk precipitant found in lungs of children with chronic respiratory infection and GI tract in those with gastro-enteropathies. Reactions take 6 or more hours or several days to be clinically apparent (7).
TYPE IV		
delayed or cell-mediated hypersensitivity	T-cells interact with antigen.	Usual mechanism of graft rejection, seen in some food allergies such as protein-losing entero-pathies and coeliac disease.

Food allergy assessment

History

Provides detailed description of symptoms, from ingestion of food to onset of symptoms, most recent reaction, quantity of food necessary to produce a reaction, and suspected foods.

Includes family history of allergic disease, enzyme deficiencies, and so forth.*

Physical examination

Includes anthropometric evaluation, assessment of growth and development and nutritional status.*

Assesses other chronic disease.

Evaluates allergic condition like allergic rhinitis, eczema and asthma.

Food and symptom diary for 2 weeks

Provides actual record of food, amount and time when eaten, time of appearance of symptoms, any medication taken.*

Allows assessment of dietary adequacy.*

Immunological testing (skin tests, RAST, other)

Yields list of suspect foods.

Requires confirmation of positive results by trial elimination diet and food challenge to show clinical sensitivity to food.

Trial elimination diet for 2 to 4 weeks, or until symptoms clear

Needs to be nutritionally sound.*

Requires that patient record all ingested food as the suspect food may be ingested in an alternative form.*

Begins with a simple elimination diet. Only foods suspected by history, food diary, and/or immunological testing are eliminated.

Progresses to a more extensive climination diet if symptoms do not clear on a simple diet. Only one food in each of four food groups or exotic foods never before eaten are allowed.*

May require use of hypoallergenic diet if symptoms do not clear on an extensive elimination.*

Food challenge

Excludes food known to cause severe reactions such as wheezing, asthma, or anaphylaxis.*

Returns suspect foods to diet one at a time after symptoms have cleared for 2 to 4 weeks.*

8 - 10 mg (½ to 1 tsp) is given for the first dose (fresh food) or 10mg - 2g dried food.

Amount is increased until it approximates usual intake. Challenge is repeated following positive reactions, as coincident reactions are common.*

It is performed as double-blind challenge when uncertainty persists.

*** Points in the diagnostic process where dietitians' expertise may be particularly valuable.**

Table 2. Diagnostic tests for food allergy

Type of test	Descriptions	Comments
Skin testing: scratch, prick or puncture	A drop of antigen is placed on the skin, which is then pricked or punctured.	Considered most sensitive test but over-diagnoses food allergy. Clinical symptoms seen in 30% of all tests. Should be followed by food challenge.
RAST (radio allergosorbent extract test)	Serum mixed with food on paper disc and then washed with radioactively labelled IgE.	No more accurate than skin test. More expensive. Useful in extremely sensitive or anaphylactic patients.
ELISA (enzyme linked immunosorbent assay)	Much like RAST but no radioactively labelled material is used here.	Same as RAST.
Cytotoxic testing	Allergen mixed with whole blood or serum leukocyte suspension; lysed leukocytes are counted.	Unreliable.
Sublingual testing	Drops of allergen extract placed under the tongue and symptoms are recorded.	Unreliable.
Provocative and neutralization testing	Subcutaneous injection of extract elicits symptoms followed by weaker or stronger injection to neutralize symptoms.	Unreliable.
Intestinal biopsy	Histological examination of inflammatory changes of villi.	Diagnostic for coeliac disease and enteropathies.
Precipitating antibodies	Serum levels of IgG, IgA, and IgM detected by double diffusion in agar.	Does not imply allergy.
T-cell evaluation	Serum levels of lymphokines	Costly and still experimental.

