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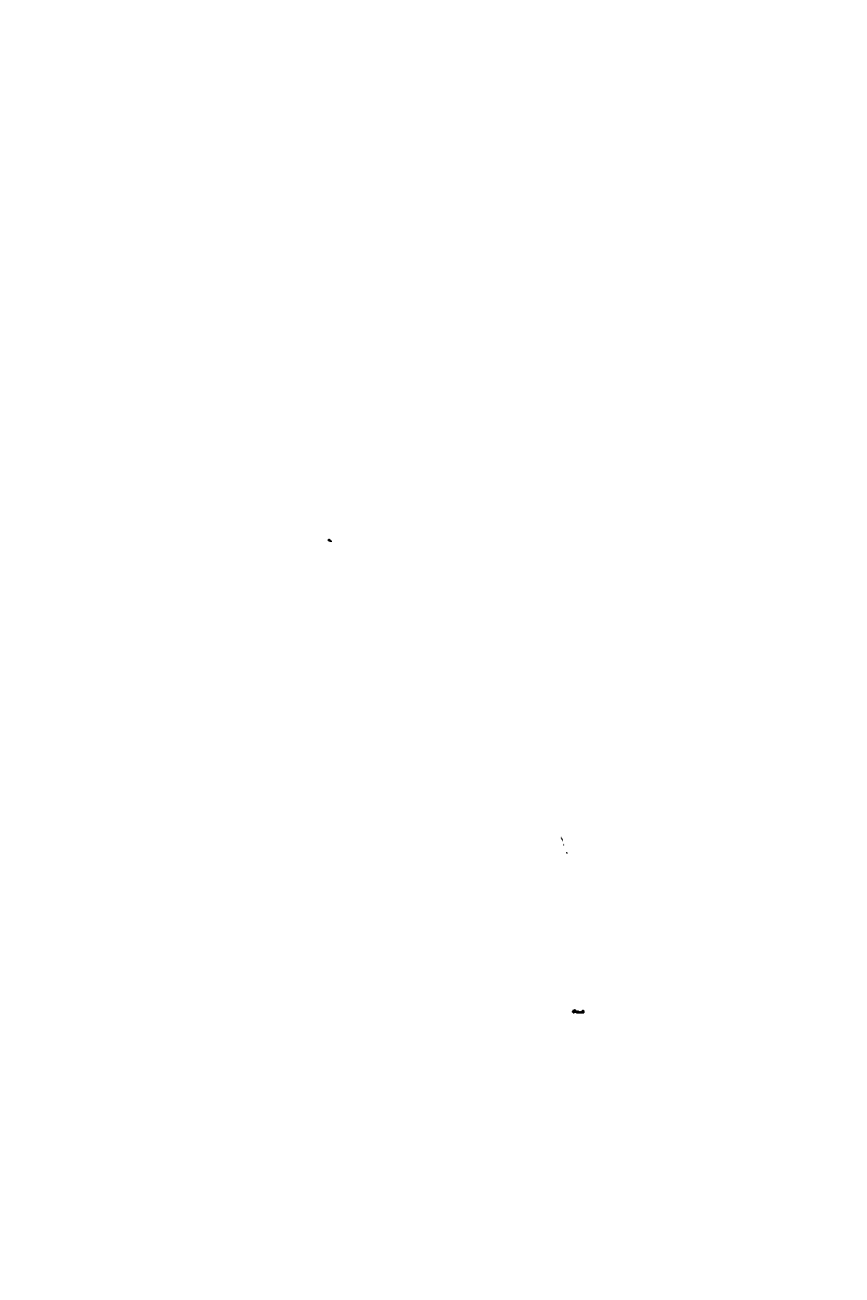
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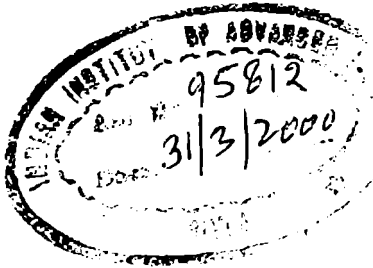
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Published by

BOOKS FOR ALL,

C-2/9, 3rd floor, Ashok Vihar,
Phase-II, Community Centre,
Delhi-110052.

Typeset by

ABC for DTP

6, Rajdhani Enclave, Delhi-34.

Printed at

D.K.Fine Art Press,
Delhi-110052

PRINTED IN INDIA

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1

Introduction

While millions of human beings in the eastern hemisphere die from inadequate food intake, millions of their western counterparts eat too much, exercise too little and risk an earlier death than they need because of the ills produced directly or indirectly by obesity.

In urban society, food intake does not usually diminish with increasing age but physical activity lessens and weight is added. Even if weight remains stationary fat can be added at the expense of muscle.

Obesity is the most common nutritional disorder. Life expectancy diminishes with excess weight. Life Insurance statistics bear out the fact that "an extra inch at the waist line is a year less of life line." Obesity invites disability diseases and premature death. Excess fat is as much a physical

hindrance as carrying a load of the same weight day and night. Obesity gives rise to breathlessness on moderate exertion such as climbing stairs.

Obesity is due to either (1) excess calorie consumption or (2) decreased energy output and lack of exercise brought about by modern labour saving devices. Not only do they reduce the physical effort needed at home and for leisure, but they also make work easier in employment. Hours of employment are also being reduced.

The exact incidence of obesity is not known. Based upon height-weight standards, it has been estimated that half of all men over age 30 are atleast 10% over-weight and one-fourth are obese. The incidence is even higher for women with about 40% being obese by the time they reach 40 years. In children also the incidence is higher in girls than in boys.

2

Defination

In mind of many people the question arises, what is obesity? It is easily answered, obesity is a weighty problem. It can be defined as the condition in which there is excessive deposition of body fat as a result of overeating. Food consumed in excess of body requirement is converted into fat and deposited under the skin. This fat normally serves as a source of energy during condition of starvation and semi-starvation. Obesity is usually associated with over-weight, however, one may be over-weight but not obese. The term overweight is applied to individuals who are 10 to 20% above desirable weight. Obesity is applied to person 20% or more overweight.

Amount of fat in the storage depots is determined by the balance between the rates of deposition and utilization. One becomes fat when

the rates of deposition exceeds the rate of utilization and lean when this processes are reversed. It has been established that obesity results purely from the intake of more food than is necessary to meet energy requirements, in other words, it is a question of appetite being improperly balanced with energy needs.

The unit in which the energy content of food is measured is the calorie. All the foods have a calorific value which is determined by oxidation of the food in a calorimeter. The Nutritive or Calorific Value of various foods is given in appendix table 1. Those foods which emit a lot of heat on combustion have high calorific values. Imagine an open fire. If oil is thrown onto the fire, they will immediately go up in flames, as will sugar and throw out a lot of heat. These foods have a high calorific value. If tomatoes were thrown onto the fire they would have the opposite effect because they have a low calorific value.

All dieting methods, such as low fat diets, a low calorific, carbohydrates diets, crash diets, single item diets are based on calories and are designed to reduce the total amount of calories consumed.

The human body is like a machine. It converts food into energy. Everything our body does it uses this energy. Even while sleeping we use approximately 75 calories per hour. The food we eat is measured in calories and the energy it produces is measured in calories. We can therefore say that if our lifestyle uses 2000 calories per day,

and we eat 2100 calories per day, the extra 100 calories not used will be turned into fat. If this were just for one day it would not matter. If it happened every day for a year, the extra 100 calories per day would add over 5-6 kg to our weight. If, on the other hand, we only eat 1900 calories, the 100 calories shortfall will be taken from our fatty tissues and we will lose weight. This is our objective, a gradual loss of weight, perhaps only 1/2-1kg a week, but coming from the correct place, the fatty tissues. We are not interested in crash diets which lose several kilogram a week, mainly fluid, and which cannot last because of their severity and end up teaching you nothing.

