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Nutritional Assessment and Management of Obesity

The assessment and management of obesity depends on the implementation of the total health care concept and on a knowledge of nutrition assessment, food composition and dietary allowances

At a time when the community requires increasing conformity with a lesser bodyweight-for-height relationship, the role of the medical practitioner in counselling the individual according to his or her needs is greater. Assessment and management of obesity, like other disorders, need to be part of total health care, recognising multi-factorial pathogenesis, differences in body habitus and differences in risk from a particular habitus.

Assessment of Obesity

Patient's Reasons for Seeking Help

Formal documentation of the patient's concerns in regard to obesity are essential if a meaningful management role is to be assumed by the practitioner. Patient's concerns can range between the cosmetic, self-esteem, problems with interpersonal relationships, isolation, inability to care for family, and concern about general health and life expectancy.

The Degree of Adiposity

Obesity implies an excess of adipose tissue to an extent which would interfere with health in some way. The extent to which a clinical assessment of body fat and lean body mass can be made reliably is therefore basic to the recognition of obesity. The most usual clinical method is a weight-for-height relationship. However, lean body mass and skeletal frame size can be contributory to apparent excess bodyweight. Weight-for-height tables are generally based on the Metropolitan Life Insurance Company of New York (1959) data [1]. The frame size allocation in these 1959 tables is not based on its formal assessment, whereas in the 1979 tables it is based on measured elbow breadth [2]. Unfortunately, frame size itself may be predictive of cardiovascular mortality [3]. The 1979 tables, released in 1983, show higher weights, associated with minimum mortality in most height categories, but particularly in the shortest men and women. Controversy surrounds the possibility that cigarette smoking, rather than underweight itself, might have accounted for the undesirability of the relatively lower weights. Smokers as a group are thinner than non-smokers. However, to a somewhat similar extent smoking should have been operative in 1959 as in 1979. For convenience, both 1959 and 1979 tables are shown (table I), but it should be remembered that, in any case, the majority of Australasian men and women are in the taller categories, according to the National Heart Foundation risk factor

TABLE I. The Metropolitan Life Insurance Tables for women 1959 and 1983

1959 desirable weights for women aged 25 and over, based on lowest mortality according to height (cm) and frame size. (Weight in indoor clothing estimated at 2.3kg, height in shoes with 5cm heels, weights rounded to the nearest kg.)				1983 height and weight table for women at ages 25 to 59, based on lowest mortality. Weight in kg according to frame (in indoor clothing weighing 1.4kg, shoes with 2.54cm heels, weights rounded to nearest kg).			
Height (cm)	**Small frame**	**Medium frame**	**Large frame**	**Height (cm)**	**Small frame**	**Medium frame**	**Large frame**
147	42-44	44-49	47-54	147	46-50	50-55	54-60
150	43-46	45-50	48-55	150	47-51	50-56	55-61
152	44-47	46-51	50-57	152	47-52	51-57	55-62
155	45-49	47-53	51-58	155	48-54	52-59	57-64
157	46-50	49-54	52-60	157	49-55	54-60	58-65
160	48-51	50-55	54-61	160	50-56	55-61	60-67
163	49-53	51-57	55-63	163	52-58	56-63	61-69
165	50-54	53-59	57-65	165	53-59	58-64	62-70
168	52-56	55-61	59-66	168	55-60	59-65	64-72
170	54-58	56-63	60-68	170	56-62	60-67	65-74
173	55-59	58-65	62-70	173	57-63	62-68	66-76
175	57-61	60-67	64-72	175	59-65	63-70	68-77
178	59-64	62-69	66-74	178	60-66	65-71	69-79
180	61-65	64-70	68-76	180	61-67	66-72	70-80
183	63-67	65-72	70-79	183	63-69	67-74	72-81

study, and for these categories the tables have changed little.

No attempt has been made to make these 2 sets of tables equivalent. They have been reproduced as they were originally published, apart from metrication and rounding of figures. The varying weight allowances for indoor clothing, including shoes, and height of heel size are specified at the top of each table.

The percentage of desirable weight measurement is useful if reference tables are settled and differences in the behaviour of individuals are appreciated.