Table 3. Representative non-immunological reactions to food (4, 21)

Cause	Associated foods	Symptoms described
gastrointesinal disorders		
lactase-deficiency	foods containing lactose and milk	bloating, flatulence, diarrhoea, abdominal pain
glucose - 6 - phosphate dehydrogenase-deficiency	Fava or broad beans	haemolytic anaemia
cystic fibrosis gall bladder disease enteropathy	symptoms may be precipitated by certain foods	characteristic of the disease
inborn errors of metabolism		
phenylalanine	foods containing phenylalanine	elevated serum phenylalanine levels, mental retardation
galactosaemia	foods containing lactose or galactose	vomiting, lethargy, failure to thrive
psychological reactions	symptoms may be precipitated by any food	wide variety, any system may be involved
reaction to pharmacological agents in food		
vasoactive amines phenylethylamine tyramine	chocolate, aged cheese, red wine, Cheddar cheese French cheese, Brewers yeast, canned fish.	migraine headaches, cutaneous erythema, urticaria, hypertensive crisis in patients sensitive to monoamine oxidase inhibitors
histamine	fermented cheese, fermented food, pork sausages, canned tuna, sardines.	erythema, headaches, decreased blood pressure
histamine releasing agents	shellfish, chocolate, strawberries, tomatoes, peanut, wine, pork, pineapple.	urticaria, eczema, pruritis
reactions to food additives		
tartrazine or D & C Yellow No:5	yellow or yellow-orange colored foods, soft drinks, medicine	hives, rash, asthma
benzoic acid or sodium benzoate	soft drinks, some cheeses, salt-free margarines, processed potato products	hives, rash, asthma
sulphites, sulphur dioxide	salad bar lettuce in restaurants, shrimp, dried fruits and vegetables, acidic juices, wine, beer	anaphylaxis, loss of consciousness
monosodium glutamate	Chinese and Japanese dishes	"Chinese restaurant syndrome" – headaches, tenseness in face, sweating, chest pain and dizziness
reactions to microorganism contamination of foods		
Proteus causes histidine to break down to histamine-like substance.	unrefrigerated tuna, bonita and mackeral. Heat-stable toxin.	itching, rash, vomiting, diarrhoea
Gonyaulax catenella	mussels, clams that ingest organism which produces soxitoxin. Heat-stable.	paralytic shellfish poisoning – progressive numbness from head to arms

Non-immunological reactions to food

In the diagnostic process, it is necessary to allow for the possibility of non-immunological reactions, which probably account for the majority of adverse responses to food. Such reactions, their cause, associated foods and manifestations are presented in Table 3.

Management/treatment of food allergy

The treatment of food allergy is elimination of the offending food. If the item is not one consumed regularly, it can easily be avoided, for example, shellfish. It is more difficult in the case of milk, eggs or wheat, which are present in so many foods.

Desensitization shots are generally not effective for food, and medication is usually restricted to very severe cases.

Denaturation of protein is effective in certain cases, as the protein loses its allergenic properties. Thus a patient sensitive to raw or lightly-boiled egg might be able to consume it when it has been boiled well (22).

The level of sensitivity to a food determines how much restriction is needed. People who are exquisitely sensitive must remove all traces of the food from their diets; people with mild to moderate sensitivity may be able to tolerate small amounts of food without reaction. Those with mild or moderate sensitivity may benefit from a rotation diet, in which a food causing an allergy is eaten only once every 5 days and is alternated with other foods (21).

Except in cases of anaphylaxis, foods causing allergies may be reintroduced every 6 months following the protocol for food challenge to see whether the allergic symptoms have decreased and tolerance to the food has developed.

The prognosis for IgE-mediated food allergies that occur before age 3 is good, with about 40% being outgrown. Food allergies diagnosed after age 3 seem to be more persistent (18, 19). Adults have reported reactions that have persisted for 15 years or more (20).

Implications for the dietitian

To the extent that the dietitian is knowledgeable about and understanding of food allergies, he/she can assume a more active role in patient assessment and education. The patient can be helped to understand the problem, plan an adequate diet and live more comfortably.

The symptoms of true food allergies can be quite severe and even life-threatening. Sometimes tolerance level for the offending food is vanishingly small – zero for all practical purposes. These patients must be approached cautiously from a diagnostic standpoint. The potential for adverse reactions to open or blinded challenges or even skin tests may dictate alternative diagnostic approaches. Dietitians can be very helpful in identifying potential sources of difficulty in avoidance diets that these patients must strictly follow.

In terms of management of non-immuological reactions to food, there is no need to be so careful in the avoidance of the offending food. A good example is sulphite sensitivity. Sulphite-sensitive asthmatics display a threshold in the range of 5-200mg free, inorganic sulphite. A patient with 200mg threshold, would be unlikely to react to most sulphited foods; exceptions would be sulphited lettuce at salad bars and dried fruits. Patients with a 5mg threshold would have to be more careful, but still could consume some sulphited food. A complicated situation faces the dietitian trying to provide advice to patients with differing thresholds (1).

