

DIETARY THERAPY – FACTS AND MYTHS

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ABSTRACT

Weight-loss is a juggling of the calories contained in fats, proteins, and carbohydrates – calories in versus calories out. Regardless of the macronutrient composition of the diet, weight loss produces metabolic changes, including improved glycaemic control, decreased blood lipids, and decreased blood pressure. The magnitude of these may vary by type of diet and amount of weight-loss. The amount of weight-loss is variable and tends to decline with the length of the study. The excess weight that one wants to lose is fat, not water. Short-term weight-loss and long-term weight-loss needs to be monitored. More emphasis on how to increase adherence to the dietary regimen in the long term is required. More research is needed to: (1) determine if one macronutrient confers better health than another; (2) determine the long-term metabolic effects of different diet types on bone changes, renal function, and lipoprotein profile, etc, once the weight-loss phase has ended and (3) before recommending the low-carbohydrate diet as a prudent approach to achieving and maintaining a healthy weight.

INTRODUCTION

The fact that there are more than 1200 'weight-loss' books on the market underscores society's quest for the perfect diet. Approximately 90% have been published since 1997 (Freeman et al, 2001). It is myth to believe that there is a 'best' diet off the rack for an individual, because it depends on individual factors (e.g health conditions, age), and goals (e.g. weight-loss, weight maintenance, improvement of medical conditions). By the time the overweight or obese patients see a healthcare professional for advice, they may already have strong preconceived notions about 'what works' for weight-loss and/or may be very disillusioned. It is useful, therefore, to be aware of the benefits and liabilities of various dietary approaches to weight-loss and offer practical advice to patients.

The MOH Clinical Practice Guidelines 5/2004 on Obesity (Obesity CPG) has a comprehensive chapter on the Dietetic Aspects of Obesity.

- o www.moh.gov.sg/cmaweb/attachments/publication/CPGBooklet-Obesity.pdf
- o www.moh.gov.sg/cmaweb/attachments/publication/cpg_Obesity_Card-Revised_Jan2005.pdf

This Unit serves as an addendum to the Obesity CPG. Background evidence to support additional facts will be elaborated at the corresponding seminar.

By the end of reading this Unit, the reader will be able to:

- o Explain the rationale of caloric balance in weight reduction
- o Estimate an individuals' energy expenditure using quick reckoners
- o Identify the common justifications used to explain the effects of macronutrients on weight loss
- o Identify the nutritional concerns of one adhering to a specific dietary regimen
- o Identify the dietary recommendations of healthier food choices for weight reduction
- o Identify various modified diets and non-traditional diets
- o Answer patients' queries on fundamental facts and myths about weight reduction

Extract information about the various popular weight reducing therapies from the web addresses supplied.

ENERGY BALANCE

Obesity CPG - A. The most important dietary component of weight loss and maintenance is a decrease in calorie intake. Typically, a 500 to 1000 kcal per day reduction produces the recommended 0.5 to 1 kg per week weight-loss. In the absence of physical activity, a diet that contains 1400 – 1500 kcal/day, regardless of macronutrient content, results in weight loss. Sustained dietary modification is necessary to maintain weight loss. (Grade A, Level Ib).

Obesity is a chronic heterogeneous disorder characterised by excess body fat, resulting from a person's inadequate energy expenditure or excessive caloric intake. The universal component of dietary interventions for weight-loss is a creation of an energy deficit. Most recommendations encourage a slow rate of weight-loss through an energy deficit (energy output minus energy intake) of 500 – 1000 kcal/day. This recommendation is based on the energy cost of burning one pound of excess body weight per week. An energy deficit of 500 – 1000 kcal/day should produce about a 10% body weight reduction over 6 months. (NHLBI, Obesity Education Initiative Expert Panel, 1998).

