

**Dietary guidelines
for the prevention of
NCD'S in Mauritius**

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ENJOYING OUR FOOD WHILE AIMING FOR HEALTH AND FITNESS

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The guidelines proposed below will assist Mauritians of different age groups to adopt healthy eating habits and make sensible food choices to reduce the risk of non-communicable diseases such as type II diabetes, coronary heart disease, hypertension, stroke and certain types of cancer.

Dietary guidelines have been developed for each of the following groups:

1. Adults (19-65 years)
2. Elderly (65+ years)
3. Infants (0-2 years)
4. Pre-school children (2-5 years)
5. School children (5-12 years)
6. Adolescents (13-18 years)
7. Pregnant and lactating women

Specific messages in the dietary guidelines have been organised around the following five concepts:

1. VARIETY
2. BALANCE – maintenance of a healthy body weight by balancing food intake with regular physical activity.
3. ADEQUACY – consumption of sufficient amounts of specific foods or food groups and fluids/water.
4. MODERATION/RESTRICTION – reduction or restriction of salt, fat, sugar and alcohol.
5. SETTING – circumstances, time, environment and other considerations related to food behaviour

A. Dietary Guidelines for Healthy Adults (19-65 years)

1. Choose a variety of nutritious foods everyday.
2. Enjoy your meals.
3. Maintain a healthy body weight by exercising regularly and controlling your food intake.
4. Eat more fruits and vegetables (including pulses and legumes).
5. Choose and prepare foods with less salt.
6. Eat foods that are low in fat, especially saturated fat.
7. Limit your intake of added sugars from beverages and foods.
8. If you drink alcohol, do so in moderation
9. Eat clean and safe food.

B. Dietary Guidelines for the Elderly (65+ years)

1. Choose a variety of nutritious foods everyday.
2. Enjoy your meals.
3. Avoid skipping meals (have 3 meals daily).
4. Keep active in order to maintain muscle strength and a healthy body weight.
5. Eat more fruits and vegetables (including pulses and legumes).
6. Choose and prepare foods with less salt.
7. Eat foods that are low in fat, especially saturated fat.
8. Limit your intake of added sugars from beverages and foods.
9. If you drink alcohol, do so in moderation.
10. Drink adequate amount of water or other fluids low in added sugars.
11. Consume calcium-rich foods such as low-fat milk, milk products and green leafy vegetables regularly.
12. Eat clean and safe food.

C. Dietary Guidelines for Infants (0-2 years)

These guidelines are directed to parents or any other caregiver of infants.

1. Breast milk is the ideal food for the first 4-6 months.
2. Iron-fortified formula can be substituted for breast milk, BUT not cow's milk before the age of one.
3. After 4 months of age, start building the diet to include a variety of foods.
4. Begin weaning by introducing iron-fortified cereals, fruits and vegetables, BUT do not overdo high-fibre foods.
5. Introduce one new food at a time.
6. DO NOT restrict fat and cholesterol intake.
7. Pay attention to the baby's appetite to avoid overfeeding or underfeeding.
8. As from one year of child may be allowed to enjoy the family meals (including pulses, meat, fish, egg and poultry).
9. Offer safe and clean foods.

D. Dietary Guidelines for Pre-School Children (2-5 years)

These guidelines are directed to parents or any other caregiver of pre-school children.

1. Offer a variety of nutritious meals and snacks.
2. Provide a balanced breakfast every day.
3. Allow enough time to eat in a relaxed atmosphere.
4. Serve small servings several times a day.
5. Offer a diet with plenty of fruits and vegetables.
6. Offer adequate amount of calcium-rich foods such as milk, milk products and green leafy vegetables.
7. Limit intake of foods high in sugar and salt.

8. Encourage water as a drink.
9. Promote physical activity.
10. Offer clean and safe foods.

E. Dietary Guidelines for Schoolchildren (5-12 years)

1. Eat a variety of nutritious meals and snacks.
2. Have a balanced breakfast every day.
3. Eat plenty of fruits and vegetables.
4. Eat calcium-rich foods such as milk, milk products and green leafy vegetables.
5. Limit your intake of foods high in sugar, fat and salt.
6. Drink adequate amount of water or other fluids low in added sugars.
7. Promote physical activity.
8. Eat clean and safe foods.

F. Dietary Guidelines for Adolescents (13-18 years)

1. Choose a variety of nutritious foods everyday.
2. Enjoy your meals.
3. Avoid skipping meals.
4. Maintain a healthy body weight by exercising regularly and controlling your food intake.
5. Eat more fruits and vegetables (including pulses and legumes).
6. Choose foods with less salt.
7. Eat foods that are low in fat, especially saturated fat.
8. Eat foods rich in iron such as liver, meat, sardines, green leafy vegetables and pulses.

9. Eat foods rich in calcium such as milk, milk products and green leafy vegetables.
10. Limit your intake of added sugars from beverages and foods.
11. Eat clean and safe food.

G. Dietary Guidelines for Pregnant and Lactating Women

1. Choose a variety of nutritious foods everyday.
2. Enjoy small, frequent meals in order to minimise discomforts such as nausea, vomiting and indigestion.
3. Eat more fruits and vegetables (including pulses and legumes).
4. Choose and prepare foods with less salt.
5. Eat foods that are low in fat, especially saturated fat.
6. Limit your intake of added sugars from beverages and foods.
7. Drink plenty of water.
8. Avoid alcohol.
9. Eat clean and safe food.
10. Eat foods that are good sources of:
 - (i) Iron – meat, sardines, green leafy vegetables and pulses.
 - (ii) Calcium – milk, milk products and green leafy vegetables.
 - (iii) Folic acid – green leafy vegetables, beans, lentils, fortified breakfast cereals.
11. Choose breast-feeding especially for the first 4-6 months.

Our basic message is

Enjoy your food

BUT

aim for health and fitness

Enjoying our food while aiming for health and fitness

Eating is a source of pleasure for all. Eating the right foods in the right proportions to maintain good health or improve our health is both possible and pleasurable. There is a big variety of food available in Mauritius. This gives us plenty of choice so that we can take action for good health while enjoying our food.

To do so there are 9 golden rules to observe:

1. Eat a balanced diet composed of a variety of food.
2. Maintain a reasonable weight
3. Reduce saturated fat and cholesterol intake
4. Stop smoking
5. Be physically active every day.
6. Reduce intake of refined sugars
7. Eat food with adequate fibre
8. Eat less salt
9. If you drink alcohol, do so in moderation

Eat a balanced diet composed of a variety of food

The balanced diet

A balanced or nutritious diet contains a variety of foods from the three food groups whilst satisfying guidelines given above. Foods are divided into these three groups on the basis of similarity in nutritional value.

Food for energy

Food in this group provide energy for daily activities and may provide some protein, vitamins and minerals e.g. rice, bread, faratha, dholl puri, mine, macaroni, potatoes, oils, butter, etc.

Food for protein

Foods in this group provide protein for body building and repair e.g. pulses, nuts, fish, poultry, milk , cheese, yoghurt, meat, eggs, etc.

Food for health

Foods in this group comprise vegetables and fruits mainly. They provide us with vitamins and minerals our body needs in order to stay in good health, e.g., banana, mango, papaya, pineapple, bringal, tomatoes, “brèdes”, salads etc.