Remember, there is no food or device that will get rid of fat. All food contains calories. We will not lose weight by eating slimming foods as well as our normal diet, we will in fact put on weight. Devices may make us look better, but the fat they displace will not disappear. Saunas and Turkish baths have only a short term benefit, because the fluid loss will soon be replaced. Into this category comes also the pills to suppress your appetite, prescribed by doctors. Eventually we have to stop taking them and we will put on weight again.

BUILD

Our build is influenced mainly by our parents' eating habits. If parents are fat, the children almost invariably are. If parents are thin, so generally are the children. If both our parents are

slim, we have over a 90% chance of being slim. If both our parents are overweight, we have a 75% chance of being over-weight. If one parent is overweight, we have a 40% of chance of being overweight. This is mainly because of our environment, not our heredity. It is because of the way in which our parents ate and how they feed us. If all our relatives are fat, we can still be slim.

Sometimes we may hear a thin person say, "I eat like a horse, but do not put on a kg of weight." They may think they are eating huge quantities, but they are probably comparing their intake with that of their parents and most probably, are not eating large quantities of high calorie foods. It all comes down to calories in the end. If a person is thin, he/she tends to be more active and of course, uses a lot of calories. To sustain that level of output, they will have to eat an equal number of calories. It may appear for a time that they are unable to put on weight. This will come as surely as day follows night, if they eat the same amount of food as they get older and slow down. The reverse is also true. A child that is brought up on a high calorie diet will get fat. He or she will not be as energetic and will not, therefore, use all the calories eaten. The trouble here is that, as the person gets older and becomes even less energetic, but consumes the same amount of food, the following process speeds up. This is why these people cut down slightly on their food and cannot understand why they are not losing weight. All they are doing is arresting their current growth.

3

Causes of Obesity

We shall now look at some other *causes of obesity*. The main cause of obesity is that when the intake of food is in excess of body needs. Some factors that can affect the person's eating habits and his weight include the following:

- (1) Age and Sex
- (2) Emotional factors
- (3) Failure to cut down eating habits during reduced activity
- (4) Overeating
- (5) Economic status
- (6) Family eating and Exercise habits
- (7) Endocrines Factors
- (8) Frequency of Meals
- (9) Physical activity
- (10) Standard of Living
- (11) Ignorance
- (12) Genetic factors

(1) Age and Sex

Obesity may occur at any age and in either sex. After puberty it is more common in woman than in men. In early pregnancy woman gain 12.5 kg weight which she fails to reduce during lactation and thus repeated pregnancy may result in obesity.

(2) Emotional Factors

Some people use food as a comfort or compensation for feeling of frustration, happiness or worry. They overeat to counteract domestic troubles, financial problems, family illness or social upsets. Obese individuals eat more if excess food is served on the table but are unlikely to make even a small effort to open a near at hand refrigerator to get more food. Not bringing more food to the table is the best method for avoiding temptation to over eat. A housewife with children is more exposed to food and more likely to be obese than a woman working in office.

(3) Failure to Cut Down Eating Habits During Reduced Activity

It has already been pointed out that as a person becomes less active with age or occupation, he requires fewer calories to maintain his weight level. If, on the other hand, his food intake is not decreased but remains the same, he puts on weight.

(4) Overeating

It is the prime factor in the obesity. Any excess of intaken calories over energy expenditure is stored as fat. Obesity is like a bank account. If a person takes 2500 cal. daily and is caloric output in 2300 cal, then he saves 200 cal. which are stored as fat. An extra slice of bread or a banana provides 50-100 cal. and such slight excess amounts to a considerable accumulation in the course of time. Dietary habits also plays a part in determining body weight. From a variety of foods, a fat person usually chooses fried potatoes while a thin person prefers vegetable salad.

(5) Economic Status

Some families because of limited income buy cheap foods that tend to be rich in carbohydrates (sugar and starches) in place of protein foods which are more expensive.

Obesity is common in poor women perhaps because of food rich in protein and fat are more expensive than the starchy foods which provide the bulk of the cheap meals. Obesity is also seen in top class executive men, here the business lunch and the alcohol may be the main cause.

(6) Family Eating and Exercise Habits

Some individuals come from homes in which parents provide meals that are excessive in calories. Others are accustomed to have between meals, eating of sweets such as soft drinks, candy,

ice-creams, pastries. Still others have been accustomed to too little exercise, few sports modern convenience, and sheer laziness.

The habit of uncontrolled snacking and nibbling can lead to the consumption of uncounted calories. If more calories are taken-in, than the body is using and thus more stored fat.

(7) Endocrine Factors

In a small percentage of patients the cause of overeating is a disturbance of function of one or more of the Endocrine glands such as thyroid or pituitary gland. Sometimes it begins at puberty, pregnancy or the menopause. The basal metabolism is lowered in this group of persons so that weight gain results unless the person takes low calorie diet.

(8) Frequency of Meals

Those taking 3 meals showed a greater tendency to over-weight to increase serum cholesterol and to diminished glucose tolerance than those taking 5 meals. However, on a low calorie diet, the weight loss was the same regardless of the frequency of meals. People with insomnia and in the habit of eating when awake at night will definitely increase in weight due to the enhanced calorie intake. It is the total intake of calories rather than the frequency of meals that determines the weight change eating habits of obese people differ. In some, nibbling is an important cause of excess food intake.

(9) Physical Activity

Reduced activity leads to obesity. Exercise to help in weight control. It also helps in physical, mental, psychological and social fitness. It provides an outlet for emotional tensions, promotes self-confidence. Obesity is seldom found in those who lead active lives. Exercise is a means of reducing weight. A combination of exercise and diet is to be strongly recommended.

(10) Standard of Living

The high standard of living has encouraged an increased food intake since when income is raised, more money is spent on food and more preference is given to tastier and high calorie foods.

At the same time, modern food processing and packing and convenience of food shopping and eating out have got several to curtail individual food intakes.

In the past 20-30 years life in the highly developed areas of the world has undergone great changes. Work hours have been shortened, labour saving machines have been installed in homes and factories, transportation is easier, occupation are sedentary rather than active. This has reduced the food habits but by and large food habits have not changed to off set the decreased needs.

(11) Ignorance

Ignorance of food value is often the cause of over-eating.

(12) Genetic Factors

Obesity often runs in families the role of heredity in obesity is not well understood. It is possible that abnormal genes may be responsible for excessive hunger or an imbalance of endocrine glands or a tendency to deposit fat. However, a dietetic habit of family rather than heredity factors may be responsible for obesity. The children of a family who eat fried foods, cereals, milk products and sweets will be heavier than their neighbours who relish green vegetables, fruits and meat.

4

More About Calories

Everybody burns up a different total of calories each day. I prefer to think of calories being burned up rather than used. As we have seen, even asleep, we burn calories. If you burn up all the calories which you consume, you start to burn fat and so lose weight. The amount of calories a person burns depends on several factors.

(a) *Height* : Obviously the taller a person is the more they should weigh. Being taller they will burn more calories and therefore have to eat more than a shorter person.

(b) *Sex*: Or perhaps we should say gender: Men have a larger frame than women and again burn more calories for their height.

(c) *Age* : The older we become the less active we are and the fewer calories we burn.

(d) *Occupation* : Again the more active you are during the day, the more calories you burn.

(e) *Leisure*: The more physically strenuous your evening and weekend activities, the more calories you burn.

