

**Guidelines for Cardiovascular Prevention in Egypt and
Developing Countries**

OVERWEIGHT AND OBESITY

Obesity is

- A factor of significant importance in the development of cardiovascular disease.
- It is a problem reaching epidemic proportions in many countries.
- Egyptian women have the highest prevalence rate of obesity at a national level worldwide (NHP 1991-94)
- It is a major cause of preventable death.

DEFINITION

- Overweight and obesity meaning excess of total body fat, is typically defined by body mass index (BMI), according to the guidelines set by World Health Organization. This is calculated by dividing an individual's weight (in kilograms) by the square of the height (in meters), for both men and women.
- The acceptable or normal range of BMI is defined as 18.5-25 kg/m².
- The ideal body weight is 21kg/m².
- Underweight < 18.5 kg/m² .
- Overweight 25 – 30 kg/m² .
- Obesity 30 - 40 kg/m².
- Morbid obesity > 40 Kg/m².

PREVALENCE

- There is an increasing prevalence of both overweight and obesity from the early 1960's. Obesity, has become an epidemic in the whole world. It affects between 10 and 25% of the population above age of 25years.
- The prevalence of obesity among Egyptians aged 25 years and above, as defined by BMI of > 30 kg/m² is 16.7% (NHP 1991-94).

ASSESSMENT AND MEASUREMENT OF VISCERAL OBESITY

- BMI does not take into account body fat distribution; those with a central or abdominal (visceral) body fat pattern are generally at higher cardiovascular risk.
- Clinical markers of visceral adiposity include waist and hip circumference, and their ratio (WHR). Abdominal fat, measured directly by computed tomography or magnetic resonance imaging correlates with the WHR. A major advantage of WHR is to self-measure and easy to track by the patients themselves.
- Upper limit of normal waist circumference for adults is ≤ 80 cm for women and ≤ 94 cm for men. Increased waist circumference is more important risk factor for future cardiovascular events than BMI. It is closely linked to hypertension, stroke and type 2 diabetes.

RELATION OF OBESITY TO ATHEROSCLEROTIC CARDIOVASCULAR DISEASE AND CARDIOVASCULAR RISK:

Central fat distribution is associated with a greater number of metabolic complications (including type 2 diabetes, hypertension, dyslipidemia, heart disease, and stroke). These metabolic complications of central fat are linked to insulin resistance and a relative excess of adrenal steroids. The mechanism is probably related to exposure of the liver to excessive release of fatty acids, from an expanded intra-abdominal fat mass, which impairs insulin function.

1. Atherosclerotic cardiovascular disease

Obesity has many adverse effects on coronary artery disease (CAD) risk factors and is probably an independent risk factor for CAD events. Epidemiological studies have clearly shown a strong relationship between obesity and increased risk of cardiovascular disease morbidity, and is associated with higher mortality.

2. Heart failure

- Obesity represents an independent risk factor for congestive heart failure. In early obesity, an expanded intravascular volume results in an increase in cardiopulmonary volume or increased preload .
- A 5% increase in the risk of heart failure for men and 7% for women for each 1 kg/m² increase in BMI has been reported .

3. Cardiovascular risks

** Obesity and Hypertension*

- Fasting and postprandial hyperinsulinemia is well described in the obese. Insulin may elevate blood pressure by affecting renal sodium retention
- Several epidemiologic studies showed that excess weight and even modest weight gain substantially increased the risk for hypertension.

** Obesity and Diabetes*

- Obesity is a major risk factor for the development of type 2 diabetes. Underlying and possible inherited insulin resistance is compound by the fact that obesity worsens insulin sensitivity. Abdominal fat bears a particularly strong relation to insulin resistance .

** Obesity and Dyslipidemia*

- Obesity strongly affects lipoprotein metabolism and is related to higher very low density lipoprotein cholesterol (VLDL) ,and triglycerides(TG), and lower levels of high density lipoprotein cholesterol(HDL-C).Weight loss reduces TG, increases HDL-C, and lowers LDL.
- The low HDL, high TG phenotype is the most frequently described dyslipidemia among obese.