Typically, the composition of the weight-loss is about 25% fat-free mass and 75% fat mass. Metabolically, the more obese person can handle a greater energy deficit, as demonstrated by a lower protein oxidation rate during fasting, than a lean person (Elia, Stubbs & Henry, 1999). Therefore it is important to monitor the rate of weight loss during the active weight-loss phases. Initially, particularly at the greater energy deficits, diuresis may occur and weight will be dropped quickly. After this initial drop in weight, the rate of weight-loss will slow and should not be greater than 1% weight per week (Van Itallie, 1999).

Dietary education and tailoring of the diet plan should accommodate individual food preferences. The dietitian may

ask the patient to complete a 3-day food record and calculate the patient's energy intake by using a nutrient analysis computer package. This is time consuming, and may not be practical for the medical professional to assess in such details. Estimating the patient's energy expenditure based on their gender, body weight and age may be a more practical option.

There are various formulas that can be used to calculate one's energy requirement, depending on the near estimation desired. The Harris Benedict Equation or Schofield Equations which incorporate the gender, age, weight and height variables are usually used in clinical setting to calculate one's enteral feeding requirements. For a consultation setting for free-living subjects, the quick reckoner from the Health Promotion Board "Keeping Fat in Check" booklet may suffice (Figure 1).

Figure 1. Daily Energy Needs of Adults

Age (yrs)	Activity Level	Men Energy Level (Cal)	Women Energy Need (Cal)
18 - <30	Light	2550	2000
	Moderate	2950	2100
	Heavy	3450	2350
30 - <60	Light	2500	2050
	Moderate	2900	2150
	Heavy	3400	2350
60 & above	Light	2100	1800
	Moderate	2450	1900
	Heavy	2850	2100

Activity Level According to Occupation

Light: Indoor sales person, office worker, housewife

Moderate: Teacher, Outdoor sales person, nurse

Heavy: Construction worker, labourer, athlete

Ref: *Keeping Fat in Check*, HPB, 2003

If such tables are not available, estimate the energy level of the patient using the 30 – 35 kcal/kg body weight formula. To create an energy deficit, subtract 500 – 1000 kcal from the estimated energy level. The more gross an estimation of the energy expenditure (ie. using less variables), the less quantitative or more qualitative the advice should be given to the patient.

EFFECTS OF DIET ON WEIGHT LOSS

Obesity CPG - C. Diets containing different proportions of the major macronutrients, such as moderate-fat balanced nutrient-reduction diets, high-fat low-carbohydrate diets and low- or very-low-fat high-carbohydrate diets have all been shown to reduce weight. Weight loss appears to be more associated with reduced caloric intake and increased diet duration, rather than the macronutrient content per se. A diet moderately restricted in total fat, moderate to high in complex carbohydrates, and moderate in protein is the most widely recommended diet. (Grade C, Level IV)

The Obesity CPG categorised the various popular diets based on macronutrient composition (fat content) (Table 6 – Examples

of Popular Diets, pg 31)

- o High-fat, low carbohydrate
- o Moderate-fat, balanced nutrient reduction
- o Low-fat and very-low-fat (VLF)

The most controversial diet has been the Dr Atkins' New Diet Revolution Diet, which is high fat, high protein but low carbohydrates.

Carbohydrate-restricted diets tend to be <100g of carbohydrate per day and purport to cause ketosis (Bravata, Sanders, Huang et al 2003), even though the level of ketosis is quite small (Van Itallie & Nufert, 2003). The fact is that insulin sends glucose into cells, including fat cells. The marketing myth is that because insulin is mostly secreted when carbohydrates are consumed, the more carbohydrates a person eats, the more glucose will be sent to the fat cells. Therefore, the message conveyed is that carbohydrates must make people fat. However, there is inadequate research to verify this claim. To date, research has shown that excess calories increase body weight, not excess protein, carbohydrates, or fat per se. There is also minimum empirical evidence that ketosis results in reduced hunger.

Nonetheless, some scientific studies do point to protein as being more satiating than other macronutrients. Carbohydrate-restricted diets may also produce more weight loss than other diets, partly because of the diuresis effect. In comparison with the more moderate diets, it may be easier for some people to follow a diet that eliminates a whole category of food. Furthermore, the theoretical cardiac risks of such a diet short-term may be less than previously thought (Foster, Wyatt, Hill et al, 2003; Samaha, Iqbal, Seshadri et al, 2003). So perhaps low-carbohydrate diets may have some advantages after all.