Maintain a reasonable weight

To be in good health we need to be of a reasonable weight.

Being too thin or overweight carries health risks. Overweight and obesity increase one's risk of getting hypertension, diabetes, ischaemic heart disease, osteoarthritis, gallstones and even certain cancers. So it makes sense to try to lose weight if we are overweight especially if this is associated with other risk factors.

How can I tell if I am overweight?

There are three things doctors and health workers will look at:

- They are
- (1) the body mass index
 - (2) waist circumference
 - (3) your overall risk

Body mass index

This describes a person's weight for a given height. It correlates well with the person's total body fat content.

It is obtained thus: $\text{Weight in kilogrammes}/(\text{Height in metres})^2$

Ideally the BMI should be between 18.5 and 25 irrespective of sex

If your BMI is less than 18, you are too thin and if it is more than 25, you are overweight and if it is more than 30 you are obese.

Waist circumference

If we have excess fat in the abdomen (tummy) out of proportion to total body fat, which is very common in Mauritius, this increases our risk factors for many non-communicable diseases. The waist circumference is a good indicator of abdominal fat content.

In women it should not be more than 88 cm

In men it should not be more than 102 cm

Overall risk

When deciding whether a person will benefit from weight loss, the doctor or other health worker will look at your other risk factors. If any of the following are present, then he/she will probably advise you to try to lose weight:

Established disease conditions e.g. coronary heart disease, diabetes

Cardiovascular risk factors e.g. smoking, hypertension, high LDL cholesterol, low HDL cholesterol, family history of premature coronary heart disease in parents or a first degree relative (before 55 in a male and before 65 in a female)

Other risk conditions e.g. physical inactivity, high serum triglycerides

The presence of any of the above condition(s) indicates that the person will benefit from weight reduction. However, reduction of these risk factors will reduce the risk for cardiovascular disease whether or not efforts at losing weight are successful.

Table 1: Selected BMI units categorised by Height and Weight

Height in m	Body weight in pounds (kg)		
	BMI 25	BMI 27	BMI 30
1.47	54	58	65
1.50	56	60	67
1.52	58	63	69
1.55	60	65	72
1.57	62	67	74
1.60	64	69	77
1.63	66	71	79
1.65	68	73	82
1.68	70	76	84
1.70	72	78	87
1.73	74	80	89
1.75	77	83	92
1.78	79	85	94
1.80	81	87	97
1.83	83	90	100
1.85	86	93	103
1.88	88	95	106
1.91	91	98	109
1.93	93	100	112

Table 2: Classification of overweight and obesity by BMI, waist circumference and associated disease risks

			Disease Risk* Relative to Normal Weight and Waist Circumference
	BMI (kg/m²)	Obesity class	Men > 102 cm (> 40 in) Women > 88 cm (> 35 in)
Underweight	< 18.5		-
Normal	18.5 – 24.9		-
Overweight	25.0 – 29.9		Increased
Obesity	30.0 – 34.9	I	High
	35.0 – 39.9	II	Very High
Extreme Obesity	> 40	III	Extremely High

Reduce saturated fat and cholesterol intake

Choose a diet that is low in saturated fat and cholesterol and moderate in total fat

Fats supply energy and essential fatty acids, and they help absorb the fat. Soluble vitamins A, D, E and K. You need some fat in the food you eat, but choose sensibly. Some kinds of fat, especially saturated fats and transfatty acids increase the risk for coronary heart disease by raising the blood cholesterol. In contrast, unsaturated fats (found mainly in vegetable oils) do not increase blood cholesterol. Eating lots of fat of any type can provide excess calories (1 gm of oil or fat contains 9 calories) and can lead to overweight and obesity.

To reduce your intake of saturated fat and cholesterol

- Choose unsaturated vegetable oils (ex. corn oil, soya oil, sunflower oil, olive oil, peanut oil, soft margarine) rather than saturated oils and fats (ex. coconut and coconut oil, palm oil, butter, ghee)
- Decrease the amount of hard margarine you use
- Get more of your calories from plant foods (grains, fruits and vegetable). Eat at least 5 servings of fruits and vegetables every day.
- Decrease the amount of fat used in cooking and at table
- Trim fat from meat and take skin off poultry
- Try switching from whole to fat-free or low-fat milk
- Limit your intake of high-fat processed meats such as sausages, salami and other cold cuts.
- Limit your intake of liver and other organ meats.
- Use egg yolks in moderation (Max 2- 3 / week)
- Decrease intake of cheese, cream, ice cream and replace (if necessary by low fat yoghurt

Serum cholesterol levels can be effectively lowered by dietary and lifestyle modifications. Lifestyle modifications that will help are:

- Stopping smoking

This decreases the ‘bad’ fats in our blood and helps the ‘good’ fats to increase reducing overall risk of coronary heart disease.

- Increasing physical activity

Increasing physical activity and having some form of regular physical activity is helpful. Besides helping to lose excess weight, regular physical activity increase the ‘good’ fats in our blood and therefore protects us against coronary heart disease.

Stop smoking

Why do I need to stop smoking?

Cigarettes are one main cause of preventable death in our country. Tobacco is toxic to our body. The nicotine in cigarettes makes our body release adrenaline. Adrenaline causes our blood vessels to constrict and our heart begins to beat faster, which raises our blood pressure. This can lead to heart attacks and strokes. The tars and other toxic substances in tobacco can cause cancer of the lungs and other organs. Tars also damage the lungs, leading to emphysema (a serious breathing disorder). Cigarette smoke contains carbon monoxide (which interferes with our lungs' ability to get oxygen into the blood), and other chemicals, such as DDT, arsenic and formaldehyde. All of these chemicals are bad for our lungs and body. That's why stopping smoking is so important.

Why is it so hard to stop smoking?

It seems hard to stop smoking because smoking causes changes in our body and in the way we act. The changes in our body are caused by addiction to nicotine. The changes in the way we act have formed over time as we have bought cigarettes, lit them and smoked them. These changes have become our smoking habit.

When you have a smoking habit, many things seem to go along with having a cigarette. These might include having a cup of coffee, being stressed or worried, talking on the phone, driving, taking a break at work, having a drink, socializing with friends or wanting something to do with your hands.

How can I stop smoking?

You'll have the best chance of stopping if you do these 4 things:

- Get support and encouragement
- Learn how to handle stress and the urge to smoke

How do I get ready to stop smoking?

Set a stop date 2 to 4 weeks from now. Keep a diary of when and why you smoke to help you better understand your smoking habit. Using the diary, you and your family doctor can develop a plan to help you deal with the things that make you want to light a cigarette.

What will happen when I stop smoking?

How you feel when you stop depends on how much you smoked, how addicted your body is to nicotine and how well you get ready to stop. You may crave a cigarette, and you may be hungrier than usual. You may feel edgy and have trouble concentrating. You also may cough more at first and you may have headaches. These things happen because your body is used to nicotine.

The symptoms are strongest during the first few days after quitting, but most go away in a few weeks.

What about nicotine replacement products?

Nicotine replacement products are ways to take in nicotine without smoking. These products come in several forms: gum, patch, inhaler and nasal spray. (The nicotine gum and the nicotine patch can be bought without a prescription from your doctor). Nicotine replacement works by lessening your craving for nicotine and reducing the withdrawal symptoms. It allows you to focus on the changes you need to make in your habits and environment.