During diagnosis, it is important for the dietitian to assess the nutritional status of the patient. Infants and children should be assessed for growth, development and dietary adequacy. A child receiving steroids or other medication may be affected in growth and nutrient utilization.

Knowledge about food allergies has increased greatly in the last few years, but many issues still need to be addressed. The dietitian is a key person in resolving issues related to food allergenicity, eradicating myths and working with the food industry in making foods safer for persons with allergies.

Labelling of food

Considerable publicity has surrounded the new discoveries of sulphites and tartrazine as food allergens, and consumer-interest groups have focussed attention on food allergies and sensitivities asking for bans on further use of sulphite and labelling of foods for the benefit of allergic individuals. Since low tolerance levels exist for true food allergies, it is imperative that allergenic foods be declared on food labels when present. Labelling allows the sensitive individual to avoid products containing ingredients that could trigger reaction.

With adequate labelling, the dietitian should be able to design safe and effective avoidance diets for patients with food sensitivities (1).

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BOOK REVIEW:

You ain't what you eat!

"Health or hoax", Arnold E. Bender. Sphere Books: London, 1985;
"Good to eat", Marvin Harris. Simon and Schuster: New York, 1985.

Both these books are written for the general public, both are designed to dispel myths. Other than that they are quite diverse treatises. Arnold Bender, the well-known and recently retired British nutritionist, sets out to assault, demolish and scatter salt on the crude edifices of the health food industry. He prises apart the tottering structure stone by stone, unremitting in his exposure of the rotten beam, the sagging roof, the cracking gable. His wrecking job is very successful on paper. "In an article about the magic of honey", he writes, "the remedy for male impotence and female frigidity is 'breakfast on eggs, bacon and honey followed by Gev-E tablets, six Healthcraft vitamin A compleat – which is essential for male potency and affects the semen – three Celaton CH3 plus – the virility tablet, and two dessert spoonfuls of Quintessence'. One might wonder how children were born before health food supplements were invented".

The author of the Beverley Hills diet, he points out, apparently believes that there are only three enzymes in the human body, and that hydrochloric acid is one of them. It is very galling for scientists that even the simplest of concepts and definitions in biology undergo such travesties by those purporting to give advice to the general public. There is much more of the same, page by page. Bender however must feel, like all rationalists, not so much that you can only preach to the converted, but that you cannot refute what is being preached to the converted. The natural food/megavitamin guru's admonitions are all too acceptable by those who really believe they have been helped by, say, vitamin E, and there are many of the latter. When I meet somebody at a party who asks what I do and say that I work on this particular vitamin, and a story comes out about some striking personal benefit, as it often does (and mostly, it has to be said, from ladies) it is difficult to dismiss it as poppycock. I believe that some people do benefit from large doses of vitamin E due to undiscovered, and presently undiscoverable inherited, probably heterozygous, defects. The problem is identifying them.

Marvin Harris is what you might call a nutritional anthropologist or socionutritionist (it is interesting to play around with these terms) and has written a very readable and enjoyable book. One of the chapters is on insect eating, which is much more widespread than I had thought. He points out that the horror of insect eating in many areas, the entire Western world for example, cannot be founded on fear of the germs and filth with which we readily associate them. After all there are many germs and not a small amount of filth around a great deal of farm animals. The answer to the taboo on insect eating, apparently, is to be found in "optimal foraging theory." Simply, hunters or collectors will pursue only those species which maximise the rate of energy gain for the time spent foraging. In temperate climates, there is a relative paucity of large and swarming insect species and a relative plenitude of large vertebrates, so pursuing the former is not economic in terms of the theory. The Chinese, he maintains, had no horror of eating insects – the workers in the silk provinces kept pots of water into which they dropped silkworms all day to keep a sort of soup continuously on the boil. Although there is much discussion in Singapore of snake, bears' paws, etc. as gastronomic treats, I have seen no mention of the lowly crawling biting forms all around us as delicacy – perhaps this is one folk practice that has been left behind in China.