Buchholz & Schoeller (2004) reviewed studies that compared weight loss and energy expenditure in adults eating diets high in protein and/or low in CHO with those eating diets high in CHO and/or low in fat. Diets high in protein and/or low in CHO resulted in approximately a 2.5 kg greater weight loss after three months of treatment. The energy intakes of the treatment groups in most studies were similar, raising the questions of the effect of macronutrient composition of the diet on weight loss and possible reasons for the difference. Some reasons, explored by the authors include a macronutrient's

- o difference between gross and metabolisable energy or
- o ability to alter energy expenditure through change in resting metabolic rate or through change in resting metabolic rate or through the Thermic Effect of Food (TEF) or
- o influence on satiety or
- o ability to alter the composition of weight loss

Although there is better weight-loss on the low-carbohydrate diet after 6 month, there was no difference after 12 months when compared to a low-fat calorie-reduced diet in obese patients. (Stern, Lqbal, Seshadri, et al, 2004; Foster, Wyatt, McGuckin, et al, 2003).

Until more convincing evidence is available about the effects of low-carbohydrates, from a purely thermodynamic perspective, a calorie is a calorie is a calorie.

A review of > 200 research studies on diet and weight-loss supported the fact that reduces caloric intake will result in weight-loss, regardless of the macronutrient content (Freeman, King & Kennedy, 2001). The weight-loss achieved is also more likely to be associated with the restriction of energy intake and duration of the diet. Bravata et al (2003)'s study also concluded that participant's weight-loss while using low-carbohydrate diets was principally associated with decreased caloric intake and increased diet duration, it was not with reduced carbohydrate content.

Table 2 shows that a sample of diets although recommending different macronutrient contribution, the energy intake recommendation ranges between 1200 to 1600 kcal (Table 2). For most overweight and obese persons, these energy prescriptions between 1200 to 1600 kcal will result in an energy deficit and weight-loss.

While macronutrient contribution is still a controversial topic, other researchers are reporting that it does not matter what diets one is on, as long as if one can adhere to a specific dietary regimen over a defined period, one will lose weight. Dansinger, Gleason, Griffith, et al (2005) conducted a 12-month randomised trial supporting that there is little difference in the weight and lipids outcome between four different types of diet – low-carb (Atkins), balanced carb-protein-fat (Zone), low-calorie (Weight Watchers), and low-fat (Ornish). All four had a high (>50%) drop-out rate, and produced only moderate weight-loss and cardiac risk reduction. The study concluded that it is better to adhere to a diet in order to achieve a better result in both weight reduction and lessened cardiac risk factors. No single diet was better than another in these respects, or more effective than another. In sum, all popular diets, as well as diets recommended by governmental organizations, will result in weight-loss if specific dietary guidelines are followed.

This brings on another concern regarding some of the popular diets is the ability of the individual to adhere to the diet long-term to ensure long-term weight-loss for health benefits such as reducing the risk for hypertension (Schulz,

Liese, Boeing, et al, 2005). Low-fat, high-carbohydrate approaches are the most researched. In the only study of a low-carbohydrate diet lasting longer than 6 months, weight was regained between 6 and 12 months (Foster, Wyatt, Hill et al, 2003), making it no different at 1 year from a low-calorie, moderate-fat, high-carbohydrate approach. Longer term data for these low-carbohydrate diets are not available to date, making any conclusions about long-term efficacy of these diets difficult. There are, however, longer term data available on other popular diets such as SlimFast and Weight Watchers (not available in Singapore, but available through internet transactions). Fletchner-Mors, Ditschuneit, Johnson et al (2000) reported successful 4-year maintenance data from SlimFast. Heshka, Anderson, Atkinson, et al (2003) compared self-help with Weight Watchers over 2 years and found a structured weight-control programme more successful in managing overweight.