People with heart disease, however, need to stop taking in nicotine altogether. Moreover these products are expensive and not easy to obtain. It is therefore perhaps better to try to stop smoking without having to use nicotine replacement products.

How do I get support and encouragement?

Tell your family and friends what kind of help you need. Some people like support from friends and family, while other don't want people to comment. Your doctor at the local health centre can also help.

What about stress and my urges to smoke?

The first few days after stopping will be the hardest. Look back at your smoking diary and see what triggered you to smoke. Then think of other things to do instead of lighting up at these times, such as walking or simply breathing deeply and slowly. Think of changes in your routine that will help you not smoke, such as drinking hot tea in the morning instead of coffee (if you used to smoke while you had a cup of coffee) or eating an apple or reading the newspaper instead of smoking while waiting for the bus.

Shall I gain weight when I stop smoking?

Most people gain a few pounds (usually less than 10) after they stop smoking. **It's important to know that any weight gain is a minor health risk compared to the risks of continuing to smoke.** To limit your weight gain, try not to replace smoking with overeating. Find other ways to keep your hands busy instead of picking up food. Make sure you have healthy, low-fat snacks on hand in case you do reach for food. And start exercising or exercise more. Exercise helps burn calories and has the added benefit of keeping you busy so you can't smoke. Your doctor will help you find out how much exercise is right for you.

Be physically active every day

Besides the fact that it helps losing weight, there are other reasons to be more active: being physically active can reduce your risk for heart disease, help lower your total cholesterol level and raise HDL – cholesterol (the “good” cholesterol that does not build up in the arteries), and help lower high blood pressure. And people who are physically active have a lower risk of getting high blood pressure than people who are not active. You don’t have to be a marathon runner to benefit from physical activity. Even light activities, if done daily, can help lower your risk of heart disease. You can fit physical activity into your daily routine in small but important ways. See table below.

Be more active everyday

- Use the stairs instead of the elevator
- Get off the bus one or two stops early and walk the rest of the way
- Park farther away from the store or office. Leave the car at home and walk to buy your bread / newspapers
- Ride a bike
- Work in the yard or garden
- Go dancing
- Mop the floor for half an hour everyday instead of watching TV

More vigorous exercise has added benefits. It helps improve the fitness of the heart and lungs. And that in turn protects you more against heart disease. Activities like swimming, brisk walking, running, and jumping rope are called “aerobic.” This means that the body uses oxygen to make the energy it needs for the activity.

Aerobic activities can condition your heart and lungs if done at the right intensity for at least 30 minutes, three to four times a week. But if you don't have 30 minutes for a break, try to find two 15 – minute periods or even three 10-minute periods. Try to do some type of aerobic activity in the course of a week.

Most people don't need to see a doctor before they start exercising, since a gradual, sensible exercise program has few health risks. But if you have a health problem like high blood pressure; if you have pains or pressure in the chest or shoulder area; if you tend to feel dizzy or faint; if you get very breathless after a mild workout; or are middle-age or older and have not been active, and you are planning a vigorous exercise program, you should check with your doctor first. Otherwise, get out, get active, and get fit- and help prevent high blood pressure. The sample walking program at the end of this sheet can help you get started.

Reduce intake of refined sugars

At present consumption of refined sugars per person per day in our tea, cakes, soft drinks, juices etc. is about 100 grams. Refined sugar is also a rich source of energy (1 gram of sugar contains 4 calories). High sugar intake contributes to the problem of excess body weight and is associated with the development of tooth decay. Moreover, due to the high prevalence of the non-communicable diseases, it is advisable to reduce consumption of refined sugars in order not to worsen conditions.

We should aim at reducing our consumption of refined sugars to less than 50 grams per person per day by using no sugar or less sugar in our tea and coffee (less than one teaspoonful per cup) and reducing our consumption of soft drinks, sweet biscuits and cakes, chocolates, juices, sweet etc. Replace soft drinks by water. Intake of water should be at least 2 litres per day, more in summer.

Eat food with adequate fibre

Eat plenty of fibre – containing foods such as whole grains, pulses, fruits and vegetables to reduce the risk of coronary heart disease, bowel diseases and possibly some types of cancer.

Dietary fibre are non digestible materials found in plant cells and are made up of various structural and non-structural components (like cellulose, hemicellulose, lignin, pectin, gums etc..). The different components play different role in the body. Foods made from grains (like rice, wheat) are the foundation of a nutritious diet. They provide vitamins, minerals, carbohydrates (starch and dietary fibre) and other substances that are good for health. Grain products are low in fat, unless fat is added in processing, in preparation or at table. Whole grains differ from refined grains in the amount of fibre and nutrients they provide and different whole-grain foods differ in nutrient content, so choose a variety.

The consumption of dietary fibre in Mauritius is only about 6 grams per day due to our low intake of fruits and vegetable and whole meal cereals.

In order to increase our intake of dietary fibre to the recommended 30 grams per person per day, we must more than double our vegetable and fruit consumption, use more wholemeal flour and wholemeal (brown) bread, and consume more pulses. Pulses e.g. dhol, lentils, white beans, red beans, butter beans (gros pois), chick peas (gram blanc), “gram” are all good sources of fibre and provide about 15 – 20 grams fibre per 100 grams dry weight. Many people complain of stomach upsets when they increase their consumption of pulses but it is good to know that the addition of cumin (“jeera” or “petit anis”) or asoefetida (“hing”) reduces the fermentation process and therefore diminishes, to a large extent, the complaints reported by many people. Soaking overnight also helps.

We should aim to consume at least five portions of fruit or vegetable every day.

What counts as 1 portion of fruit?

Each of the following counts as 1 portion of fruit

1 mango 1 banana 1 apple 1 pear 1 orange 1 mandarin
1 slice papaya 1 slice pineapple 1 slice watermelon
2 small plums 2 small peaches or nectarines 2 kiwis ½ cup grapes

For vegetables 1 cup of raw vegetables or ½ cup of cooked vegetables count as a portion of vegetables.

Listed below are some good sources of fibre

Less than 1% (Low)	1 to 3% (Medium)	3 to 5% or more (High)
White Bread	Maize	Oatmeal
Rice	Whole wheat flour	Peas (green and dry)
Semolina (Gréau)	Wheat bread	Dholl grams
Potato (with skin)	Coriander leaves	Ground nut (peanuts)
Beetroot	Mint	Drumstick (baton mouroungue)
Pumpkin	Celery	Goyavas
Spinard (brèdes épinards)	Carrots	Passion fruits (grenadine)
Watercress	Brinjal	
Lettuces	Cabbage	
Cucumber	Cauliflower	
Tomato	Cauliflower greens	
Lentils	French beans	
Black grams dholl	Ladies finger	
Papaya	Pumpkin leaves	
Pineapple	Pears	
Watermelon	Apple	
Carambole	Bilimbi	
	Grapes (green + black)	
	Jack fruits	
	Bread fruits (fruit à pain)	

Eat less salt

Many people eat more salt (sodium chloride) and other forms of sodium than they need. And guess what? They also have higher rates of high blood pressure than people who eat less salt.