There is an interesting chapter on lactose intolerance. Everybody in the nutritional field is now familiar with this phenonenon and that to have lactase is unusual, on a world-wide basis, not the other way around, but it is salutory to be reminded that it only came to light in the early 1960s. In unravelling this puzzle Harris comes to the same conclusion as I did myself (it is a pity that he has managed to publish first): that the lactase gene almost certainly arose to ensure that sufficient calcium was absorbed to guard against pelvic deformities in sunless Northern climes, and that there is more or less confirmation of this in the fact that the Chinese at roughly similar lattitudes developed the equally calcium-providing soya bean as a staple.

The chapters on cannibalism, horse eating, the taboos on pigs and cows as food animals in the Moslem and Hindu worlds respectively, and (horrors!) the apparent prevalence in many areas of pet-eating, are equally interesting.

John Candlish

John Candlish is an Associate Professor in the Biochemistry Department, National University of Singapore.

Resources

Below is a list of materials received by our Association from the British Diabetic Association in July this year. Members wishing to borrow any of the materials should contact any committee member.

Papers and policy statements

1. The Role of the Dietitian in the Management of the Diabetic – A Policy Statement by the British Diabetic Association. (Human Nutrition: Applied Nutrition, 36A, 395-400, 1982.
2. Dietary Recommendations for Diabetics for the 1980s – A Policy Statement by the British Diabetic Association. (1983)
3. The Provision of Dietetic Services to Diabetics in the UK (results of a survey). (1986)
4. The Diet for Diabetics. Jill Metcalfe (Dietitian at the British Diabetic Association). Practical Diabetes, Vol 2, No 1, 28-33, 1985.
5. Dietary Requirements in Diabetes. Jill Metcalfe. GP, March 11, 1983.

Leaflets (all published in 1983)

1. Diet and Diabetes
2. Hypoglycaemia and Diet
3. Diet During Illness
4. Food Values List for Diabetics
5. Simple Diabetic Cookery (50 recipes)
6. Food and Diabetes – Just a Beginning (stop-gap advice)

Booklets

1. Dietary Advice for Diabetics on Diet or Diet and Tablets (1985)
2. Dietary Advice for Diabetics on Insulin (1985)
3. Fast Food CHO/Calories Checklist (1986)
4. The Lean Plan – Information on the Findus range of "Lean Cuisine" (ready-made meals)

The following are also available (write to British Diabetic Association, 10, Queen Anne Street, London WIM OBD, for further information):

Leaflets

Simple Home Baking
Home Preserving
Christmas Cookery
Eating Out
Alcohol and Diabetes
Exercise and Sport
Holiday and Travel

Papers

Dietary Fibre in the Management of the Diabetic. Proceedings of the BDA Symposium in June 1984.

Books

1. Cooking the New Diabetic Way – the High-Fibre, Calorie-Conscious Cookbook.
2. The Vegetarian on a Diet – the High-Fibre, Low Sugar, Low Fat Wholefood Vegetarian cookbook.
3. Better Cookery for Diabetics
4. Countdown – CHO and calorie content of manufactured foods and drinks.

Games

The Countdown Game

In Brief . . .

Hospital malnutrition – nutrition screening necessary

A study of 3047 patients from 33 hospitals was conducted to identify patients at nutritional risk. Nutrition screening could not be completed for a large number of patients (60%) because of insufficient data. Of the remaining 40%, more than 50% were considered at nutritional risk according to values of serum albumin, haemoglobin and total lymphocyte count. This collaborative study involving nutrition screening of patients by clinical administrators at 33 Illinois hospitals, with technical and computer support from the Department of Nutrition and Medical Dietetics at the University of Illinois in Chicago confirms other studies of reported levels of nutritional risk among patients over the last decade. The study was carried out to address the need for early nutrition intervention in high-risk patients. However, nutrition intervention is not feasible unless nutrition screening is carried out on patients as soon as possible upon admission to establish patients' needs for nutritional care.

Trace element study

An eleven nation dietary study on 25 trace elements is being conducted by the International Atomic Energy Agency (IAEA), an organisation sponsored by the United Nations. The objective of the study is to collect samples of selected groups of peoples' diets for analysis of the 25 trace elements essential or toxic to human health. The countries involved are the United States, China, Canada, Iran, Spain, Sudan, Sweden, Thailand, Turkey, Brazil and Vienna. This programme, initiated in late 1984, is predicted to be completed in 1989.