ETIOLOGY

The etiology of obesity is often simplified into three components that govern energy balance: *diet, exercise, and genes*. Attempts to identify a single cause within this trilogy will inevitably fail, because all three must apply in every case.

1. Extra calories from carbohydrate, protein, and fat itself are converted into the fat stores in adipose tissue to be used if food supplies diminish.
2. Drugs can cause weight gain. (corticosteroids, phenothiazines and tricyclic antidepressants, pizotifen for migraine prophylaxis, valproate for epilepsy, and progesterone in contraceptive pills or hormone replacement therapy). Cyproheptadine used to increase appetite in wasted patients, and of course cause weight gain as an unwanted effect when used for other reasons.
3. Appetite and food: The 24-hour energy requirement usually approximates to BMR X 1.5. This is the amount of calories we need. Appetite regulation is under genetic control.
4. Genetic predisposition to weight gain: Between individuals, and between communities, there are quite large differences in the predisposition to weight gain. Fat distribution is partly genetic.
 - Leptin, a peptide produced in the adipose tissue and released in well fed state, can be a cause. It reduces appetite by acting on receptors in the brain. The defects in this system, either in leptin production or in its receptors (leptin resistance) can cause obesity.
5. Social causes
 - Urbanization with its necessary accompanying industrialization is the defining feature of an obesity-prone society.
 - In modern Westernized societies, obesity is increasingly a problem of population subgroups characterized by social deprivation. The trend is most marked amongst women, but seems to follow later in men.

WEIGHT CONTROL & RISK REDUCTION

Weight loss through dietary restriction (with or without exercise) is considered a means to control hypertension, dyslipidemia, and diabetes.

WEIGHT CONTROL

Current recommendations for treatment of obesity emphasize three modalities; reduce caloric intake, increased physical activity and behavioral modification.

- Dietary approaches

Maintenance of a Healthy Body Weight

- To maintain healthy body weight: Match energy intake to energy needs. Caloric expenditure needs to be in balance with caloric intake to maintain body weight and must exceed caloric intake to achieve weight loss.
- For calculation of total energy expenditure in respect to kind of activity:
 - § Average Activity: ~ 30 Calorie/kg of ideal body weight
 - § Below Average (Sedentary): ~ 25 Calorie/kg of ideal body weight
 - § Above Average (Excess efforts): 35-40 Calorie/kg of ideal body weight
- Caloric intake depends on the kind of diet. Consumption of one gram of fat yields 9 Calories, while each gram of carbohydrate or protein gives 4 Calories.
- Accordingly, a man aging 40 years and weighing 70 Kg with an intermediate activity level, needs ~ 2100 Calories/day to maintain body weight in a healthy range distributed as:
 - § Carbohydrates (50-60% of total calorie intake) : ~ 300 gram which give 1200 Cal
 - § Fats (< 30% of total calorie intake): ~ 70 gram which give 630 Cal
 - § Proteins (1 gm/kg wt): ~ 70 gram which give 280 Cal
- This aim might be achieved by reducing carbohydrate intake (especially of refined and high-glycemic index diet), increase consumption of fruits vegetables and whole grains, and moderate intake of low-fat dairy products.

To prevent gradual weight gain over time: Make small decrease in food and beverage calories and increase physical activity

Those who need to lose weight:

- § Decrease calorie intake, for slow and steady weight loss, while maintaining an adequate nutrient intake and increasing physical activity.
- § The rate of weight loss is directly related to the difference between the subject's energy intake and energy requirements.
- § An average deficit of 500 kcal/day should result in weight loss of 0.45 kg/week.

- Hypocaloric diet, whether or not low-fat diet is employed, produces both weight loss and a decrease in abdominal adiposity. Such diet, allows 1000 – 1200 Cal/day. The very low calorie diet (400- 500 Cal/d), although produces rapid weight loss, the amount of weight lost over a year, is similar to either plan, but is associated with more dropout and failure to adherence.

- **Physical activity**

The importance of incorporating regular physical activity concurrently with a dietary program is well documented, such as :

- Walking up the stairs instead of taking elevators,
- Parking further away from one's destination, and
- Brisk walk of 30 minutes daily or on most days.