Often, if people with high blood pressure cut back on salt and sodium, their blood pressure falls. Cutting back on salt and sodium also prevents blood pressure from rising. Some people like those of black-African origin are more affected by sodium than others. Since there's really no practical way to predict exactly who will be affected by sodium, it makes sense to limit intake of salt and sodium to help prevent high blood pressure.

All of us, but especially people with high blood pressure, should eat no more than about 6 grams of salt a day, which equals about 2,400 milligrams of sodium. That's about 1 teaspoon of table salt. But remember to keep track of **ALL** salt eaten – including that in hidden form. Canned food, processed food, dried fish and meat, pickles, cheese and condiments like soya sauce, all contain high amounts of salt, should be eaten in moderation.

If you drink alcohol, do so in moderation

Light to moderate drinkers of alcohol (1 – 2 units/day) have a lower incidence of coronary heart disease than non-drinkers. Heavy drinking on the other hand, results in elevated blood pressure and elevated triglycerides; contributes towards elevated triglycerides obesity and increases both cardiac and overall mortality.

Although alcohol in moderation may be beneficial, the advantages are not very much. Therefore it is not advisable for non-drinkers should not be to start drinking.

If you drink alcohol, do so in moderation and try not to drink everyday of the week

- Maximum of 2 units/day for males
- Maximum of 1 unit/day for females

What is 1 unit of alcohol?

300 ml beer (1 chopine)

or

1 wine glass of wine (75 ml)

or

½ tot whisky

or

½ tot rum

**SUMMARY OF DIETARY RECOMMENDATIONS FOR THE PREVENTION
OF NON-COMMUNICABLE DISEASES AMONG MAURITIANS**

Fat (% of total energy intake)	
Total	≤ 30
Saturated	7 – 10
Polyunsaturated	10
Monounsaturated	10 - 13
Cholesterol (mg/day)	≤ 300
<i>If response inadequate</i>	≤ 200
Dietary fibre	25-30 g on a normal diet (10-13 g on a 1000 cal diet)
Sodium (mg/day)	≤ 2400 (equivalent to 6g or 1 teaspoon tablesalt)
Energy	To maintain BMI < 25
Fruits and vegetables (servings*)	5 – 9
Alcohol (drink[#]/day)	
Men	≤ 2 units
Women	≤ 1 units

* One serving = 1 medium fruit or 1 cup leafy vegetables or ½ cup raw/cooked vegetable

One drink = 300 ml beer, 1 wine glass of wine (75 ml), 1 tot whisky or rum (25 ml)

**GUIDELINES ON DIETARY MANAGEMENT
OF
CORONARY HEART DISEASE
AND
HYPERLIPIDAEMIAS**

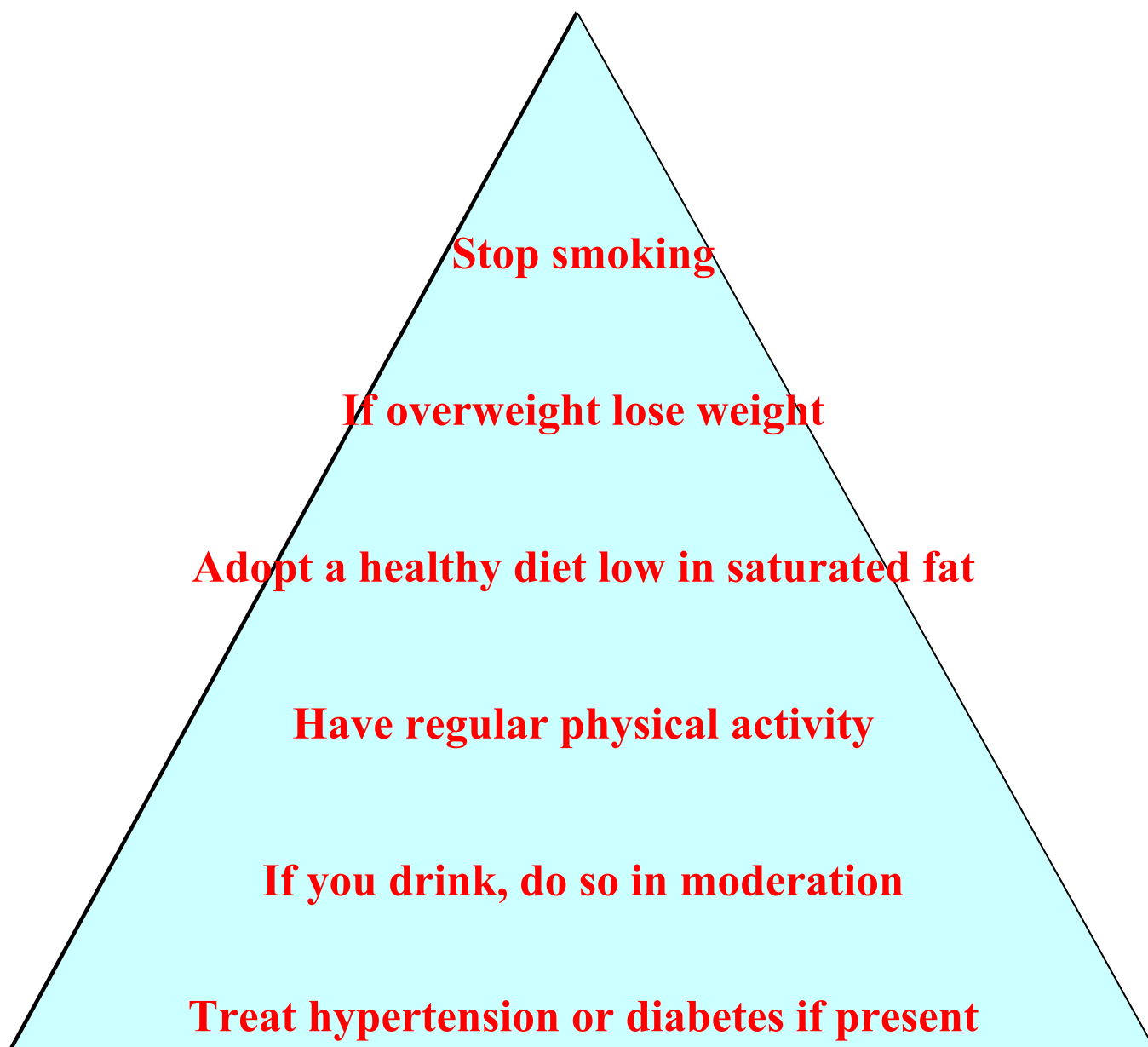
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CORONARY ARTERY DISEASE: HOW YOUR DIET CAN HELP

1. What is coronary artery disease?
2. Who is at risk?
3. What is cholesterol?

PRIMARY PREVENTION OF CHD

Lifestyle measures remain the first priority for the prevention of Coronary Heart Disease



CORONARY ARTERY DISEASE: HOW YOUR DIET CAN HELP

1. What is coronary artery disease?

The vessels that bring blood to the heart are called the coronary arteries. They are like narrow tubes. A fatty substance called plaque can build up in these arteries and make them narrow, so less blood gets to the heart. This called coronary artery disease. If you have coronary artery disease, your heart isn't getting to blood and oxygen it needs to work like it should. Coronary artery disease can lead to serious health problems, including angina (pain or pressure in the chest) and heart attack.