MAKING FOOD CHOICES

The distribution of food intake should be as even as possible throughout the day, and meals should not be skipped as a weight control method. Meals should be adequately sized so that snacks are not needed between meals. (Grade C, Level IV).

With regards to managing weight in terms of dietary habits, the Dietary Guidelines 2003 for Adult Singaporeans (18-65 years) states that: *"The amount and type of food eaten determine energy intake. Energy in food comes from carbohydrates, protein and fat. Dietary fat provides double the amount of energy provided by carbohydrates or protein. There is however no need for abstinence from any food. Rather, individuals should be encouraged to control portion sizes of food high in fat and added sugar. Encourage consumption of a variety of plant-based food such as wholegrains, fruit, vegetables and pulses as these food provide bulk and promote satiety. Advocate regular meals as skipping of meals increases the risk of subsequent overeating".*

This was also highlighted in the Dietary Guidelines for Americans 2005 launched in January (www.health.gov/dietaryguidelines/dga2005/document/pdf/Chapter3.pdf) that: *"Lifestyle change in diet and physical activity is the best first choice for weight loss. A reduction in 500 calories or more per*

Table 2: Macronutrient Contribution in Various Diets

Diet	% Carbohydrate	% Protein	% Fat	Calories
Current Diet Recommended for Weight Loss	>55	15	<30	500 – 1000 below usual intake per day
Enter the Zone	40	30	30	1300 for women 1700 for men
Sugar Busters	35	25	40	800 – 1200
Dr Atkins' New Diet Revolution	9	33	58	1500
Ornish	80	15	6	1600
Protein Power	15	30	55	1400
Dietary Approaches to Stopping Hypertension	52	18	30	1600

day is commonly needed. When it comes to body weight control, it is calories that count—not the proportions of fat, carbohydrates, and protein in the diet..... Diets that provide very low or very high amounts of protein, carbohydrates, or fat are likely to provide low amounts of some nutrients and are not advisable for long-term use. Although these kinds of weight-loss diets have been shown to result in weight reduction, the maintenance of a reduced weight ultimately will depend on a change in lifestyle. Successful and sustainable weight loss and weight maintenance strategies require attention to both sides of the energy balance equation (i.e., caloric intake and energy expenditure)... to prevent gradual weight gain over time, make small decreases in food and beverage calories and increase physical activity."

The emphasis is to aim for a slow, steady weight loss by decreasing calorie intake while maintaining an adequate nutrient intake and increasing physical activity.

A list of Weight Management Tips to making healthier food choices is listed in Table 3.

Table 3: Weight Management Tips

- o adopt a lifelong 'eating plan for good health' rather than a 'diet for weight loss'
- o be involved in planning
- o 'energy out' should exceed 'energy in' by about 500 kcal/day
- o make nutritional adequacy a high priority
- o emphasize nutrient-dense foods
- o eat small portions
- o limit low-fat treats to the serving size on the label
- o make legumes, whole grains, vegetables, and fruits central to one's diet plan
- o eat slowly
- o limit high-fat foods
- o limit concentrated sweets and alcoholic beverages
- o drink a glass of water before you begin to eat and another while you eat. Drink plenty of water throughout the day (8 glasses or more a day)
- o learn, practice, and follow a healthful eating plan for the rest of your life

MODIFIED DIETS AND NON-TRADITIONAL DIETS

Obesity CPG - A. Low-calorie (LCD) and very-low-calorie-diets (VLCD) may be useful shorter term adjuncts (up to 6 months) for weight loss, but sustained modification of food intake is necessary to maintain weight-loss. The use of these diets as part of a meal replacement strategy appears useful. The combination of a controlled energy diet (LCD or VLCD), increased physical activity, and behaviour therapy appears to provide the most successful outcome for weight-loss and maintenance. (Grade A, Level Ib)