Most individuals have their day divided into three roughly equal eight-hour periods.

(a) Sleep which accounts for 400-500 calories.

(b) Occupation which accounts for between 600 and 1200 calories, depending on whether you have a sedentary job (e.g office worker) or a moderately active one (e.g. light individual worker postman).

(c) Leisure time which can account for anything between 600 and over 2000 calories depending on the nature of your hobbies.

You are stuck with your height, your age, your sex and your occupation. You do have control over your leisure time. If you are just a bit more active you will burn more calories. For instance, 20 minutes brisk walk will burn up another 100 calories.

To start with, you will probably find that you do not have the energy to do any extra physical work. Do not worry, after one week of the dieting you will feel fitter and be more inclined to extra exercise. This is because your legs, at the moment, have become accustomed to carrying your existing weight. As soon as you lose a kilogram or two, your legs will feel much more springy from not

having to carry the same weight. This is the time to start and get a dual bonus from burning more calories and consuming less. Try to burn more calories during your normal day e.g: climb the stairs instead of using lift, walk instead of using conveyance to go shopping. Remember a 20 minute walk burns up over 100 calories. Whatever you do extra will be of direct benefit to you.

5

Complications Arising Due to Obesity

Obesity can cause coronary diseases, high blood pressure probably strokes and heart attacks especially if you also smoke and drink. It is closely associated with kidney diseases, hernia, arthritis, gout and gall bladder stones. The obese have elevated blood triglycerides and cholesterol and a reduced carbohydrates tolerance. Obesity entails a respiratory cost in normal person by increased work of breathing, a decrease in lung volume and pulmonary hypertension. Increased difficulty in breathing may lead to carbon-dioxide retention. It gives rise to breathlessness on moderate exertion such as climbing stairs. In any person with chronic pulmonary disorders such as asthma obesity greatly increases the respiratory stress.

The hazards of surgery and of pregnancy and child birth are multiplied in the presence of excessive adipose tissues or obesity. The excessive deposits of subcutaneous fat cause skin infections.

Diabetes is also much more likely to occur in overweight people than in those who are slim and it can be controlled by diet.

Obese people are more uncomfortable during warm weather because the thick layers of fat serve as an insulator. More effort must be expended to do a given amount of work because of the increase in body mass. Because of their lessened agility, obese people are more susceptible to accidents. At home they may slip on floor while walking and spill boiling milk or water over themselves; at their work, they have difficulty in avoiding the moving parts of machinery and on the road, they cannot quickly cross the traffic.

Fatigue, backache, leg pain and foot troubles are common complaints of the obese.

In addition to above complications, obese people have risk from the standpoint of life insurance like the person is likely to die at 55-60 when he might otherwise live to 70 years had he not been obese.

6

Excuses for Being Fat

We shall now examine the most common excuses for being fat and destroy each in turn.

(1) Glands

It is possible for glands to cause weight gain but if this is the case you will already know about it.

(2) Excess Fluid Retention

If a person is very much over-weight, they are very often easily convinced that this is due to them having excess fluid retention. This is not true, apart from the person who is very ill from heart or kidney diseases or is perhaps taking steroid tablets. A kilogram or two may in fact be due to fluid retention but the remaining weight will be pure fat.

(3) Middle Age Spread

As we get older, you need fewer calories because we are less energetic and also because our metabolism slows down. At the age of forty we should be eating 5% less than we ate at the age of twenty and at the age of fifty we should be eating 10% less. Most people do not decrease their intake and result is overweight.

(4) Low Blood Sugar

If we eat more sugar, starch and carbohydrates than we need, the level of sugar in our blood rises and insulin is released to reduce this level. Sometimes too much insulin is produced, which then has the reverse effect, bringing about a low blood sugar level, which in turn makes a person feel hungry and irritable. If he then satisfies this hunger with more sugar, starch or carbohydrates; he will obviously gain weight and it is possible for a vicious circle to start, which may eventually end with the pancreas being unable to produce sufficient insulin to cope and diabetes could result. In other words, low blood sugar, is most likely to be a direct result of eating too much food in the form of sugar, starch and carbohydrates too quickly.

(5) Heavy Bones

The bones of an average woman weigh 16 to 17 pounds (1 pound=2.2 kg). If our bones are heavier they would certainly not account for an extra 10 lb or more! If some of our bones are wider it will take

more flesh to cover them, but this is accounted for in the height/weight tables under the heading of large frame.

(6) Metabolism

This is a much used word. Let us take a closer look at it, to see what it actually does mean. During digestion, proteins are split into amino acids, carbohydrates are split into simple sugars and most fats are converted into fatty acids and glycerol. At this stage they are absorbed into the body, where they are metabolised. They are either burned as fuel for various parts of the body or built up again into the protein, fats and carbohydrates of the special kinds the body needs. They are used to rebuild tissues or stored for future use. Many of them will be transformed into a different form from which they are digested. For example, excess carbohydrate is converted into fat. If there is a shortage of carbohydrate, some will be made from the protein amino acids which would normally be used for body repair. Our Basal Metabolic Rate is the amount of calories we use just to keep going without actually physically exerting ourselves. The average woman uses about 1400/1500 calories in 24 hours at this rate, and man slightly more. It can vary by as much as from 1200 to 1800 calories per day. This means that, however heavy or light we are, we must lose weight if we take in less than 1200 calories per day, regardless of our metabolic rate. This rate does come down slightly after a lengthy period of dieting, mainly

because of reduced body size, and can cause a barrier of further weight loss. There is some evidence that exercise increases our metabolic rate. Exercise, then, has a double benefit. It burns up more calories and also, by increasing the metabolic rate, helps to burn other foods faster.

Everyone's metabolism works at a slightly different rate however, as far as dieting is concerned, the difference is so small that it is not worth considering. If we stay on our diet for 2 months and do not lose weight, please see a doctor. But be sure you have not cheated in the meantime.

One in four adults try to diet every year, mostly without success. This is probably either because they do not allow a sensible dieting plan or because the one they do follow is so harsh, they cannot stick to it for more than a week or so.

7

Fads of the Fat

Every fat individual has his own theories as to the cause and treatment of obesity. He sincerely believes that some mechanism other than his high calorie diet has caused his obesity. Similarly for the treatment, he tries everything else but not alone calorie diet. Some people believe that they are fat because they drink too much of water in between meals or during the day. If it were possible for water to provide calories and be stored as fat, the greatest problem in the world that of feeding the population would immediately disappear. The frustrated obese patients in their never ending search for a new method of losing weight may try sour lime in the early morning which may erode the enamel and destroy the teeth.

A kindly friend may advise him to take particular food stuff having a 'specific reducing property'. This food stuff, if it is in excess of his

total calories requirement merely increases his waist line.

Some try to avoid mixing proteins, fat and carbohydrates at a meal. Natural foods are combinations of protein, fat and carbohydrates and oils and animal fats which provide pure fat. The juices of our alimentary canal are designed by nature for the digestion of mixed food. All types of 'Monodiet' like the meat diet, egg diet, buttermilk diet and fruit and fruit juices diet usually result in monotony and this may reduce appetite.

8

Treatment

There are three essential points in the treatment. First the patient should be made to understand the reason why she should reduce her weight. She must be convinced that she must give up permanently those habits which lead to obesity; otherwise reduction in weight which she can expect to obtain from an anti-obesity diet will not be maintained when dietary restrictions are relaxed. False knowledge, often acquired from popular papers and books, must be eradicated.

Secondly, the patient should be instructed in some physiological principles in regard to appetite, exercise and the expenditure of energy.

Thirdly, the patient should be taught that there are no "slimming foods" and no successful "slimming diets" which do not depend on a reduced intake of calories.