Several things increase your risk for coronary artery disease, including high blood pressure, smoking, diabetes, obesity, being male, a family history of the disease and too much of the bad cholesterol in our blood. Although you can't change all the things that increase your risk for coronary artery disease, there are still many changes you can bring in your lifestyle which will be positive for your health e.g. you can lower your cholesterol level by making changes in your diet (see the box below), and you can quit smoking (if you smoke now).

2. Who is at risk?

Mauritius has very high rates of coronary heart disease. Several factors may affect your risk of getting heart disease. What you eat and whether you exercise affect you risk of getting heart disease. Moreover, your risk is HIGHER if you have one or more of the following risk factors:

- High blood cholesterol especially 'LDL' cholesterol
- Smoking
- Diabetes
- Hypertension

- Family history of heart disease
- Overweight/obesity
- Physical inactivity

3. **What is cholesterol?**

Cholesterol is a fatty substance found in everybody's blood. We need it in small amounts for health. But excess cholesterol in the blood leads to fatty deposits in blood vessels and can cause problems.

There are 2 types of cholesterol:

1. HDL cholesterol - When raised this protects against heart disease
2. LDL cholesterol - when raised this causes fatty deposits to form in our blood vessels.

So what must we do?

1. **First aim to eat less fat.** Reducing saturated fat can help lower LDL cholesterol and if you are overweight, will help you lose weight. Some foods, e.g. egg yolk, liver, offals (abats), shellfish, are rich in cholesterol but are not the main factor leading to raised cholesterol in the blood. More important than the cholesterol we eat, is saturated fats.

2. **Saturated fats**

What are saturated fats and how do they harm us?

Saturated fats come mainly from animal sources and from some plant sources. (e.g full cream milk, butter, cheese, meat, poultry with skin / fat, pastries, palm oil, bard margarine, ghee, coconut, mayonnaise, salad cream, biscuits, chocolates, ice cream, all fried food) and they raise LDL cholesterol.

3. **Unsaturated fats**

These fats come mainly from plant sources and fish. There are 2 main types

(i) Polyunsaturated fats (e.g. sunflower oil, corn oil, soya oil and soft margarines with labels 'high in polyunsaturates'). They lower total blood cholesterol and LDL cholesterol. oily fish e.g. tuna, pilchards, sardines, salmon, mackrel).

(ii) Monounsaturated fats (e.g. Olive oil, most nuts, avocado and soft margarines with label 'high in monounsaturates'. They raise HDL cholesterol.

4. **Should we not eat any fat at all?**

No, our bodies need some fat to stay in good health. But the fat we eat should be more of the monounsaturated and polyunsaturated type and very little of the saturated type.

How does lowering LDL cholesterol help?

Lowering your LDL cholesterol level will help keep plaque from building up in your arteries. This makes it easier for your heart to get the blood and nutrients it needs.

If you already have coronary artery disease, your doctor will probably want you to lower your LDL level by at least 30 to 35% through diet, exercise and possibly, medicines. Another way to help is to increase your HDL level. If you can reduce your LDL level to less than 130 and increase your HDL level to at least 50, you're on the right track.

LDL cholesterol is called ‘bad’ cholesterol because it can build up on the inside of your arteries, causing them to become narrow from plaque. HDL is called ‘good’ cholesterol because it protects your arteries from plaque build-up by removing cholesterol from the blood.

What foods should I add to my diet?

When trying to lower your LDL cholesterol, you should add foods to your diet that are low in cholesterol and saturated fats, because your body turns saturated fat into cholesterol. To do this, eat foods that are high in soluble fiber (see the box below).

EAT LESS OF THESE FOODS:	INSTEAD, EAT MORE OF THESE FOODS:
Potato chips, French fries, burgers, gateaux piments samoussa and other fried snacks.	Whole meal, bread and flour, pulses (dholl, lentils, dried beans etc...)
Vegetable cooked in butter, ghee cheese, crease sauces and lots of oil.	Fresh vegetables and fruits
Whole milk	Semi-skimmed or skimmed milk, yogurt made from skimmed milk
Bacon, ausage, liver and organ meats (like liver, ‘cari endans’, skin of chicken, fatty meat	Fish cooked with added fat preferably, skinless poultry, lean cuts of meat (with fat trimmed away)
Egg yolks	
Cakes, pastries, ice cream	Sorbets, low fat yoghurt
Sea food like prawns, octopus, calamar Butter, hard margarine, ghee, and cheese	Olive oil, Peanut oil, corn oil, soya oil, (in small amounts). E.g. nuts, peanuts are high in monounsaturated fats but also very high in calories and therefore in small amounts (1 tablespoonful NOT by handfuls), they are good for health

There are lots of ways to add healthy foods to your diet. Follow the tips and the serving-size guidelines below:

- Start your day out right. Have some form of grain (like whole-grain bread or whole-grain cereal) and fruits for breakfast.
- Think of grains and vegetables as your main dish for lunches and dinners. If you're serving meat or poultry as a main dish, add a tossed salad or vegetable to the plate.
- Eat more pulses, beans and peas for health. They are good for health, contain good amounts of protein and fibre, and very little saturated fat.
- Drink fat-free or 1% (*) milk not whole milk or 2% milk. Replace whole milk yoghurt by fat-free yoghurt. Replace ice cream by milk-free 'sorbetts'.
- Serve raw or cooked fruits with low-fat yogurt for dessert.
- Use only a little oil for cooking.
- Eat only small amounts of sweets or better still none at all.
- Eat 1 to 2 servings of fish each week, especially oily fish like tuna, salmon, sardines, pilchards, mackerel. Fish is rich in omega-3 fatty acids which seem to protect from coronary artery disease. People with coronary heart disease also seem to benefit from eating fish .
- Eat small amounts of nuts that are rich in monounsaturated fat, like almonds, cashews, and peanuts. Avoid eating nuts by the handful though. Instead, garnish food with one tablespoon of chopped nuts per person.

What else can I do if I have coronary artery disease?

- Besides changing your diet, you should talk to your doctor about an exercise program that's right for you.
- If you smoke, quit.
- If you're overweight, try to lose weight (changing your diet and exercising will help you to lose weight).
- Talk with your doctor about reducing other risk factors, such as high blood pressure or diabetes.

What if changing my diet doesn't help?

Your body will need time to respond to changes in your diet. Your doctor will watch your progress. If your cholesterol level hasn't improved after 2 to 6 months, your doctor may prescribe medicine to lower your cholesterol. However, you will still need to eat a healthy diet to help the medicine work.

DIETARY GUIDELINES

ON

MANAGEMENT OF OBESITY

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Classification of Obesity: Cut Off Points

Classification of Obesity

Body mass index (BMI) is a useful way of classifying obesity

It is measured in the following way: $\text{Weight in kgs}/[\text{Height in metres}]^2$

Obesity is defined as a BMI >30 kg/m²

Overweight is defined as a BMI >25 kg/ m²

However, it must be noted that CHD risks often occur at lower BMI's than the above. Waist circumference is in fact more closely correlated with CHD risks than BMI per se and should therefore, also be taken into consideration when deciding which patients will benefit from weight reduction.