A weight-for-height expression, such as W (kilogram)/H^2 (metre^2) allows a unifying expression to be developed for comparison of those of different height, and need make no judgement about health relationships. As an index of adiposity, W/H^2 (body mass index, Quetelet's rule) seems most satisfactory as it relates poorly to height (height will depend more predictably in its correlations on muscle and bone than on fat).

The general relationships between different indices of adiposity are shown in table II. The predictability of adiposity from the body mass index depends on frame size and the level of physical activity (and therefore muscle mass). In more physically active individuals muscle contributes more and fat contributes less to weight for a given body height.

Body circumferences, especially abdominal, and skinfold thicknesses (triceps, biceps, subscapscular, suprailiac), can be more helpful in assessing adiposity where frame size and the level of physical activity may be unusual.

From a clinical point of view, some judgement is needed about the likely severity of obesity. Garrow [6] has suggested grading for this assessment (table III).

Health Significance (fig. 1)

The broad dimensions of health significance need evaluation. These include the psychological and organic consequences of the obesity, and also of any proposed management. Organic consequences of

TABLE II. Relationships between different indices of adiposity

% desirable bodyweight[a]	Body mass index (W/H^2)	% body mass as fat[b]	Triceps skinfold (mm)[c]
Men aged 17 to 76 years			
90	20.5	15	6
100	23	18.5	9
110	25	21	11
120	27.5	24.5	14
130	29.5	27	17
150	34.1	33	28
200	45.5	48.5	92
Women aged 17 to 68 years			
90	20	24	12
100	22	26.5	14
110	24	29.5	17
120	26.5	33	21
130	28.5	35.5	25
150	32.8	41.5	36
200	43.7	56.5	87

a In this table 'desirable bodyweight' is taken as the middle value of the median frame range of the Metropolitan Life Insurance desirable weight tables, 1959 (table I).

b Based on Womersley and Durnin, 1977 [4].

c Based on Durnin and Womersley, 1974 [5].

obesity include greater prevalence of risk factors for atherosclerotic vascular disease, e.g. hypertension and hyperlipidaemia, diabetes, rheumatological problems (gout, osteoarthritis, low back strain), breast cancer, gall bladder disease, increased surgical risk and accident proneness.

A family history of some of the possible outcomes of obesity may add to the case for intervention. For example, this would apply where there is evidence of non-insulin dependent diabetes mellitus in parents or siblings.

The presence of associated disease may also increase the need for intervention in, e.g. a diabetic, a hypertensive, a person with hyperlipidaemia or in a cigarette smoker. The difficulties for the obese cigarette smoker are considerable since, especially for women, it may have been used as a technique to control weight and giving it up increases the risk of weight gain.

Food Intake

Although it is important to elicit information about present food intake, the patient may be in a new steady state of weight and food intake when first seen. Therefore, the identification of periods of weight gain and the associated food intake may be more important. This approach may locate problem areas in food intake. For recent or remote past events, a history of usual and unusual food intake is required. Overeating may be systematic at particular meals or snacking occasions, or it may be episodic as with binge eating. Prospectively, the patient can be asked to maintain a food diary which can be helpful, not only as a time-saving approach to gathering food intake information, but also provide valuable feed-back for the patient (fig. 2.).

Once food intake data are gathered, it is necessary to identify areas of excess energy intake; whether it occurs by way of cooking techniques, frequency of food consumption, serving size or macronutrient composition of the food. Energy excess in the affluent diet arises most commonly from fat for men and women, and from ethanol for men. The corollary, of course, is that foods high in dietary fibre and water, being low in energy density, are protective against excessive energy intake.

TABLE III. Assessment of the likely severity of obesity

Body mass index	Grade	Clinical significance
20-24.9	0	Minimal mortality
25-29.9	I	Slight mortality increase, but important to prevent progress from this grade
30-40	II	At mid-point, mortality double that of Grade 0
> 40	III	Incompatible with normal employment or health

FIG. 1. A representation of some of the organic health consequences of obesity. The presence or possibility of any of these will increase the need for intervention.

To consider the nutritional adequacy of a food intake pattern, some concept of foods which are good, moderate and poor sources of essential nutrients is required. Some nutrients are more critical than others, e.g. folic acid, thiamin, zinc and dietary fibre. It is also helpful to have some concept of recommended nutrient allowances [7,8,9,10]. With this information, adjustments of both energy and nutrient density of a diet can then be made. These data then serve as reference points at future interviews.