(a) Weight Reduction and Maintenance

- (1) Firstly look at the height and weight. Tables given after this heading to find the ideal weight for your weight and build. Decide on your target weight and determine to reach it by following a low calorie diet before any reducing programme is started. Only a mentally, well adjusted individual can succeed in losing weight, for diet and exercise must be persued. Those who have no determination are always talking to their friends or doctors in the hope of finding out about some 'secret' pills or food instead of taking a low calorie diet.
- (2) A medical check up is necessary before commencing a reducing programme.
- (3) The Dietetic programme consists of:
 - (a) A low calorie diet designed to reduce the weight by 3-4 kg per month till the ideal body weight is reached.
 - (b) A moderate calorie diet to maintain the ideal weight for 3-6 months.
 - (c) A reversion to the usual diet with such a mental orientation that foods of high calorie value are taken in small helpings. The patient is checked every week while on a reducing diet and a loss in weight of 3-4 kg is expected by the end of the month. A written dietetic prescription should always be given with definite

instructions to exclude all other foods not mentioned.

- (4) Not taking breakfast may sharply increase appetite at lunch. Three regular meals should, therefore, be taken.
- (5) With a low food and fluid intake, constipation may occur. This can usually be avoided by ensuring that the diet contains adequate fluids and bulk-producing vegetables and fruits (in the form of salad).
- (6) Exercise according to the capacity of the patient is recommended. 15 minutes brisk walking in early morning is the best exercise.

(b) Dietetic Management

The essential regime for the treatment of obesity is to regulate the daily energy intake. It is, therefore, wise that a patient who is seriously overweight should at first make a habit of weighing what they are about to eat. Diet should depart too much from established food habits. Main purpose of Dietetic treatment to bring about steady weight loss and to establish good food habits. The diet should promote a sense of well being and be palatable but it is not necessary to prepare much complicated recipes which require much preparation time or additional expense.

Calories

The guiding principle of all reducing diets is to provide few calories. It is not the quantity of food but the low calorie equivalent that produces weight loss. Unless there are special indications, the patient is allowed to continue with his routine work. About 20 cal/kg of ideal body weight are prescribed for a sedentary worker and 25 calories/kg of ideal weight for a moderately active. For a reducing diet the calories will vary from 1000-1500 kcal.

A gradual loss of 6-8 pounds monthly is desirable since the patient need not experience the severe hunger, nervous exhaustion and weakness which often accompany drastic reduction regimes. The rate of weight loss should not exceed except under close supervision of a dietician and physician.

Proteins

The protein content of the diet should be sufficient to maintain the body in nitrogen equilibrium. The allowance of protein should be at least 1 gm/kg of ideal body weight, but an allowance of 1-1/2 gm/kg improves the satiety value of the diet and minimizes tissue nitrogen loss. Most diets can be planned to include 70-100 gms.

Proteins are also needed at all times for repair of body tissues when this demand has been met. The remainder is used as a source of energy on heat

production. Many people find that the onset of hunger is delayed for a longer time when a meal containing ample protein is taken as compared to one rich in carbohydrates. High protein diets are expensive and so often impractical.

Carbohydrates

The intake of foods rich in carbohydrates should be drastically reduced since over indulgence in such foods is the most common cause of obesity. There have been unfounded fears that too drastic reduction of the carbohydrates intake may lead to ketosis and that this ketosis is responsible for numerous complaints such as weakness and nausea. In fact, obese people seldom develop more than a trace of ketosis on any diet and never sufficient to cause symptoms. In a diet 100 gms of carbohydrate is a suitable allowance.

Fats

Since fats are concentrated source of energy, they should be restricted.

Weight Loss with Other Nutrients

The weight loss is proportionate to the intake of calories as long as proteins, fats and carbohydrates are taken in the usual proportions. With prolonged restriction of fats, there is likely to be deficiency of fat soluble Vitamin A and D which may be supplemented. Also properly constructed reducing diets should contain plenty of green vegetables and fruit, since they provide little energy

with their bulk helps to fill the stomach and relieve hunger; they also help to relieve constipation which is a common trouble on low calorie diet. Hence Vitamin A and C should be sufficient to meet needs.

The only mineral that need serious consideration are calcium and iron. If the diet provides only 1/2 a pint of milk, there is likelihood of a negative calcium balance in an adult. The supply of iron is less sure. Restriction of sodium as common salt is helpful in weight reducing diet. Excess sodium in body predisposes to the retention of fluid. If salt is restricted then fluids can be taken liberally as extra fluids are excreted by the healthy kidneys. A glass of water taken before meals may help to cut down the intake of food.

Alcohol is permissible in a reducing regime in small amounts, provided a reduction is made 1 gm of alcohol provides 7 calories and since most alcohols contain only carbohydrates in some form so as far as possible they should be limited.

Nutritional Adequacy

It is important that reducing diet meet the recommended Dietary Allowances for adequate nutrition except in calories. However, it is necessary to establish new patterns of eating with low calorie menus especially desserts that are attractive and satisfying. A sound reducing diet should lay the foundation for the individuals' food habits in the future and help him to remain within

his desirable weight limits once he has reached his goal.

Satiety Value of Foods

One of the greatest problem of obese is that they are in the habit of eating frequently and in more than average quantities. It is essential that low calorie diet be as satisfying as possible. That "all gone feeling" which is often experienced when the food intake is limited may be severe as to cause real discomfort and become a strong temptation to overstep the prescribed diet.

Thus patient must have a sense of satisfaction and well being which can be effected by considering the satiety value of foods. Proteins and fats remain in the stomach longer and their use delays the return of hunger. Cheese between the meals satisfy the feeling of hunger without appreciably increasing the calorie intake.

SELECTION OF FOODS

Foods to Restrict or Avoid

Avoid high carbohydrate foods, high fat foods and beverages.

(A) *High Carbohydrate Foods:* Rice, Noodles, Potatoes, Shakarkandi, Arbi, Zimikand, Sugar, Honey, Cake Cookies, Rich Puddings, Banana, Chiku, Mango, Grapes.

(B) *High Fat Foods*: Like Butter, Cream, Ghee, Oil, Ice-creams, Red Meat, Fried Foods of any kind, Graves, Nuts, Pastries etc.

(C) *Beverages*: Cold Drinks, Alcoholic Drinks, Whole Milk and Malted Milks etc.

Foods to be taken or commonly used in Low Calorie Diets are: Milk, Skimmed milk or bottled milk (Boil and remove its malai); Milk and Products: Cottage Cheese is the only cheese suitable for use in restricted diet.

Meat and Meat Substitutes: White meat--chicken and fish (Boiled and Baked). Egg should be boiled or poached to avoid the fat.

Vegetables and Fruits: It is desirable to include one fruit in a day any time. Its weight shouldn't be more than 100-150 gms. The fruits can be included as Papaya (Papita) Pears, Apple, Orange, Guava, Jamun etc.

One can take plenty of vegetables in the form of soup, salad and boiled vegetables. If the blood pressure is normal Zeera Pani can be taken in between meals.

Dietetic Foods

Instead of sugar, artificial sweetening agents such as saccharin or saceryl may be used in beverages with fruits and cereals and in a variety of low calorie desserts. Fruits canned with artificial sweetness are useful in providing menu variety.

(c) Exercise

The claim of some fat people is that they eat less than average may infact be true if they have less energy expenditure due to sedentary habits and complete lack of exercise. A certain minimum amount of exercise may be necessary for the accurate regulation of food intake.