CLINICAL GUIDELINES ON THE IDENTIFICATION, EVALUATION, AND TREATMENT OF OVERWEIGHT AND OBESITY IN ADULTS

A. ADVANTAGES OF WEIGHT LOSS

The recommendation to treat overweight and obesity is based not only on evidence that relates obesity to increased mortality but also on evidence that weight loss reduces risk factors for disease. Thus, weight loss may not only help control diseases worsened by obesity, it may also help decrease the likelihood of developing these diseases.

1. Blood Pressure

There is strong and consistent evidence from lifestyle trials in both overweight hypertensive and nonhypertensive patients that weight loss produced by lifestyle modifications reduces blood pressure levels. Limited evidence exists that decreases in abdominal fat will reduce blood pressure in overweight nonhypertensive individuals, although not independent of weight loss, and there is considerable evidence that increased aerobic activity to increase cardiorespiratory fitness reduced blood pressure (independent of weight loss).

Weight loss is recommended to lower elevated blood pressure in overweight and obese persons with high blood pressure.

2. Serum/Plasma Lipids

There is strong evidence from lifestyle trials that weight loss produced by lifestyle modifications in overweight individuals is accompanied by reductions in serum triglycerides and by increases in HDL-cholesterol. Weight loss generally produces some reductions in serum total cholesterol and LDL-cholesterol. Limited evidence exists that a decrease in abdominal fat correlates with improvements in lipids, although the effect may not be independent of weight loss, and there is strong evidence that increased aerobic activity to increase cardiorespiratory fitness favourably affects blood lipids, particularly if accompanied by weight loss.

Weight loss is recommended to lower elevated levels of total cholesterol, LDL cholesterol, and triglycerides, and to raise low levels of HDL-cholesterol in overweight and obese persons with dyslipidemia.

3. Blood Glucose

There is strong evidence from lifestyle therapy trials that weight loss produced by lifestyle modification reduces blood glucose levels in overweight and obese persons without diabetes, and weight loss reduces blood glucose levels and Hb_{A1c} in some patients with type 2 diabetes; there is suggestive evidence that decreases in abdominal fat will improve glucose tolerance in overweight individuals with impaired glucose tolerance, although not independent of weight loss; and there is limited evidence that increased cardiorespiratory fitness improves glucose tolerance in overweight individuals with impaired glucose tolerance or diabetes, although not independent of weight loss. In addition, there is suggestive evidence from randomized trials that weight loss induced by weight loss medications does not appear to improve blood glucose levels any better than weight loss through lifestyle therapy in overweight persons both with and without type 2 diabetes.

Weight loss is recommended to lower elevated blood glucose levels in overweight and obese persons with type 2 diabetes.

B. MEASUREMENT OF DEGREE OF OVERWEIGHT AND OBESITY

Patients should have their BMI and levels of abdominal fat measured not only for the initial assessment of the degree of overweight and obesity, but also as a guide to the efficacy of weight loss treatment.

1. BMI To Assess Overweight and Obesity

There are a number of accurate methods to assess body fat but no trial data exist to indicate that one measure of fatness is better than any other for following overweight and obese patients during treatment. Since measuring body fat by these techniques is often expensive and is not readily available, a more practical approach for the clinical

setting is the measurement of BMI; epidemiological and observational studies have shown that BMI provides an acceptable approximation of total body fat for the majority of patients.

Practitioners should use the BMI to assess overweight and obesity. Body weight alone can be used to follow weight loss, and to determine efficacy of therapy.

2. BMI To Estimate Relative Risk

In epidemiological studies, BMI is the favored measure of excess weight to estimate relative risk of disease. BMI correlates both with morbidity and mortality; the relative risk for CVD risk factors and CVD incidence increases in a graded fashion with increasing BMI in all population groups.

Moreover, calculating BMI is simple, rapid, and inexpensive, and can be applied generally to adults. The panel, therefore, makes this recommendation:

The BMI should be used to classify overweight and obesity and to estimate relative risk of disease compared to normal weight.

3. Assessing Abdominal Fat

Evidence from epidemiological studies shows waist circumference to be a better marker of abdominal fat content than waist-hip ratio, and that it is the most practical anthropometric measurement for assessing a patient's abdominal fat content before and during weight loss treatment. Based on evidence that waist circumference is a better marker than waist-hip ratio, it is recommended that:

The waist circumference should be used to assess abdominal fat content.

4. Sex-Specific Measurements

Evidence from epidemiological studies indicates that a high waist circumference is associated with an increased risk for type 2 diabetes, dyslipidemia, hypertension, and CVD. Therefore, sex-specific cutoffs for waist circumference can be used to identify increased risk associated with abdominal fat in adults with a BMI in the range of 25 to 34.9. These cutpoints can be applied to all adult ethnic or racial groups. On the other hand, if a patient is very short, or has a BMI above the 25 to 34.9 range, waist cutpoints used for the general population may not be applicable. Based on the evidence from nonrandomized studies, it is recommended that:

For adult patients with a BMI of 25 to 34.9 kg/m², sex-specific waist circumference cutoffs should be used in conjunction with BMI to identify increased disease risks.

C. HOW TO ACHIEVE WEIGHT LOSS

Goals for weight loss

The general goals of weight loss and management are:

- to reduce body weight
- to maintain a lower body weight over the long term
- and to prevent further weight gain

Evidence indicates that a moderate weight loss can be maintained over time if some form of therapy continues. It is better to maintain a moderate weight loss over a prolonged period than to regain from a marked weight loss.

1. Initial goal of Weight Loss from Baseline

There is strong and consistent evidence from randomised trials that overweight and obese patients in well-designed programs can achieve a weight loss of as much as 10 percent of baseline weight. In the diet trials, an average of 8 percent of baseline weight was lost. Since this average includes persons who did not lose weight, an individualized goal of 10 percent is reasonable. It is therefore recommended that:

The initial goal of weight loss therapy should be to reduce body weight by approximately 10 percent from baseline. With success, further weight loss can be attempted if indicated through further assessment.

2. Amount of Weight Loss

Randomized trials suggest that weight loss at the rate of 1 to 2 lb/week (calorie deficit of 500 to 1,000 kcal/day) commonly occurs for up to 6 months.

Weight loss should be about 1 to 2 lb/week for a period of 6 months, with the subsequent strategy based on the amount of weight lost.

PHYSICAL ACTIVITY

Effects of Physical Activity on Weight Loss

Thirteen of these articles were accepted for inclusion in these guidelines. There is strong evidence that physical activity alone, i.e., aerobic exercise, in obese adults results in **modest** weight loss and that physical activity in overweight and obese adults increases cardiorespiratory fitness, independent of weight loss. Randomized trials suggest that increased physical activity in overweight and obese adults reduces abdominal fat only

modestly or not at all, and that regular physical activity independently reduces the risk for cardiovascular disease.

Physical activity is recommended as part of a comprehensive weight loss therapy and weight control program because it:

- (1) modestly contributes to weight loss in overweight and obese adults (Evidence Category A),*
- (2) may decrease abdominal fat (Evidence Category B),*
- (3) increases cardiorespiratory fitness (Evidence Category A), and (4) may help with maintenance of weight loss (Evidence Category C).*

Physical activity should be an integral part of weight loss therapy and weight maintenance. Initially, moderate levels of physical activity for 30 to 45 minutes, 3 to 5 days a week, should be encouraged. All adults should set a long-term goal to accumulate at least 30 minutes or more of moderate-intensity physical activity on most, and preferably all, days of the week.

