

Current concepts in the management of obesity

An evidence based review

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ABSTRACT

The increasing prevalence of overweight and obesity is an important public health problem contributing to significant excess in morbidity and mortality. A cross-sectional national epidemiological household survey showed that the prevalence of obesity in female Saudi subjects was among the highest reported. Obesity is a complex multifactorial chronic disease that develops from an interaction of genotype and the environment. Our understanding of how and why obesity develops is incomplete, but involves the integration of social behavioral, cultural physiological, metabolic and genetic factors. While there is agreement about health risks of over weight and obesity, there is less agreement about their management. Primary health care services should play the dominant role for obesity management. Family physicians need to assess the patient's readiness to enter weight loss therapy and take appropriate steps for motivation. Weight loss and weight maintenance therapy should employ the combination of low caloric diet, increased physical activity, and behavioral therapy. Weight loss drugs may be used as part of comprehensive weight loss program. Weight loss surgery is an option for carefully selected patients with severe obesity Body Mass Index greater than 40. After successful weight loss, a program consisting of dietary therapy, physical activity, and behavioural therapy, which should be continued indefinitely, enhances the likelihood of weight loss maintenance.

Keywords: Obesity, overweight, review, management, weight loss.

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The prevalence of obesity is rising to epidemic proportions at an alarming rate in both developed and less developed countries. It has increased by about 10-40% in the majority of European countries in the last 10 years.¹ The health, economic and psychosocial consequences of the increasing incidence of obesity are substantial. Obesity is associated with numerous health complications, that range from non-fatal debilitating conditions such as osteoarthritis, to life threatening chronic diseases such as coronary heart disease, diabetes, and certain cancers. The psychological consequences can range from lowered self-esteem to

clinical depression. Recent estimates suggest that between 2 to 8% of total sick care cost in Western countries are attributable to obesity.¹ Despite the high prevalence of obesity and many advances in our understanding of how it develops, present management strategies have persistently failed to achieve long term success.

Definition of obesity. Obesity is a complex multifactorial chronic disease that develops from an interaction of genotype and environment.² It involves the integration of social, behavioral, cultural, physiological, metabolic and genetic factors. It is

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Table 1 - Classification of overweight and obesity by BMI, waist circumference and associated disease risk.

Classification	Body Mass Index (kg/m ²)	Obesity Class	Disease Risk Relative to Normal* Weight and Waist Circumference Men ≤ 102 cm Women ≤ 88 cm	Men > 102 cm Women > 88 cm
Underweight	<18.5	-	-	-
Normal	18.5-24.9	-	-	-
overweight	25.0-29.9	-	Increased	High
Obesity	30.0-34.9	I	High	Very high
	35.0-39.9	II	Very high	Very high
Extreme obesity	≥40	III	Extremely high	Extremely high

*Disease risk for type 2 diabetes mellitus, cardiovascular disease and hypertension

defined by body mass index (BMI) of ≥ 30 .¹ **Classification of overweight and obesity according to body mass index and waist circumference (Table 1).** Body mass index (BMI) describes relative weight to height. According to epidemiological and observational studies, it had been shown to positively correlate with the total body fat content.³ BMI is calculated as weight kg/height (meter²). Overweight is defined as BMI (25.0-29.9), and obesity as BMI ≥ 30 .¹ Waist circumference (WC) and waist to hip ratio (WHR) are the most effective techniques for assessing abdominal fat content.⁴ Evidence from epidemiological studies shows that WC to be a better marker of abdominal fat content than WHR and that it is the most practical anthropometric measurement for assessing abdominal fat.² Abdominal fat is an independent predictor of risk factors and morbidity.⁵ A WC of >102 cm for males, and >88 cm for females is associated with increased risk for morbidity.¹

Prevalence of obesity in Saudi Arabia. A cross-sectional national epidemiological household survey was conducted between 1990-1993. Thirteen thousand, one hundred and seventy seven subjects were included with ages ranging from 15 years and over. The prevalence of over weight defined as BMI (25-30), was higher among male subjects than for females, (29% vs 27%), while the prevalence of obesity defined as BMI (>30), was higher among female subjects than for males (24% vs 16%).⁶ The prevalence of obesity among female Saudi subjects was amongst the highest reported (Table 2).¹ Other cross-sectional studies conducted in Riyadh and Queza have reported similar findings of high prevalence of obesity especially in females.^{7,8} As the prevalence of obesity increases with the increase of

age,^{6,8} and considering that the majority of Saudi population in this study were less than 30 years old, then one would expect the prevalence of obesity would even become higher in near future.⁶ Several reasons have been suggested to explain the rising prevalence of obesity in the Kingdom, these include the major economical development during the past 30 years, which had resulted in profound changes in eating and exercise habits. The combination of westernized and high fat diets and reduced physical activity suggests that sedentary lifestyles are the most important factor. The high prevalence of obesity among Saudi females reflects the perception of fatness as a sign of affluence and beauty.⁶

Table 2 - Obesity prevalence worldwide (BMI>30).