The National Heart Foundation of Australia's 'Guide to Healthy Eating' [11] can be useful in meal planning. The Penguin book 'Food Facts' [12] can be useful in assessing nutrient adequacy of the diet.

Level of Physical Activity

Excess adiposity is a reflection of energy intake, energy requirement and the efficiency with which energy is expended. Thus an assessment of the patient's level of physical activity is intrinsic in the assessment of obesity.

Some estimate of the present level of fitness should be made. Physical activity at work and in leisure time is necessary. Episodes – the type, duration and intensity – of physical activity can be documented. An estimate of motivation can be made. Limiting factors for exercise, e.g. joint disease, can be documented. Finally, the state for and likelihood of overall improvement in physical activity can be recorded. The National Heart Foundation of Australia Guide to Exercise [13] can be recommended to many patients.

Concepts of Body Composition and Weight Change

With energy restriction in food intake, weight can be lost not only from fat tissue, but also from muscle and internal organs such as the liver, much of which is water and some of which is glycogen. The more severe the energy restriction and the carbohydrate restriction, the greater the loss of muscle mass and of glycogen stores with associated water. Thus, modest energy restriction and the emphasis on a high-carbohydrate, high-fibre diet

Time	Food	Amount	Place
7.15	Buttered wholemeal toast	2 slices	Kitchen
	Marmalade	a little	
	Coffee + sugar	1 cup	
		2 teaspoons	
10.00	Coffee + sugar	1 cup, 2 tsp	Work
	Sweet biscuits	2	
3.00	Coffee + sugar	1 cup	Work
	Packet potato chips		
6.00	Toasted cheese sandwich (wholemeal)	2 rounds	Kitchen
	Coffee + sugar	1 cup	
7.00	Dry white wine	1 glass	Kitchen
	Roast Beef, Baked Potato and veges	usual	
	Fresh fruit salad		
9.30	Coffee + sugar	1 cup	TV
	Cheese + biscuits	4 biscuits	

FIG. 2. An example of a food diary which can assist in providing food intake information and also give valuable feedback to the patient.

will minimise reduction in muscle mass, whilst optimising a relationship between loss of adipose tissue and muscle mass. However, this will not be as impressive in its magnitude and the patient needs to understand this at the outset. A simple explanation of body compartments is required.

Loss of weight also tends to be greater in the initial phase of a diet than later, because there is a relatively greater loss of non-adipose tissue body mass initially, and this needs to be anticipated. Furthermore, when physical activity is encouraged and muscle mass is retained or even increased, it is possible to decrease adiposity and have little change in bodyweight. Thus, the preferred adipose tissue reduction programmes are those associated with the least rate of weight loss. The expectations of the medical adviser therefore must be seen to be those of a change in adiposity rather than change in weight. Emphasis on change, for example, in abdominal circumference, is often useful.

Most chronic dieters have a long experience of failure; setting realistic goals enhances motivation and the likelihood of success

Management

When the decision to recommend dieting is made, a number of precautions can be taken to ameliorate the side effects. The most useful maxim may be 'build in success'. Most chronic dieters have a long experience of failure. Setting goals to enhance the likelihood of success is an important way to maintain motivation. This can be done by:

Setting a Realistic Long Term Goal Weight

A weight loss averaging 0.5kg weekly will achieve a 6kg total loss in 3 months. It is a useful educational interchange to negotiate a mutually acceptable weight loss and then estimate the time required to achieve this loss. Patients often need support in accepting the fact that weight loss takes time, and comparing this time with the time taken to accumulate the excess weight may help put the process in perspective. If the desired weight loss is considerable, e.g. 25kg, it may be helpful to set intermediate goals, e.g. for 10kg.

Weights recommended in the life insurance tables may not be appropriate for individuals and if patients, for example, specify they 'only want to lose a stone', they should be supported in their decision, rather than persuaded towards goals they may feel unable to achieve.

Setting Short Term Goals

An individual who has 3 teaspoons of sugar in tea and drinks 10 cups of tea daily may start to lose weight satisfactorily by focussing on sugar consumption. Similarly, targeting fat consumption may also have satisfactory results. This kind of change may be much more manageable than a complete dietary overhaul.

For example, 3 specific goals for a 2-week period may be:

- Cut fat off meat
- Scrape butter on bread
- ½ teaspoon sugar in each cup of tea.