Walking is the best and safest exercise. Brisk walking with reduced diet is a good way to reduce. Morning walk improves circulation. It also helps in physical, mental and social fitness. It removes one's emotional tension and promotes self-confidence. It can result in better muscular tone and a sense of well being.

(d) Treatment with Hormones and Drugs

The commonly used drugs are Thyroxin, Anorectic drugs, Fenfluramine, Methyl Cellulose, Diuretics etc. They are not safe without medical supervision and unless the diet is regulated, weight reduction does not occur.

(e) Formula Diets

Expensive canned formula diets with added vitamins, which supply less than 1000 calories per tin are available commercially. They contain hydrophilic substances which absorb water in stomach and produce sense of satiety. Such foods are readily taken by obese patients for a few patients and they are satisfied by noticing some reduction in weight. However, with the consump-

tion of their usual diets, the original weight is quickly restored. These formulae have the disadvantage that they do not permit the patient to get any knowledge of what foods to eat and what foods to avoid when the usual diet is resumed.

Many reducing pills advertised in the press and on radio and T.V. programmes are preparation of glucose or other sugars, not fat dry milk and various combinations of vitamins. They have no effect whatsoever on the control of weight, but are usually sold at high prices. Some preparations contain luxative or diuretic drugs so that weight lost, but at the expense of body water-- not body fat.

Hence there are no drugs which can be used with advantage in the treatment of obesity. Unless the patient really desires to lose weight, no reduction occurs an unshakable will to follow the low calorie diets. The obese person who wants to rely on drugs has no real will to reduce and never succeeds in losing his excess weight and maintaining it.

(f) Fasting

Total fasting, allowing only water and multivitamins for a prolonged period is the quickest method of losing weight. The average weight loss of 7-8 kg during the first 10-12 days is subsequently more gradual. Prolonged fasting upto 249 days is reported. Such a regime has only been followed under hospital conditions.

Dangers of fasting include electrolyte imbalance, loss of hair, fatty livers, abnormal. E.C.G., lapse in memory, gouty attacks in a susceptible patient. It is no more efficacious than calories restriction in the obese and follow up studies after a few months may show regain of the weight.

Other Physical Measures

Turkish Baths have been a popular means of reducing weight. Though they achieve a temporary success in bringing the weight down by a few pounds. This is due solely to loss of body water which is very soon replaced. Numerous massage machines are advertised as a means for removing unslightly local deposits of fat but this is very expensive.

Dangers of Rapid Reduction

Very rapid weight reduction may prove harmful results. Drastic reduction may follow a self administered diet or a low calorie diet published in a popular magazine.

(1) *Hernia*: A latent umbilical or inguinal hernia may develop due to diminution of fat in the hernial sac. To prevent its development light abdominal exercise should be taken regularly and constipation avoided.

(2) *Gall Bladder Diseases*: Drastic reduction can cause gall bladder diseases. This effect may be due to an increase in blood lipids particularly cholesterol. Drastic reducing diets do not contain

fat and it is also possible that the stimulates to gall bladder contraction is, therefore, lacking and is responsible for biliary stagnation and resultant cholecystitis.

(3) *Peptic Ulcer*. Starvation may cause bleeding from peptic ulcer. This may be due to lack of neutralization of gastric juice by foods.

(g) Surgery in the Treatment of Obesity

Plastic surgeons have sometimes been called upon to assist in the treatment of obesity. Thus it is possible to reduce and resuspend enlarged and pendulous breasts. For some patient this has proved a satisfactory operation.

Plastic operation have also been carried with object of improving the shape of the thighs and arms. Plastic surgeon can produce immediate temporary improvement in the appearance of either arms or legs, the fat may reappear, in which case it is laid down in irregular lumps under the skin of the limbs. The last state of the patient may then be far worse than the first.

(h) Afterwards

Once you have reached your target, increase your daily allowance. At these levels you should neither gain nor lose weight. Weight yourself after a week as a matter of habit and if your weight increases by 1 kg reduce your calorie intake for a week, or for as long as necessary to regain your target weight. Fluctuations in daily weight are

almost due to rise and fall in the body fluid. It is a good idea to get into the habit of weighting weekly otherwise suddenly you will find you are at least 1 kg overweight.

(j) Summary of the Treatment : "How to Lose Weight"

- (1) The principle of this diet is the avoidance of all starch and sugars but with an increased amount of protein and a normal amount of fat.
- (2) You must give up every thing containing sugar or made of flour, instead of bread you must eat starch reduced rolls or crisp bread. Saccharin can be used instead of sugar.
- (3) Plenty of all kinds of vegetables except potato, arbi, are needed. As many salads and as much fruits as possible should be eaten.
- (4) You must eat boiled egg, cottage cheese etc.
- (5) Butter, cooking fats should be limited.
- (6) As far as drinks are concerned, you should limit cold drinks, alcohol etc.
- (7) Increased activity e.g. walking instead of taking a bus will help in losing weight.
- (8) Have 3 or 4 goods meals a day of non-fattening foods, there is never any need to be hungry. Never try to live on a low calorie

starvation diet. There is no need to limit salt or amount of fluid or drink.

- (9) Weight reduction needs to be slow and steady. Once weight has been lost, you must never go back to your old type of meals.

9

Management

The obese patient is treated ordinarily by Dietician or by reference from and in consultation with a doctor. The doctor should assure him that there is no physical disease causing or complaining obesity. The doctor should use drugs only when there are clear indications other than obesity itself. They may also be used when other methods have failed.

The patient should weight herself at weekly intervals, day-to-day variations in weight are not important and may be due to retention of urine or faeces or due to increase in body water that sometime proceeds menstruation. The weight on each occasion should be recorded in a note-book.

The prescribed diet should be carefully and explained and attention should be directed towards the central principle of energy intake as measured

in calories. The patient should be seen at first not less than once a week by a dietician and should be referred to her doctor from time to time. The object of these visits is threefold.

First, to check the progress. At each visit patient should be weighed. A good balance is necessary.

Secondly, to encourage the patient. If the weight loss has been satisfactory, the need to preserve must be repeated.

Thirdly, to check the patients, general health. If orthopaedic metabolic or cardiovascular complications are present, regular medical supervision is necessary.

10

General Instructions

EATING HABITS

20 Tips and Facts to Help Your Diet

1. Try to cut out sugar in tea and coffee. Gradually reduce the number of teaspoonfuls until you stop completely. You will find within 6 months that the taste of sugar in tea or coffee becomes repulsive.
2. If you are not able to have unsweetened drinks, take Saccharine. Saccharine was discovered in 1879 and has been tested several times over the years and has been found to be completely safe with no side effects. But it has the peculiar property that if too much is used, it will leave a bitter taste in the mouth.
3. You have to realise the difference between hunger and greed. You know when you are

hungry, your stomach tells you. If your stomach is satisfied and you want more to eat, the desire will have come from your brain. Initially, there may be a longing for a little extra. If this longing is not satisfied and becomes an obsession, it will have turned into greed. You will have to train your brain and not give it extra food to dwell on.

4. Try to keep fattening foods out of the house as much as possible.
5. Alcohol must be counted in your daily total of calories. Two bottles of whisky or, five bottles of wine, 20 *pints of beer* will each add 1lb of fat.
6. Commercial fruit—flavoured yoghurts are not low in calories.
7. Raw or slightly cooked vegetables are much better because the vitamin C is not destroyed.
8. If you are not hungry—do not eat even at meal times.
9. Have at least *1/2 pint of milk*, or 1 pint of skimmed milk each day (or make the milk skimmed by removing its malai after boiling).
10. Eat slowly.
11. Use non-stick pans to reduce or cut out the amount of fat used.
12. Beware of foods advertised as giving 'energy'. They will not make you run faster, jump higher or be able to get through twice as

much work in the same time. Energy means calories for the body. If you consume too much fuel or energy, the excess will be turned into fat and will in fact have the opposite effect. It will slow you down. Such foods will give you 'energy' but nothing else.