Country	Year	Age	Men	Women	
USA	1993	18+	13.7	13.5	
Canada	1991	18-74	15	15	
Saudi Arabia	1990-93	15+			
			Total	16	24
			Urban	18	28
Rural	12	18			
Kuwait	1994	18+	32	44	
West Germany	1991	25-69	16	21	
Netherlands	1994	20-59	10	11	
Australia	1989	20-69	9.3	11.1	
Japan	1993	20+	1.7	2.7	

Table 3 - Weight loss drugs.⁺

Drug	Action	Adverse effects
Dexfenfluramine*	Serotonin reuptake inhibitor	Valvular heart disease
Fenfluramine	Serotonin releaser	Primary pulmonary, hypertension neurotoxicity
Sibutramine	Norepinephrine, dopamine, and serotonin reuptake inhibitor	Increase heart rate and blood pressure
Orlistat [±]	Inhibits pancreatic lipase, decreases fat absorption	Decrease in absorption of fat-soluble vitamins, Soft stools and anal leakage, possible link to breast cancer

+Ephedrine and caffeine, and fluoxetine have also been tested for weight loss, but are not approved for use in the treatment of obesity. Mazindol, phentermine, benzphetamine, and phendimetrazine are approved for only short-term use for the treatment of obesity.
*FDA approval withdrawn
[±]FDA approval pending

Pathophysiology and etiology. Understanding the etiology of obesity is important for its management. Recent advances in the study of body weight regulation are shedding light on how genetics and environment interact to cause or prevent obesity. Body weight is dependent on a balance of energy intake, and energy expenditure. When energy intake and expenditure are in balance, weight remains stable. A net excess in energy whether through greater intake or lesser expenditure, leads to weight gain.⁹ Over the past 5 years we have learned a great deal about several genes that participate in body weight regulation. The first major advance was the discovery of Leptin and its receptor. Leptin is a hormone synthesized in fat that acts on the hypothalamus to suppress food intake and increase energy expenditure.⁹ Mutation disrupting the Leptin and its receptor genes were identified in humans, and the chromosomal locus was genetically linked to human body weight.⁹ However, the vast majority of obese individuals appear to have normal genetic sequences and high levels of Leptin in proportion to their body fat stores.¹⁰ Studies to determine the safety and efficacy of recombinant human Leptin for weight reduction are going on.⁹ Several neurotransmitter systems have been shown to be important for body weight regulation. Among these are neuropeptide Y, proopiomelanocortin, melanocyte stimulating hormone, and the endorphins.¹¹ A combination of genetics and physiological studies is improving our understanding of the complex mechanisms that control appetite and energy expenditure, this should lead to new, more effective treatments for obesity that will transform its management in the future.¹¹

Health consequences of overweight and obesity. The health consequences of obesity range from a number of non-fatal problems that impact on the quality of life such as infertility, respiratory

difficulties, musculoskeletal, skin problems; to problems that lead to increased risk of premature death, as a result of non-insulin dependant diabetes mellitus, gall bladder disease, and cardiovascular problems.¹² Two prospective cohort studies showed that the relation of body mass indexes less than 30 and the incidence of conditions caused by excess of body fat in women and men appear monotonic and linear.¹³

Cancers have been associated with obesity, these include colorectal cancer in men, and cancer of the breast, cervix, endometrium and ovaries in women.¹⁴ Negative attitudes towards the obese can lead to discrimination in many areas of their life including health care and employment. The psychological consequences of obesity can range from lowered self-esteem, depression to anorexia nervosa and bulimia.¹⁵