Dr G Venkatesh Iyengar, chief scientist for the study (from the US), says that this study will "open the way to linking health problems in some countries to nutritional inadequacies, and set the stage for intervention (through food fortification programmes), if necessary to improve the diet of the target population group". Wayne R Wolf, Ph.D, a research chemist who specializes in analysing trace elements at USDA's Human Nutrition Research Center in Beltsville, MD, predicted that the international programme could someday help "raise world consciousness about the importance of trace elements to human health".

The food samples collected are also being put to other uses by each individual country. In the US, the USDA is also analysing the phytate levels while the FDA is determining the vitamin content. In Brazil the data is also being used to compare the separate effects of zinc supplements on infant growth and on the prevalence and duration of diarrhoeal disease.

Books

Contemporary Clinical Nutrition – A Conspectus
John J. Cunningham, Ph. D., George F. Stickley Co.: Philadelphia, 1985 softcover, 320pp, US$19.95.

Dr Cunningham has collected in one volume all of the pertinent information concerning clinical nutrition! In his thorough review of the best literature he has selected 50 articles which are reprinted in their entirety; in addition he has written overviews to sections explaining the present and future developments in perspective. Starting with standards for nutritional adequacy of the diet, he covers infants, children, the elderly, the hospitalized patient, diet and disease, cardiovascular disease, hypertension, alcoholism, obesity, cancer, appetite regulation, carbohydrate metabolism, and changing U.S. lifestyles.

Nutrition And Diet Therapy In Gastrointestinal Disease *Martin H. Flock MD, Plenum Publishing Co.: New York, 1981, hardbound, 380 pp, US$39.50.*

This volume, designed for medical students, internists, family physicians, dietitians, and nurses, is general in scope and not highly technical. Separate sections cover GI physiology and nutrition, the role of nutritional therapies in common functional and organic GI diseases, defined formula diets and total parenteral nutrition, and specific diets and food lists. The presentations of nutritional and dietary therapies are well-balanced with appropriate recognition of the role, limitations and lack of studies to support many commonly accepted therapies.

Abstracts

SPECIALIZED FORMULAS AND FEEDINGS FOR INFANTS WITH MALABSORPTION OR FORMULA INTOLERANCE. *M. S. Brady, K.A. Rickord, J.F. Fitzgerald and J.A. Lemons, J.Am. Diet. Assoc. 84:191, 1986.* Major medical advances have resulted in the potential for long-term survival for infants with malabsorption who previously were considered to have uncorrectable problems. Expert medical and nutrition management is required to ensure survival and to optimize growth and development. This article describes the composition of specialized infant formulas for infants with malabsorption or formula intolerance, the limited studies of efficacy, and a rationale for choosing an appropriate formula.

SELENIUM, VITAMINS A, E AND C: NUTRIENTS WITH CANCER PREVENTION PROPERTIES. *R.R. Watson and T.K. Leonard. J. Am. Diet. Assoc. 86:505, 1986.* There is a relationship between diet and cancer incidence in human populations. Selenium and vitamins A, E and C may act as anticarcinogens altering cancer incidence, differentiation and growth. Increased dietary intakes of these nutrients are thought to yield benefits in a reduced risk for the development of some types of cancer. The risks of toxicity of moderately high intakes are low except for selenium, but use as preventive agents is experimental and requires further research.

A CRITICAL REVIEW OF FOOD FIBRE ANALYSIS AND DATA. *E. Lanza and R.R. Butrum. J. Am. Diet. Assoc. 86 : 32, 1986. This* article presents a review of This chemistry and definitions of dietary fibre in foods. A provisional table on the dietary fibre content of 126 foods commonly consumed in the United States is included. The table was compiled from an extensive evaluation of literature values.

PROVISIONAL TABLES ON THE CONTENT OF OMEGA-3 FATTY ACIDS AND OTHER FAT COMPONENTS OF SELECTED FOODS. *F.N. Hepburn, J.Exler and J.L. Weihrauch, J.Am. Diet. Assoc. 86:788, 1986.* In response to the current interest in the physiological effects of omega-3 fatty acids, provisional tables were prepared by the Nutrient Data Research Branch of the U.S. Department of Agriculture's Human Information Service. Total

Meetings

Nov 21, 1986
Philadephia, PA
Diabetes Mellitus : Maximizing nutrition intervention. Designed for nutritionists working to expand their role in diabetic management.