13. Keep busy and try not to think of food. If you have to eat between meals, veg. soup or salad will appease your stomach for a time and is negligible in calories.
14. Experiments have shown that one can put on slightly more weight if he consumes all his calories in one large meals a day, as opposed to three or four smaller ones.
15. Clean your teeth after your evening meal. This has a dual benefit. It helps to keep teeth healthy and discourages further eating in the evening. Drinking water with a meal also helps by filling you up and keeping your mouth clear of residual food.
16. Processed food is often less filling than natural food and often contains artificial preservatives and colourings, which are undesirable.
17. Constipation may be helped if, necessary, by eating large quantities of green vegetables or foods high in fibre.
18. Low Calories drinks—(black tea, *Nimbu Paani*) are almost all sweetened with saccharine.

19. Salt has no calories and is not fattening, although it may lead to some fluid retention. An excess of salt should be avoided as it can cause high blood pressure which in turn is a major factor in heart attacks.
20. Have 15 minutes brisk walking in the early morning.

11

Nutritionally Speaking

VITAMINS AND MINERALS

Vitamin A— Helps keep skin and eyes healthy.

Food sources— Animal foods, oils—milk, butter, wholemilk cheese, liver and egg yolk.

Green leafy vegetables—Spinach, Sarso ka Saag, Methi, etc.

Yellow vegetables — Carrots, shakarkandi, pumpkin.

Yellow fruits - Peaches, apricots.

Vitamin B— It aids the digestive and nervous systems.

Food sources— Cereals—wholegrains,—meats—poultry, fish, eggs. Milk is a fair source.

Vitamin C— It helps the body absorb iron and protects against infection. It also builds up tissues.

Food sources— Fruits such as orange, grapes, lemons are excellent source.

Vitamin D— It helps the body absorb calcium. Sunlight is good source.

MINERALS

Calcium— It helps build strong teeth and bones.

Food sources— Milk, certain green leafy vegetables.

Iron— It maintains the red blood cells.

Food sources— Lean meats, deep green leafy vegetables, whole grain and breads.

Most vitamins and minerals are interdependent to a degree e.g. for the proper absorption of iron, Vit. C must be present. Calcium absorption is dependent on Vit. D.

12

Prevention

It is guiding principle in medicine that prevention is better than cure.

- (A) Under exercising and over-eating are the causes of obesity. Regular exercise should be essential part of reducing regimen. It burns up fat and is of great value in keeping the body healthy. Always walk as much as possible every day.
- (B) You can eat what you like and grow thin provided you make sure that your caloric intake is less than your caloric expenditure.
- (C) Mental work does not require additional calories.
- (D) Never use excess of alcoholic beverages.

13

Summary

Obesity is the condition in which there is excessive deposition of body fat as a result of overeating. Food consumed in excess of body requirement is converted into fat and deposited in the adipose tissue under the skin. This fat normally serves as a source of energy during condition of starvation and semi-starvation.

The important causes of obesity are (1) Overeating, (2) Lack of physical exercise, and (3) Change in harmonial activities. It has been estimated that an intake of even hundred calories per day over the daily energy needs can cause an increase of 5-7 kg of body weight in a year. The increase in the income of society has encouraged excessive consumption of food rich in fat resulting in generation of calories over and above the energy needs.

The obese person become more prone to diseases like high blood pressure and diabetes than normal persons. This has been detected by surveys carried out in many states. Obesity also decreases longitivity of people. The most common methods of treatment of obesity are by (1) Reduced food intake and (2) Regulative physical exercise. The aim of reduced food intake is to produce a calorie deficit which will result in the fat stored in the adipose tissue being used to meet the caloric needs. It has been observed that consumption of a diet providing 1000 calories may help to reduce about 1/2 -1 kg per week. It is essential that the subject should weight himself once a constant level. Most obese lead a sedentary life. Sustained mild to moderate exercise will help to present obesity in a subject who is consuming a diet just meeting the caloric requirements walking is the good exercise.

Development of obesity can be prevented by avoiding excessive and frequent eating of food rich in calories and by taking mild or moderate exercise daily.

APPENDIX 1
Nutritive Value of Various Foods

| <i>Food</i> | <i>Household measure</i> | <i>Wt.</i> | <i>Calories</i> | <i>Protein</i> | <i>Carbo- hydrate</i> | <i>Fat</i> |
|---------------------------------|--------------------------|------------|-----------------|----------------|---------------------------|------------|
| Milk & Milk Products | | | | | | |
| Cow's milk & DMS milk | 1 glass | 250 ml | 170 | 8 gms | 10 gms | 10.25 gms |
| | | 100 ml | 67 | 3.2 gms | 4.4 gms | 4.11 gms |
| Buffalo milk | 1 glass | 250 ml | 293 | 10.8 gms | 12.5 gms | 20.20 gms |
| | | 100 ml | 117 | 4.3 | 5.0 | 8.8 |
| Paneer (cow's milk) | 1 medium piece | 50 gms | 133 | 9.1 | 1.6 | 10.4 |
| | | 100 gms | 265 | 18.3 | 1.2 | 20.8 |
| Cheese | 1 medium piece | 50 gms | 174 | 12 | 3.2 | 12.5 |
| | | 100 grns | 348 | 24.1 | 6.3 | 25.1 |
| Khoa (cow's milk) | | 100 gms | 413 | 20 | 24.9 | 25.9 |

(Contd.)

| <i>Food</i> | <i>Household measure</i> | <i>Wt.</i> | <i>Calories</i> | <i>Protein</i> | <i>Carbo- hydrate</i> | <i>Fat</i> |
|-----------------------------|------------------------------|------------|-----------------|----------------|---------------------------|------------|
| Cereals | | | | | | |
| Chapati | 1 small | 20 gm. | 68 | 2.4 | 13.88 | 0.3 |
| Wheat flour | | 100 gms. | 341 | 12.1 | 19.4 | 1.7 |
| Rice | 1 karchi | 20 gms | 373 | 1.3 | 15.6 | 0.1 |
| | | 100 gms | 345 | 6.8 | 78.2 | 0.5 |
| Rice flakes | — | 20 gms | 69 | 1.3 | 15.5 | 0.2 |
| | | 100 gms | 346 | 6.6 | 77.3 | 1.2 |
| Pulses | | | | | | |
| All dals (on an average) | 1 katori | 30 gms | 100 | 7.0 | — | — |
| Channa dal | | 100 gms | 372 | 20.8 | 59.0 | 5.6 |
| Urad | | 100 gms | 347 | 24.0 | 59.6 | 1.4 |
| Peas dry | | 100 gms | 315 | 19.7 | 56.5 | 1.1 |
| Rajmah | | 100 gms | 346 | 22.9 | 60.6 | 1.3 |
| Mung | | 100 gms. | 348 | 24.5 | 59.9 | 1.2 |
| Arhar | | 100 gms | 335 | 22.3 | 57.6 | 1.7 |
| Soyabean | | 100 gms | 43.2 | 43.2 | 20.9 | 19.5 |