- o VLCDs may be considered in patients with BMI ≥ 27.5 kg/m², who have failed more conservative weight-loss attempts, or those in whom rapid weight-loss is a medical necessity.
Grade C, Level IV
- o VLCDs should be avoided in patients with BMI ≤ 27.5 kg/m², where loss of lean body mass may be excessive, children or younger adolescents, and elderly patients over 65 years old, except in specialized treatment programs.
Grade C, Level IV

- o VLCDs are not recommended for pregnant or breastfeeding women, patients with severe systemic or organ diseases, or with significant psychiatric or eating disorders.
Grade C, Level IV

Although weight-loss is a matter of calories consumed versus calories expended, the structure and the form of the diet can improve adherence to reduced-calorie regimens. The Obesity CPG has outlined the use of low-calorie diets and very-low-calorie diets and criteria to use VLCD.

Although VLCDs are effective in inducing larger short-term weight losses, there is some debate about the outcome of long-term maintenance of weight loss after VLCDs. Must earlier research has shown complete or higher weight regain. However, in recent reviews, weight-loss maintenance after VLCDs differs considerably, depending on the intensity of follow-up (Saris, 2001; Mustajoki & Pekkarine, 2001; Ayyad & Anderson, 2000).

Dietitians in Alexandra hospital put an in-patient on VLCD for 11 weeks and successfully lost 50 kg. However, since discharge, the patient has been more mobile and able to work longer hours at work, he has defaulted numerous dietitian's appointments despite persistent reminders from the dietitian. The rate of weight-loss has been a gradual 12 kg over 6 months (NHGPartners Direct, Feb 05).

More studies need to be done to compare the efficacy of weight-loss maintenance to length of time on VLCDs and the use of meal replacements to help maintain the larger weight losses.

A less stringent regimen to VLCD is to substitute with the liquid formula for one or two meals, with the directions to eat a 'sensible meal' for either lunch or dinner. Low calorie diets can be defined as providing 800 to 1500 kcal/day. Like VLCDs, there are many incarnations of these meal replacements, from liquid to powder to bars to prepackaged frozen and freeze-dried meals. Meal replacements, when used appropriately, can be very successful. The data on meal replacement for one meal per day also show good weight maintenance compared with those who attempt weight-loss maintenance without a meal replacement (Rothacker, Staniszewski & Ellis, 2001).

A recent position statement released by the dietitians working in obesity management in UK also supports "the use of meal replacements, as one of a range of dietary treatment options, in comprehensive weight management programmes. It offers an alternative to the more conventional dietary treatments and may prove beneficial for some patients" www.domuk.org/common_files/public_show.php?tbl=topical_updates&col=article&id=9

POPULAR SLIMMING PROGRAMMES

As long as there are obese people around, discussions about the best diet will abound. Regardless, the clinical must be prepared to hear the wanton cry: "Help me with the newest popular diet!" If the healthcare professionals are not

prepared to be flexible, they take the risk of losing more than a client; they lose the opportunity to guide someone to better health.

There are numerous weight reduction/slimming programmes/centres advertised in the local newspapers and media. In general, majority of these products/programmes are endorsed by celebrities with convincing before-and-after digital photographs and dynamic testimonials. Nearly all the advertisements would have a disclaimer "Your results may vary" finely printed on the advertisement. All of the adverts concentrate on the change in body weight and circumferences, but very seldom in reference to the Body Mass Index.

List of Websites below is not exhaustive. For reference purposes. An overview of these will be presented during the corresponding seminar.