Health benefits of weight loss. There is sufficient evidence that weight reduction can provide health benefits, at least in the short term (within 2 years after starting a weight reduction program). Three prospective cohort studies found that weight reduction with dietary treatment in patients with obesity and diabetes, was associated with improved glycemic control and a reduction in oral hypoglycemic drugs and insulin requirements.¹⁶⁻¹⁸ A systematic review demonstrated that a reduction of weight in patients with obesity and hypertension was associated with a reduction in blood pressure.¹⁹ For patients with obesity and hyperlipidemia, 4 prospective cohort studies found that weight reduction improved serum lipid profile.¹³ Three randomized controlled trials reported that multiple risk reduction programs including low fat diet, exercise, smoking cessation, was associated with reduction or weight maintenance, resulted in slower progression²⁰ or regression²¹ of coronary atherosclerosis and fewer angina symptoms.²² Despite convincing evidence supporting short-term

effectiveness of obesity treatments, there is only limited evidence that weight reduction is associated with a reduction in major clinical outcomes including myocardial infarction, stroke and cardiovascular death.¹³

Assessment. When assessing a patient for risk status and for weight loss therapy, consider patient's BMI, waist circumference and overall risk status.¹ According to "Clinical Guidelines of National Heart, Lung and Blood Institute Evidence Report"² risk can be assessed as: a) Relative risk status: This defines the relative risk according to BMI and waist circumference (Table 1). They indicate cutpoints where there is need to institute weight loss therapy. b) Absolute risk status: Identification of patients at very high absolute risk; patients with coronary heart disease (CHD), presence of atherosclerotic diseases, type 2 diabetes mellitus and sleep apnea. c) Identification of coronary vascular risk factors such as cigarette smoking, hypertension, high low density lipoprotein, low high density lipoprotein, impaired fasting glucose, family history of premature CHD, and males > 45 years or females > 55 years. Presence of three or more of these risk factors classify the patient at high absolute risk for obesity disorders. d) Obesity associated diseases such as osteoarthritis and gallstones. Other risk factors such as reduced physical activity and high triglycerides.

Patient motivation. Assessment of patient motivation is a pre-requisite of weight loss therapy. Motivation should be high, if not, the family physician should heighten a patient's motivation for weight loss especially when a significant benefit for risk reduction is perceived. Evaluating reasons and asking about previous history of successful and unsuccessful weight loss attempts, assessing social support, checking patient understanding of obesity and its associated diseases and his attitude towards physical activity should be evaluated.²

How to achieve weight loss? Life style modification. Dietary therapy. A decrease in calorie intake is the most important component of dietary therapy. There are two main types; a low calorie diet (LCD) which provides 800 to 1500 kcal of energy daily and a very low calorie diet (VLCD) which provides 250 to 800 kcal of energy daily.¹³ Strong and consistent evidence exist that an average weight loss of 8 percent of initial body weight can be obtained over 6 months with LCD. This weight loss affects a decrease in abdominal fat.²³ A deficit of 500 to 1000 kcal/day will produce a weight loss of 0.25-0.5 kg/week. Although VLCDs produce greater initial weight losses than LCDs, however both are equally effective for long-term treatment of more than one year.²⁴ Gradual weight regain followed the initial weight loss in most of the studies.¹³

Physical activity. Physical activity increases energy expenditure. Successful restoration of normal weight in many overweight and obese persons requires a higher level of energy expenditure. A

meta-analysis of the past 25 years of weight loss research showed that the weight loss in obese adults following exercise was 2.9 kg, diet and exercise 10.7 kg, plus diet, was 11kg. The finding that exercise programs did not produce a great change in body composition was consistent.²⁵ There is strong evidence that increased physical activity increases cardio-respiratory fitness with or without weight loss.² The more active an individual the lower is the risk for CVD and diabetes.²⁶ Physical activity reduces CVD risk factors including blood pressure and triglycerides, increases HDL-cholesterol and improves glucose tolerance with or without weight loss.²⁶ Among strategies suggested to increase physical activity by the "NHLBI report"² is to initiate it slowly and increase it gradually. Starting with walking for 10 minutes, 3 days a week and build this up to 30-45 minutes at least 5 days a week. Other examples of moderate amount activities are swimming for 20 minutes, bicycling for 30 minutes, jumping rope for 15 minutes and stair walking for 15 minutes.

Dietary counselling and behavioral therapy. Dietary counselling usually deals with dietary and lifestyle modifications as well as reinforcement of behavioral therapy principles. Behavior therapy consists of cognitive behavior skills training, is aimed at modifying eating and physical activity habits to prevent regain of weight lost and it is often used in adjunct to dietary therapy.¹³ No single method of behavior therapy proved to be clearly superior.² There is little reliable evidence that behavioral treatments by themselves are effective.²⁷

In an over-weight or obese patient what is the most successful lifestyle therapy for weight loss? There is a strong evidence that combination of two or more interventions of LCDs, increased physical activity and behavior therapy, provide the most successful therapy for weight loss and maintenance.^{2,27,28}

Pharmacotherapy. The majority of persons who lose weight regain it²⁹ so the challenge is to maintain the weight loss. Long-term medications to aid in treatment of obesity shown in (Table 3), may be indicated in carefully selected patients. These are effective but of modest ability to produce and maintain weight loss.¹³ Net weight loss attributed to drugs generally had been reported to be in the range of 2 to 10 kg.² Indications of anti-obesity medications according to NHLBI report² were: Patients with BMI \geq 30; Patients with BMI \geq 27 with concomitant diseases; Failure to respond to life style therapy after a trial of 6 months.