Effects of Physical Activity and Diet on Weight Loss (Combined Therapy)

There is strong evidence that the combination of a reduced-calorie diet and increased physical activity produces greater weight loss than diet alone or physical activity alone, and that the combination of diet and physical activity improves cardiorespiratory fitness in overweight and obese adults when compared to diet alone. The combined effect of a reduced calorie diet and increased physical activity seemingly produces modestly greater reductions in abdominal fat than either diet alone or physical activity alone, although it has not been shown to be independent of weight loss.

The combination of a reduced calorie diet and increased physical activity is recommended since it produces weight loss that may also result in decreases in abdominal fat and increases in cardiorespiratory fitness.

BEHAVIOUR THERAPY

Evidence indicates that behavioural strategies to reinforce changes in diet and physical activity in obese adults produce weight loss in the range of 10 percent over 4 months to 1 year. In addition, no one behavior therapy appears superior to any other in its effect on weight loss; multimodal strategies appear to work best and those interventions with the greatest intensity appear to be associated with the greatest weight loss. Long-term follow-up of patient undergoing behavior therapy shows a return to baseline weight for the great majority of subjects in the absence of continued behavioural intervention. Randomized trials suggest that behavior therapy, when used in combination with other weight loss approaches, provides additional benefits in assisting patients to loss weight short-term, i.e., 1 year (no additional benefits are found at 3 to 5 years).

There is also suggestive evidence that patient motivation is a key component for success in a weight loss program.

Practitioners need to assess the patient's motivation to enter weight loss therapy; assess the readiness of the patient to implement the plan and then take appropriate steps to motivate the patient for treatment.

SUMMARY OF LIFESTYLE THERAPY

There is strong evidence that combined interventions of reducing diets, increased physical activity, and behavior therapy provide the most successful therapy for weight loss and weight maintenance.

Weight loss and weight maintenance therapy should employ the combination of reducing diets, increased physical activity, and behavior therapy.

GOALS FOR WEIGHT LOSS MAINTENANCE

Once the goals of weight loss have been successfully achieved, maintenance of a lower body weight becomes the challenge. Studies have shown that whereas weight loss is achievable, it is difficult to maintain over a long period of time (3 to 5 years). In fact, the majority of persons who lose weight, once dismissed from clinical therapy, frequently regain it – so the challenge to the patient and the practitioner is to maintain the weight loss. Successful weight reduction thus depends on continuing a maintenance program on a long-term basis. In the past, obtaining the goal of weight loss has been considered the end of weight loss therapy. Observation, monitoring, and encouragement of patients who have successfully lost weight should be continued long term.

The literature suggests that weight loss and weight maintenance therapies that provide a greater frequency of contacts between the patient and the practitioner and are provided over the long term should be utilized whenever possible. This can lead to more successful weight loss and weight maintenance.

SPECIAL GROUPS

The needs of special patient groups must be addressed when considering treatment options for overweight and obesity. The guidelines focus on three such groups including smokers, older adults, and diverse patient populations.

1. Smokers

Cigarette smoking is a major risk factor for cardiopulmonary disease. Because of its attendant high risk, smoking cessation is a major goal of risk-factor management. This aim is especially important in the overweight or obese patient, who usually carries

excess risk from obesity-associated risk factors. Thus, smoking cessation in these patients becomes a high priority for risk reduction. Smoking and obesity together increase compound cardiovascular risk, but fear of weight gain upon smoking cessation is an obstacle for many patients. Therefore, the panel recommends that:

All smokers, regardless of their weight status, should quit smoking. Evidence Category A. Prevention of weight gain should be encouraged and if weight gain does occur, it should be treated through dietary therapy, physical activity, and behavior therapy, maintaining the primary emphasis on the importance of abstinence from smoking..

2. Older Adults

The general nutritional safety of weight reduction at older ages is of concern because restrictions on overall food intake due to dieting could result in inadequate intake of protein or essential vitamins or minerals. In addition, involuntary weight loss indicative of occult disease might be mistaken for success in voluntary weight reduction. These concerns can be alleviated by providing proper nutritional counselling and regular body weight monitoring in older persons for whom weight reduction is prescribed. A review of several studies indicates that age alone should not preclude treatment for obesity in adult men and women.

A clinical decision to forgo obesity treatment in older adults should be guided by an evaluation of the potential benefits of weight reduction for day-to-day functioning and reduction of the risk of future cardiovascular events, as well as the patient's motivation for weight reduction. Care must be taken to ensure that any weight reduction program minimizes the likelihood of adverse effects on bone health or other aspects of nutritional status.

RESPONSIBILITY

Put responsibility on patients, not professionals.

There is an extensive amount of literature continually trying to provide the person desiring to lose weight with the reducing diet that works, however ultimately the only reducing diet that works is one which achieves a sustained reduction in energy intake and such a reducing diet will only be beneficial if it provides a balanced nutrient intake.

GENERAL CONSIDERATIONS

When prescribing a reducing diet the following factors must be borne in mind:-

1. The diet must provide the body with all the essential nutrients, vitamins and minerals necessary to maintain health and at the same time creating an energy deficit.
2. It must be sufficiently flexible to take into account a patient's dietary habits, culture and financial status.
3. the diet must be presented to the patient as a basis for a long term change of eating habits and not a short term crash diet.
4. A calorie deficit of loss of 500 KCals / day will help achieve a weight loss of 0.5 kg /week. For most patients, this will be the maximum practical deficit achievable. For many more, it will be less than this.

ENERGY CONTENT AND DIETARY COMPOSITION

1. The usual energy intake of each individual will provide the best guide to what the energy content of the weight reducing diet will be. In a hospital context for the management of obese patients, the energy content of the reducing diet amounts to ~ 1000 Kcal for females and ~1300 – 1500 K Cal for males.
2. Regular meal patterns are important. Patients should consume a minimum of 3 meals a day.
3. Bread, cereals and potatoes are still thought to be ‘fattening’ by many people and this misconception must be clarified. Fibre rich sources of carbohydrate such as whole meal bread, cereals, potatoes have a low energy density, are inexpensive, easily available and are good sources of protein, vitamins and minerals and help provide satiety. They should be provided with every meal.
4. Protein content must be adequate to meet daily requirements, otherwise there will be loss of lean body mass instead of adipose tissue.

However, an energy deficit of 1000 Kcal/day below requirements will achieve an approximate weight loss of 1 kg/week, which for most patients is the (2) maximum practical deficit recommended.

5. With an energy volume of 9 Kcal/g, fat is a very concentrated source of energy in any person’s diet. Reduction in fat intake, especially saturated fat, is very important. The percentage of energy from fat in a reducing diet should be as low as possible with the biggest reduction being in saturated fat.

Adding oils and fat to food e.g. cakes and biscuits, fried foods, butter on bread, cooking with oil, should be minimized.

All foods rich in fat, especially saturated fat, should be avoided.

6. Plenty of fruits and vegetables should be included daily as they are valuable sources of fibre, vitamins and minerals.
7. Energy rich foods such as sugar, chocolates, cakes etc should be avoided.
8. Patients should be discouraged from weighing themselves more than once a week
9. List of “foods which can be eaten freely” and “foods to avoid” based on low and high energy dense food respectively are helpful to patients.