| <i>Food</i> | <i>Household measure</i> | <i>Wt</i> | <i>Cal.</i> | <i>Protein</i> | <i>CHO</i> | <i>Fat.</i> |
|-------------------------------|------------------------------|-----------|-------------|----------------|------------|-------------|
| Egg., Meat and Fish | | | | | | |
| Egg | One | 50 gms | 86 | 6.6 | — | 6.7 |
| Goat meat | 6-7 pieces | 100 gms | 118 | 21.4 | — | 3.6 |
| Mutton, muscle | | 100 gms | 194 | 18.5 | — | 13.3 |
| Pompret, white | | 100 gms | 87 | 17.0 | 1.8 | 1.3 |
| Rohu | | 100 gms | 197 | 16.6 | 4.4 | 1.4 |
| Chicken | | 100 gms | 109 | 25.9 | — | 0.6 |
| Green leafy vegetables | | | | | | |
| Drumstick leaves | 1 karchi cooked | 100 gms | 9.2 | 6.7 | 12.5 | 1.7 |
| Methi | | 100 gms | 49 | 4.4 | 6.0 | 0.9 |
| Pudina | | 100 gms | 48 | 4.8 | 5.8 | 0.6 |
| Dhania | | 100 gms | 44 | 3.3 | 6.3 | 0.6 |
| Sarson | | 100 gms | 34 | 4.0 | 3.2 | 0.6 |
| Cabbage | | 100 gms | 27 | 1.8 | 4.6 | 0.1 |
| Palak | | 100 gms | 26 | 2.0 | 2.9 | 0.7 |

| <i>Food</i> | <i>Household measure</i> | <i>Wt</i> | <i>Calories</i> | <i>Protein</i> | <i>CHO</i> | <i>Fat.</i> |
|--------------------------------|--------------------------|-----------|-----------------|----------------|------------|-------------|
| Other vegetables | | | | | | |
| Onion | | 100 gms | 50 | 1.2 | 8.9 | 0.2 |
| Broad beans | | 100 gms | 48 | 4.5 | 7.2 | 0.1 |
| Carrot | | 100 gms | 48 | 0.9 | 10.6 | 0.2 |
| Ladies finger | | 100 gms | 35 | 1.9 | 6.4 | 0.2 |
| Turnip | | 100 gms | 30 | 0.5 | — | — |
| Cauliflower | | 100 gms | 30 | 2.6 | 4.0 | 0.4 |
| Pumpkin | | 100 gms | 25 | 1.4 | 4.6 | 0.2 |
| Kerala | | 100 gms | 25 | 1.6 | 10.6 | 1.0 |
| Brinjal | | 100 gms | 24 | 1.4 | 4.0 | 0.3 |
| Tinda | | 100 gms | 21 | 1.4 | 3.4 | 0.2 |
| Redish | | 100 gms | 17 | 0.7 | 3.4 | 0.1 |
| Cucumber | | 100 gms | 13 | 0.4 | 2.5 | 0.1 |
| Ghia | | 100 gms | 12 | 0.2 | 2.5 | 0.1 |
| High Calorie vegetables | | | | | | |
| Sweet Potato | | 100 gms | 120 | 1.2 | 28.2 | 0.3 |
| Singhara | | 100 gms | 115 | 4.7 | 23.3 | 0.3 |
| Potato | | 100 gms | 97 | 1.6 | 22.6 | 0.1 |
| Arbi | | 100 gms | 97 | 3.0 | 21.1 | 0.1 |
| Peas | | 100 gms | 93 | 7.2 | 15.9 | 0.1 |
| Zimikand | | 100 gms | 79 | 1.2 | 26.0 | 0.1 |

| <i>Food</i> | <i>Household measure</i> | <i>Wt</i> | <i>Calories</i> | <i>Protein</i> | <i>CHO</i> | <i>Fat.</i> |
|-----------------------|------------------------------|-----------|-----------------|----------------|------------|-------------|
| Fruits | | | | | | |
| Banana | | 100 gms | 116 | 1.2 | 27.2 | 0.3 |
| Sapota (Chikoo) | | 100 gms | 98 | 0.7 | — | — |
| Mango | | 100 gms | 74 | 0.6 | 16.9 | 0.4 |
| Grapes, green | | 100 gms | 71 | 0.5 | 16.5 | 0.3 |
| Pomegranate (Anar) | | 100 gms | 65 | 1.6 | 14.5 | 0.1 |
| Apple | | 100 gms | 59 | 0.2 | 13.4 | 0.5 |
| Amla | | 100 gms | 58 | 0.5 | 13.7 | 0.1 |
| Lemon | | 100 gms | 57 | 1.0 | 11.1 | 0.9 |
| Guava | | 100 gms | 51 | 0.9 | — | — |
| Orange | | 100 gms | 48 | 0.7 | — | — |
| Pineapple | | 100 gms | 46 | 0.4 | 10.8 | 0.1 |
| Mausambi | | 100 gms | 43 | 0.8 | 9.3 | 0.3 |
| Papaya | | 100 gms | 32 | 0.6 | 7.2 | 0.1 |
| Kharbuja (Musk-melon) | | 100 gms | 17 | 0.3 | 3.5 | 0.2 |
| Water-melon(Tarbuji) | | 100 gms | 16 | 0.2 | 3.3 | 0.2 |

(Contd.)

APPENDIX 1
Nutritive Value of Various Foods

| Food | <i>Household measure</i> | <i>Wt</i> | <i>Calories</i> | <i>Protein</i> | <i>CHO</i> | <i>Fat</i> |
|-----------------------------|------------------------------|-----------|-----------------|----------------|------------|------------|
| Dried Foods | | | | | | |
| Khajur (Dates dried) | | 100 gms | 317 | 2.5 | 75.8 | 0.4 |
| Raisins (Kishmish) | | 100 gms | 308 | 1.8 | 74.6 | 0.3 |
| Figs Anjeer | | 100 gms | 37 | 1.3 | 7.6 | 0.2 |
| Nuts & Oil Seeds | | | | | | |
| Walnut (Akhrot) | | 100 gms | 687 | 15.6 | 17.9 | 64.5 |
| Almond (Badam) | | 100 gms | 655 | 20.8 | 10.5 | 58.9 |
| Cashewnuts (Kaju) | | 100 gms | 596 | 21.2 | 22.3 | 46.9 |
| Gingelly seeds (Til) | | 100 gms | 563 | 18.3 | 25.0 | 43.3 |
| Coconut dry | | 100 gms | 662 | 6.8 | 18.4 | 62.3 |
| Coconut fresh | | 100 gms | 444 | 4.5 | 13.0 | 41.6 |
| Fats & Oils | | | | | | |
| Butter | | 100 gms | 729 | — | — | 81.0 |
| Ghee | | 100 gms | 900 | — | — | 100.0 |
| Oil | | 100 ms | 900 | — | — | 100.0 |

| <i>Food</i> | <i>Household measure</i> | <i>Wt</i> | <i>Calories</i> | <i>Protein</i> | <i>CHO</i> | <i>Fat.</i> |
|----------------------|------------------------------|-----------|-----------------|----------------|------------|-------------|
| Miscellaneous | | | | | | |
| Biscuits salty | | 100 gms | 534 | 6.6 | 54.9 | 32.4 |
| Biscuits sweet | | 100 gms | 450 | 6.4 | 71.9 | 15.2 |
| Bread white | 4 slices | | | | | |
| | small | 100 gms | 245 | 7.8 | 51.9 | 0.7 |
| Honey | | 100 gms | 31.9 | 0.3 | 7.9.5 | — |
| Sago (Sabudana) | | 100 gms | 351 | 0.2 | 87.1 | 0.2 |
| Sugar | 20 tsp | 100 grams | 400 | — | 100.0 | — |
| Jaggery (Gur) | | 100 gms | 383 | 0.4 | 9.5 | 0.1 |

Appendix II

RECOMMENDED CALORIE CHART

Fruit Exchange

One portion providing 40 Cal and 10 gms Carbohydrates.