It is important that these drugs are used continuously with continual assessment of drug therapy for efficacy and safety and only as an adjunct to diet and lifestyle management.³⁰ Although a combination of diet and appetite suppressants appears to be effective during the first 6 months of treatment, long term effectiveness beyond 1 year has

not been demonstrated except in a small proportion of patients from a single study.³¹

Surgical interventions. Surgical treatment is normally considered only for people with morbid obesity, and when less invasive methods of weight loss have failed.³² It is the most effective approach in reducing weight^{27,28} resulting in a substantial weight loss of 27.6 to 45.5 kg.¹³ According to the NHLBI report² weight loss surgery is indicated in patients with BMI ≥ 40 or ≥ 35 with co-morbid conditions, when less invasive methods of weight loss have failed and patient is at high risk for obesity associated morbidity or mortality. Surgical procedures in current use are gastric restriction (vertical gastric banding) and gastric by pass (Roux-en Y). Assessing both peri-operative risk and long-term complications is important and requires assessing the risk/benefit ratio in each case.

How to maintain weight loss? Despite the effectiveness of several interventions in promoting short-term weight loss, it is difficult to maintain it over long period of time (>3 to 5 years). In fact the majority of persons who lose weight regain it.^{13,27,29} To maintain the weight lost a weight maintenance program consisting of dietary therapy, physical activity, and behavioral therapy should be continued in-definitely.^{2,27,28}

Effectiveness of community-based preventive obesity programs. Three prospective cohort studies³³⁻³⁵ aiming at reducing the prevalence of obesity had health promotion programs. The experimental communities were exposed to seminars, mailed educational packages, and mass media participation. These were compared with demographically similar control communities that were not exposed to these interventions. In all the three studies the mean weight of the intervention and control communities did not differ significantly during 3 to 7 years follow up period. Due to methodological limitations of these studies, and lack of studies relating to prevention of obesity, the evidence is insufficient to recommend in favor or against community-based obesity prevention programs. However, because of considerable health risks associated with obesity and the limited long-term effectiveness of weight reduction methods, the Canadian Task Force on Preventive Health Care recommends that the prevention of obesity should be a high priority for health care providers.¹²

The focus of preventive efforts in the Kingdom should be directed towards young mothers who are at risk of developing obesity and who play central role in perpetuating it in their offspring.⁷

Role of family physicians. Despite the high prevalence of obesity and improvements in our knowledge of how this disease develops, there are limited effective obesity management systems. This in contrast to other chronic diseases such as diabetes, hypertension, and coronary heart disease, where

integrated care is frequently provided. Rational development of co-ordinated health care services for management of overweight and obesity is needed. Primary health care services should play the dominant role as they have the potential to access large numbers of patients. Hospital and specialist services are also required for dealing with more severe cases and the associated major life threatening complications. Clear communication between the different types of health services is also essential. Improvement of services in primary health care centres must be based on the existing evidence (NHLBI² 1998, Glenny²⁸ 1997, EHCB²⁷ 1997) and good clinical judgement. At the present family physicians appear to have incomplete, confused, and occasional incorrect knowledge of obesity management. This raises the issue and the need for improved training of family physicians and other health care workers, not only to improve levels of knowledge and skills in obesity management strategies but also to help overcome the negative attitudes that many health professionals currently exhibit towards obesity management and the obese.

In conclusion there is strong evidence to recommend weight loss in overweight and obese patients with hypertension, diabetes type 2 and hyperlipidaemia; Behavioral, dietary, exercise and drug therapies have all been shown to be effective, particularly when two or more are combined; Surgical intervention is the most effective approach for reducing weight of severe morbid obesity; A weight maintenance program consisting of life style therapy should be continued in-definitely; There is insufficient evidence to recommend in favour or against community-based obesity prevention programs; Primary health care services should play the dominant role for obesity management and family physicians should be trained and motivated to treat obese patients.

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