Rate of weight loss

Excess energy is stored as adipose tissue. Therefore during weight loss this adipose tissue should be utilized without loss of lean body mass. To achieve this, it is important

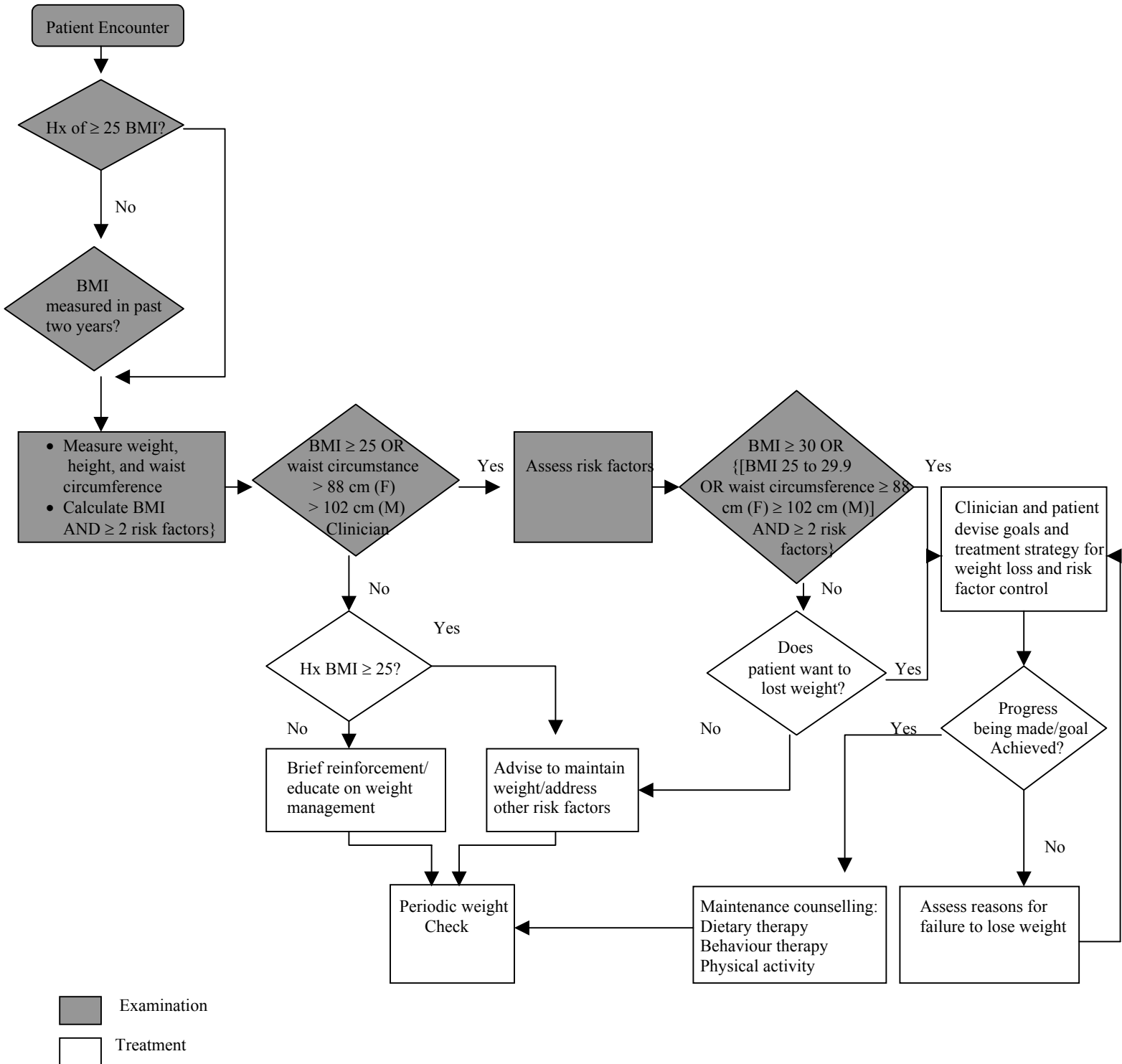
- (i) not to go on very low calorie, crash diets eg. fruit only diets**
- (ii) to have adequate protein in the diet**
- (iii) to build up a programme of regular exercise**

Exercise

Exercise is beneficial to our health and feeling of well being. A significant amount of exercise can be performed by ordinary daily tasks e.g.

1. Walking up the stairs
2. Walk to the shops if you are planning to do some ‘light’ shopping
3. Get off the bus a stop early and walk home
4. Walk your children or grand children to school
5. Doing housework instead of watching television.
6. Gardening

Algorithm for management of obesity



* This algorithm applies only to the assessment for overweight and obesity and subsequent decisions based on that assessment. It does not reflect any initial overall assessment for other conditions and diseases that they physician may wish to do.

CLASSIFICATION OF OBESITY: CUT OFF POINTS

Different cut off points are used by different countries but for this purpose recommendations for the World Health Organisation will be used as this has already been used in previous surveys in Mauritius. (Garrow 1981) also classifies obesity in the following way: Grade 1 obesity (BMI 25-30), Grade 0 (BMI 20-25), Grade 2 or greater (BMI >30). However it is to be noted that in Asian populations, morbidity and mortality is occurring in people with lower BMI's and smaller waist circumferences. In a study of 1513 Hong Kong Chinese, the risk of diabetes, hypertension dyslipidaemia and albuminuria starts to increase at a BMI of about 23 kg/m² (Ko et al 1999). Similar data have been published from the Chinese in Singapore (Deurenberg-Yap et al 1999) and in Indian Asians living in Mauritius where there is a significantly increased risk of Type 2 diabetes and hypertension among those with the normal range. In pacific Islanders higher cut offs are required to define overweight and obesity of BMI \geq 26 Kg/m² and BMI \geq 32 kg/m² respectively (Swinburn et al 1999). BMI may not correspond to the same degree of fatness across different populations due in part to different body proportions. Although it can generally be assumed that individuals with a BMI of 30 or above have an excess fat mass in their body, BMI does not distinguish between weight associated with muscle and weight associated with fat, As result the relationship between BMI and body fat content varies according to body build and proportion, and it has been shown repeatedly that a given BMI may not correspond to the same degree of fatness across populations. The shortest and tallest subjects also tend to be misclassified as obese (Freeman et al 1995).

However recent evidence suggests that waist circumference alone measured at the mid point between the lower border of the rib cage and iliac crest may provide a more practical correlation of abdominal fat distribution and associated ill health (WHO 1998). Populations differ in the level of risk associated with a particular waist circumference. South Asians (Indians) have high levels of abdominal obesity, although they may not be considered obese by conventional BMI criteria (McKeigue et al 1991). Although the recent WHO report (WHO 1998) suggests that 94 cm in men and 80 cm in women should

be the appropriate measures in Europeans, these cut-off are not suitable for Asian populations. This report suggests that instead, 90 cm for men and 80 cm for women be used as interim lower values for values. However it is important to include waist measures in any assessment of obesity; a reduction in waist even with no weight change may result in significant risk reduction (WHO 1998).