- J Aimin Acupuncture Weight Loss Centre - www.aimin.com.sg
- J Beauty Express International Pte Ltd - www.beautyexpress.com.sg
- J Beauty & Slimming Consultant/Aesthetics Marketing - Body Therapy/Whitening/Firming & Slimming - www.aesthetics.com.sg/home.htm
- J Expressions International (S) Pte Ltd - www.expressions.com.sg
- J Haach Face Skin & Body Care Pte Ltd - www.haach.com
- J Jean Yip Salon Pte Ltd - www.jeanyipgroup.com
- J Marie France Bodyline (S) Pte Ltd - www.mariefrance.com
- J Mary Chia Beauty & Slimming Specialist Pte Ltd - www.marychia.com
- J Phillip Wain International (S) Pte Ltd - www.singaporemirror.com.sg/co_phillipwain.htm
- J The Slimming Sanctuary Pte Ltd - www.slimming-sanctuary.com
- J Unisense - www.unisenseintl.com/whoweare.htm
- J Weight Management Programmes at Alexandra Hospital - www.alexhosp.com.sg/services/hfl_edu.asp
- J Weight Management Programmes at Changi General Hospital - www.cgh.com.sg/For_patients_visitors/patients_visitors_wel_prog_sports.asp#weight
- J Cambridge Diet - www.wherehealthbegins.com/singapore/StorePage?dest=TheCambridgeDiet/AboutTCD.jsp
- J Extrim Body Sculptor - www.lifepharm.com/prod_extrim_bodysculptor.html
- J Extrim Starch Blocker - www.lifepharm.com/prod_extrim_starchblocker.html
- J Holford Diet - www.holforddiet.com/content.asp?id_Content=1
- J Income 3-Day Diet - www.income.coop/diet/index.asp
- J Herbalife International Thermojetics - www.herbalifewww.com.sg

- J Monarch's Forever Fit Weight Management Programme - worldassociation.com/ForeverFitProducts.htm
- J Ocean Health Minus Fat - www.wherehealthbegins.com/singapore/Product?skuno=16052
- J SlimWater - www.lifepharm.com/prod_slimwater.html
- J Diet Reviews and Information (excellent website on over 300 diet reviews) - www.chasefreedom.com

Useful websites outlining common myths about weight-loss:

- J www.medicinenet.com/script/main/art.asp?articlekey=21744
- J www.win.niddk.nih.gov/publications/myths.htm
- J www.edis.ifas.ufl.edu/pdffiles/fy/fy30100.pdf
- J www.betterhealth.vic.gov.au/bhcv2/bhcarticles.nsf/pages/Weight_loss_common_misconceptions?OpenDocument

RECOMMENDED READING

1. Weight Loss and Dieting – MedlinePlus www.nlm.nih.gov/medlineplus/weightlossanddieting.html
2. Weight Loss and Nutrition Myths – MedicineNet.com www.medicinenet.com/script/main/art.asp?articlekey=21744
3. Weight Loss and Nutrition Myths – National Institute of Diabetes and Digestive and Kidney Diseases.
4. win.niddk.nih.gov/publications/myths.htm
5. Link to News Articles on Obesity - Monarch Health Sciences - worldassociation.com/NewsArticles.htm
6. Time for the latest fad diet – Asian Food Information Centre - www.afic.org/Time%20for%20the%20latest%20Fad%20Diet.htm
7. Dietitians in Alexandra hospital help the Highly Obese Patients through very low calorie diet – NHG Partners Direct, Feb 05 (pdf available).

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LEARNING POINTS

In addition to the Obesity CPG recommendations pertaining to dietary aspects, below are more learning points:

- o Weight-loss is a juggling of the calories contained in fats, proteins, and carbohydrates – calories in versus calories out.
 - o Weight-loss, regardless of the macronutrient composition of the diet, produces metabolic changes, including improved glycaemic control, decreased blood lipids, and decreased blood pressure. The magnitude of these may vary by type of diet and amount of weight-loss.
 - o The amount of weight-loss is variable and tends to decline with the length of the study.
 - o The excess weight that one wants to lose is fat, not water. Short-term weight-loss and long-term weight-loss needs to be monitored.
 - o More research is needed to determine if one macronutrient confers better health than another.
 - o More research is needed to determine the long-term metabolic effects of different diet types on bone changes, renal function, and lipoprotein profile, etc, once the weight-loss phase has ended.
 - o More research is needed before recommending the low-carbohydrate diet as a prudent approach to achieving and maintaining a healthy weight.
 - o More emphasis on how to increase adherence to the dietary regimen long term.
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