- **Social support**

- Effective maintenance of weight loss requires ongoing contact with the physician or consultant help in problem solving, and enhancing interactions.
- Participants should be encouraged to bring a spouse or friends.
- Maintaining a good quality of life is also important, which involves physical functioning, psychological functioning, and social functioning as well as overall life satisfaction and perception of health status.
- Focus groups can provide insights into patient's perceptions of why obesity is a problem and psychological issues such as lack of control and depression.

Pharmacotherapy

- *Sibutramine*(Meridia®), a serotonin and norepinephrine reuptake blocker is now FDA approved. The increased satiety and thermogenesis of brown adipose tissue was not associated with neurotoxicity or pulmonary hypertension. To be used cautiously in hypertensive patients.
- *Orlistat*(Xenical®), a newly approved inhibitor of intestinal lipases, works by inhibiting fat absorption.
- *Rimonabant*(Accamoplia®), a unique and promising cannabinoid receptor antagonist. It plays a role in the central and peripheral regulation of energy balance, fat accumulation and glucose and lipid metabolism. In a dose of 20 mg/day, this drug markedly improved multiple cardiometabolic risk factors including abdominal obesity, lipid and glucose metabolism and insulin resistance.

Since long term weight loss through dieting is so unsuccessful, an alternative drug to suppress or reduce appetite may be prescribed. Unfortunately, lost weight is regained when medications are discontinued. Thus, there are no long term drugs.

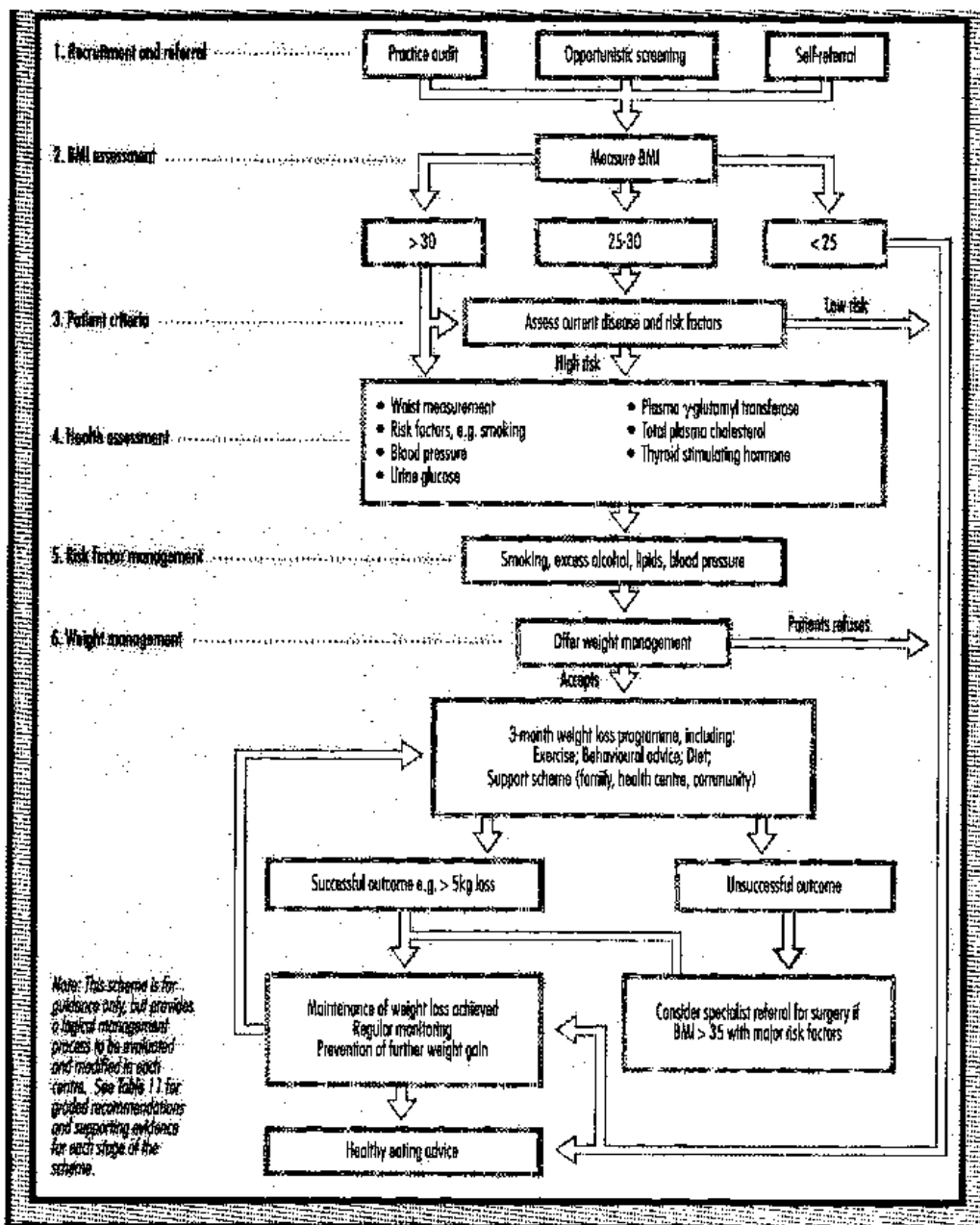
- **Bariatric surgery**
 - Surgical approach should be limited to those with BMI more than 35kg/m².
 - Surgery is quite major, and also more likely to complications. Hospital mortality is 1-2%.
 - Every effort should be made to lose weight before surgery.
 - Nutritional status may need to be ensured.
 - The most common surgical procedure in use is the banded gastroplasty, or stapling, which effectively reduces the size of the stomach to be able to accommodate only about 50 ml.
 - Postoperative medical, dietetic and possibly psychiatric support will be required.