Exercise goals should also be set, e.g.

- Walk up and down stairs instead of using the lift
- Take a daily brisk walk or jog
- Park the car at a distance from the work place and walk the rest
- Walk to the shop instead of taking the car
- Ride a bicycle
- Buy a skipping rope and use it.

Points in Brief

A planning check list for management of obesity

1. Establish with the patient agreed reasons for intervention
2. Set a goal for change in adiposity
3. Discuss and agree upon methods of change (diet, activity, behavioural, e.g. stress management)
4. Establish the nature of support the patient will receive from the practitioner (kind of monitoring, frequency of visits, duration of programme)

Encouraging a Flexible Approach to Diet

A common way of constructing a diet is to have 'allowed' and 'not allowed' foods. This is usually based on the belief that some foods are especially 'fattening' while others have 'slimming' properties – an idea implied in advertising for some products, e.g. lowfat milk, and which can lead to the labelling of some foods as 'forbidden' and promote what may be an unhelpful rigidity in dietary advice.

All foods have calories. Weight for weight, some have more than others. This means that for a given number of calories a dieter can have more of the low calorie food and less of the high calorie foods. For example, with 200 calories a dieter could 'buy':

2¾ slices of wholemeal bread *or*
2 glasses of claret *or*
1½ tablespoons of butter *or*
50g of cheese.

Alternatively, 200 calories will 'buy':

1 glass of claret *and*
½ slice of wholemeal bread *and*
7.5g of cheese.

Maybe 3 apples and a cup of coffee would be preferable in different circumstances. The point being that to 'spend' a budget of calories in the most delectable and convenient way possible can be a lot more fun and requires a lot more skill than sticking to a required plan. Good nutrition will be largely taken care of as long as a wide variety of foods are included in the budget. A budgeting approach offers many possibilities for developing skills and self-confidence in controlling food intake. It gives choice and variety rather than requiring compliance with an externally imposed dietary pattern.

An overspent budget is not an irretrievable situation as the dieter can also choose to underspend. The dieter can 'do things' with a calorie budget, whereas they may at best joylessly tolerate a diet [14].

Promoting Self-management in Dieting

Encourage the dieter to seek support for his or her efforts among family and friends and as a medical practitioner be prepared to offer continuing non-judgemental support.

Encourage rational thinking about dieting and being overweight. Although many dieters have quite a lot of information about the energy value of foods, accurate knowledge about obesity and the obese seems not to be so widespread. This may be due to the difficulty of separating common prejudices from facts [15]. For example, there is no obese 'eating style' or personality type, e.g. overweight, normal weight and underweight people can engage in binge eating.

Practice Procedures

Assessment of food intake

1. Determine past and present, usual and unusual, circumstances of eating (method would usually be a diet history and/or a food diary with reference to meal and snacking times)
2. Identify areas of energy excess
   a) Cooking techniques
   b) Frequency of intake
   c) Serving size
   d) Macronutrient composition (especially fat and ethanol)
3. Consider nutritional adequacy (requires a general knowledge of food, moderate and poor sources of critical essential nutrients)
4. Make agreed adjustments in food intake
5. Agree to review these adjustments at next visit

Encourage the dieter to seek support for his or her efforts among family, friends, and to think rationally

Conclusions

It is increasingly clear that moderate overweight uncomplicated by problems such as hypertension or diabetes requires thought in assessment and treatment.

The very real disadvantages to a person of 'simple' weight control measures such as dieting should be realistically assessed against the possible benefits [16, 17]. Life expectancy is not significantly adversely affected for those up to 30% above desirable weight and the very idea that an ideal weight can be specified for an individual is questionable [18].

The adherences of both the general public and health professionals to a cultural standard of appropriate

weight, i.e. one based on contemporary ideas about approved appearance, has had unfortunate consequences. Young women (of all weight statuses) are the group most clearly at risk for both mental and physical problems consequent on weight reduction attempts [19].

We have reached a stage in our knowledge about the ineffectiveness of treatment, and the health risks of both being overweight and dieting, to re-evaluate our role as health professionals in this area.

Nevertheless, there are strategies which are useful in assessment and management of obesity which depend on the implementation of the total health care concept and on a knowledge of nutrition assessment techniques as well as of food composition and dietary allowances. □

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