Organized by ADA.

Dec 5, 1986
Milwaukee, WI
Adolescent obesity and weight management

Organized by ADA.

Oct 27 – 31, 1986
ADA 69th Annual Meeting
Las Vegas, Nevada

Contact: American Dietetic Association,
Department of meetings
PO Box 10960, Chicago,
IL, 60610 – 0960
(312) 280–5035.

Sept 28-Oct 2, 1987
7th International Congress of Food Science and Technology
Raffles City Convention Centre

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

Nov 23 – 25, 1986
Nutrition in Ageing
Hyderabad, India

Organized by the World Health Organization in conjunction with the Indian Gerontological Assocation.

We are pleased to report that one of our members, Anna Grace Jacob Chacko, will be attending the above conference in India, as a representative of the Gerontological Society of Singapore.

Abstracts

fat, total saturated fat, total monounsaturated fat, total polyunsaturated fat, fatty acids 18:3, 20:5, 22:6 and cholesterol contents of over 120 types of fish and seafood, and over 100 other food items are listed. Fish oils, mackerel, tuna, salmon, eel, trout, oat, wheat germ and soybean oil are among the foods containing significant amounts of omega-3 fatty acids.

SERUM LIPID RESPONSE TO OAT PRODUCT INTAKE WITH A FAT MODIFIED DIET. *L. V. Van Horn, K. Liu, D. Parker, L. Emily, Y. Liao, W. H. Pan, D. Giumetti, J. Hewitt and J. Stanler J. Am. Diet. Assos. 86:759, 1986.* Modification of dietary fat is effective and feasible in achieving reductions in serum cholesterol levels. While following the dietary recommendations of the American Heart Association, randomly assigned free-living participants were asked to isocalorically substitute moderate amounts (60g) of oat bran or oatmeal for other carbohydrates. Reductions in serum cholesterol levels with oat product intervention exceeded those achieved with fat modification alone.

ANSWERS TO THE EGG QUIZ ON P. 8

1. (B) 15 minutes is the recommended amount of time to make certain that the egg is cooked but not overcooked.
   To prevent cracking and toughness, place uncooked eggs in a panful of cold water. Then bring them to a boil over high heat. Remove from burner and let them sit covered for 15 mins. Rinse in cold water to stop the cooking.

2. (C) There is no reason to worry about the safety of packaged dyes used to colour the eggs.

3. (C) Refrigerate them. Once an egg is cooked, its natural defences against bacterial contamination break down. And if left at room temperature, these bacteria can multiply and cause food poisoning. When you store the eggs in the refrigerator after hard-cooking, they remain safe to eat for a week to 10 days.

4. (C) It's a common belief that brown-shelled eggs are more nutritious than white-shelled. But the only difference is that they are produced by different breeds of hens.

5. (C) If a shell cracks in the supermarket or on the way home, it's best to throw out the egg because microscopic bacteria, such as salmonella, may contaminate it before it is safely stored in the refrigerator. On the other hand, if you crack an egg once you're already in the house and promptly refrigerate it, its's okay to cook it later that day. Both blood spots and dark rings, by the way, are harmless. A blood spot is simply the result of a blood vessel rupture on the yolk's surface. And the ring comes from an interaction between the iron and sulphur naturally present in eggs.

6. (B) The unfertilized eggs typically sold in supermarkets are likely to keep longer than the fertilized eggs available in certain health food stores. The reason is that once an egg is fertilized, the yolk can start to develop, leading to quicker deterioration. Incidentally, fertilized eggs are not better for you than unfertilized eggs.

7. (B) It's best to store eggs in the covered containers in which they are bought because they readily lose moisture and absorb odors from other foods. For best taste and freshness, they should be used within 5 weeks after you bring them home.

8. (B) As an egg ages, it gives off carbon dioxide, causing the white to spread thin and turn clear.

9. (A) Three-quarters of an egg's calorie content, which ranges from 70 for a medium egg to 90 for an extra-large one, is provided by the yolk.

10. (A) One large egg has about 275 milligrams of cholesterol, which is just 25 milligrams lower than the 300 milligram recommended daily allowance. All the cholesterol is in the yolk, however, so people watching cholesterol intake can safely substitute two egg whites for a whole egg in certain recipes, such as omelette, scrambled eggs, etc.

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.