Guidelines for control and prevention of obesity.

Goals : is to maintain a healthy body weight, This is achieved when the body mass index (BMI) in kg/m² is 18.5-24.9 in both men and women and the waist circumference ≤ 94 cm in men, and ≤ 80 cm in women.

- The following approach is reproduced by SIGN Working Party for the Royal Colleges in Scotland, and presents an idealized model aimed at management and control of obesity (Figure 1).
- It suggests that patients with BMI ≥ 30 kg/m² should undergo health assessment including : Blood pressure, blood glucose, plasma cholesterol level, lipid profile, and thyroid stimulating hormone. They also should undergo risk factor modification.
- Weight control program including exercise, behavior advice; diet, support scheme is followed up to 3 months. A weight loss of ≥ 5 kg, is considered successful outcome. Regular monitoring and prevention of further weight gain is advisable.

Figure (1): Weight Management in Primary Health Care/Community



Source: Lean M. Clinical Handbook of Weight Management. London. Martin Duntiz, 1998.

SUMMARY

- Obesity is defined by body mass index (BMI) of more than 30 kg/m².
- Visceral obesity is assessed by waist circumference. The upper limit of normal waist circumference for adults is ≤ 80 cm for women and ≤ 94 cm for men.
- To prevent gradual weight gain over time: Make small decrease in food and beverage calories and increase physical activity.

Those who need to lose weight:

- § Decrease calorie intake, for slow and steady weight loss, while maintaining an adequate nutrient intake and increasing physical activity.
- § The rate of weight loss is directly related to the difference between the subject's energy intake and energy requirements.
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- Physical activity : Incorporating regular physical activity : such as walking up the stairs instead of taking elevators, and parking further away from one's destination, or a brisk walk of 30 minutes five times a week.
- Social support: Maintaining a good quality of life is also important, which involves physical functioning, psychological functioning, and social functioning as well as overall life satisfaction and perception of health status.
- **Pharmacotherapy**
 - Sibutramine, a serotonin and norepinephrine reuptake blocker.
 - Orlistat inhibitor of intestinal lipases.
 - Rimonabant is a new Cannabinoid receptor antagonist, has proved to improve multiple cardiometabolic risk factors (Emerging drug).
- Surgery can produce a significant loss of weight with reports of more than 50% of the excess lost. The most common surgical procedure in use is the banded gastroplasty.

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