| | |
|---------------------------|---------|
| Apple | 75 gms |
| Banana | 40 gms |
| Cherries | 70 gms |
| Dates, fresh | 30 gms |
| Grapes | 60 gms |
| Gauava | 80 gms |
| Lichchi | 75 gms |
| Mousambi/Orange/Pineapple | 100 gms |
| Loquat | 100 gms |
| Mango | 60 gms |
| Papaya | 140 gms |
| Pear | 85 gms |
| Plums | 90 gms |
| Pomegranate | 70 gms |

| | |
|-------------|---------|
| Rasbberry | 85 gms |
| Sapota | 50 gms |
| Water melon | 300 gms |
| Musk melon | 300 gms |

Cereal Exchange

| | |
|--------------------|---------------|
| Provides Calories— | 68 kcal |
| Protein | 2 gms. |
| Carbohydrates | 15 gms. |
| Bread 1 slice | (30 gms) |
| Biscuit 1 slice | (2" diameter) |
| Flour | 2-1/2 tsp. |
| Cereal cooked | 1/2 cup. |

HEIGHT & WEIGHT TABLES**Standard Height And Weight***For Indian Men and Women*

| <i>Height</i> | <i>Weight</i> | | | |
|----------------|---------------|-------------|--------------|-------------|
| | <i>Men</i> | | <i>Women</i> | |
| | <i>(kg)</i> | <i>(lb)</i> | <i>(kg)</i> | <i>(lb)</i> |
| 5'-0" (1.52M) | — | — | 50-54 | 112-120 |
| 5'-1" (1.54M) | — | — | 51-55 | 114-122 |
| 5'-2" (1.57M) | 56-60 | 124-133 | 53-56 | 117-125 |
| 5'-3" (1.59M) | 57-61 | 127-136 | 54-58 | 120-128 |
| 5'-4" (1.62M) | 59-63 | 130-140 | 56-60 | 124-132 |
| 5'-5" (1.65M) | 61-65 | 134-144 | 58-61 | 127-135 |
| 5'-6" (1.67M) | 62-67 | 137-147 | 59-64 | 130-140 |
| 5'-7" (1.70M) | 64-68 | 141-151 | 61-65 | 134-144 |
| 5'-8" (1.72M) | 66-71 | 145-156 | 62-67 | 137-147 |
| 5'-9" (1.75M) | 68-73 | 149-160 | 64-69 | 141-151 |
| 5'-10" (1.77M) | 69-74 | 153-164 | 66-70 | 145-155 |
| 5'-11" (1.80M) | 71-76 | 157-168 | 67-72 | 148-158 |
| 6'-0" (1.82M) | 73-78 | 161-173 | 69-74 | 151-163 |
| 6'-1" (1.85M) | 75-81 | 166-178 | — | — |
| 6'-2" (1.87M) | 77-84 | 171-184 | — | — |

Sources : Life Insurance Corporation of India.

**Average Height and Weight
of Boys at a Given Age**

| <i>Age</i> | <i>Standard</i> | |
|---------------|------------------------|------------------------|
| | <i>Height (in cm.)</i> | <i>Weight (in kg.)</i> |
| At birth | 50.0 | 3.0 |
| Upto 3 months | 56.0 | 4.5 |
| 4-6 months | 62.5 | 6.5 |
| 7-9 months | 65.0 | 7.0 |
| 10-12 months | 69.5 | 7.5 |
| 1 year | 74.0 | 8.5 |
| 2 years | 81.5 | 10.0 |
| 3 years | 89.0 | 12.0 |
| 4 years | 96.0 | 13.5 |
| 5 years | 102.0 | 15.0 |
| 6 years | 108.5 | 16.5 |
| 7 years | 114.0 | 18.0 |
| 8 years | 119.5 | 19.5 |
| 9 years | 123.5 | 21.5 |
| 10 years | 128.5 | 23.5 |
| 11 years | 133.5 | 26.0 |
| 12 years | 138.5 | 28.5 |
| 13 years | 144.5 | 32.0 |
| 14 years | 150.0 | 35.5 |
| 15 years | 155.5 | 39.5 |
| 16 years | 157.5 | 43.0 |
| 17 years | 159.5 | 45.5 |
| 18 years | 161.5 | 47.5 |
| 19 years | 163.0 | 48.0 |
| 20 years | 164.0 | 49.0 |
| 21 years | 164.0 | 49.5 |

**Average Height and Weight
of Girls at a Given Age**

| <i>Age</i> | <i>Standard</i> | |
|---------------|-----------------------|-----------------------|
| | <i>Height (in cm)</i> | <i>Weight (in kg)</i> |
| At birth | 50.0 | 3.0 |
| Upto 3 months | 55.0 | 4.0 |
| 4-6 months | 61.0 | 5.5 |
| 7-9 months | 64.5 | 6.0 |
| 10-12 months | 66.5 | 6.5 |
| 1 year | 72.5 | 8.0 |
| 2 years | 80.0 | 9.5 |
| 3 years | 87.0 | 11.0 |
| 4 years | 94.5 | 13.0 |
| 5 years | 101.5 | 14.5 |
| 6 years | 107.5 | 16.0 |
| 7 years | 113.0 | 17.5 |
| 8 years | 118.0 | 19.5 |
| 9 years | 123.0 | 21.5 |
| 10 years | 128.5 | 23.5 |
| 11 years | 133.5 | 26.5 |
| 12 years | 139.0 | 30.0 |
| 13 years | 144.0 | 33.5 |
| 14 years | 147.5 | 37.0 |
| 15 years | 149.5 | 39.0 |
| 16 years | 151.0 | 41.0 |
| 17 years | 151.0 | 42.5 |
| 18 years | 151.5 | 42.5 |
| 19 years | 151.5 | 42.5 |
| 20 years | 151.5 | 43.5 |
| 21 years | 153.0 | 44.0 |

**REDUCING DIET
(1000 CALORIES)**

| | |
|---------------|---|
| Early Morning | 1 Cup of Tea. |
| Breakfast | 1 bread slice 1 boiled egg/30gms paneer 1 glass milk 1 fruit |
| Mid Morning | Nimbu Paani |
| Lunch | 1 Katori curry veg. 1 Katori dry veg. 1 Katori curd (125 gms) 2 Chappaties (40 gm Atta) 1 plate salad |
| Evening | 1 Cup of Tea |
| Dinner | 1 Katori Dal 1 Katori Veg Chappaties (40 gms Atta) 1 Plate Salad |

Note: Do not use sugar & Oil.

**REDUCING DIET
(1200 CALORIES)**

| | |
|---------------|---|
| Early Morning | 1 Cup of Tea |
| Breakfast | 1 bread slice 1 boiled egg/30 gm paneer 1 glass milk 1 Fruit |

| | |
|-------------|---|
| Mid Morning | Nimbu Paani |
| Lunch | 1 Katori Dal 1 Katori Veg 1 Katori Curd (125 gms) 2 Chappaties (50 gm Atta) 1 Plate Salad |
| Tea Time | 1 Cup of Tea 1 Biscuit |
| Dinner | 1 Katori Dal 1 Katori Veg Chappaties (50 gm Atta) 1 Plate Salad |

Note: 1. Use 1 tsp cooking oil in a day.
2. Do not use sugar.

INSTRUCTIONS FOR WEIGHT REDUCING DIET

Foods to Avoid

1. Cream, butter, oil, fried foods, Ice cream.
2. Sugar, honey, jam, sweets of any kind.
3. Commercial energy foods (Ovaltine, horlick, cocoa etc.)
4. Patato, arvi, Zimikand.
5. All aerated waters except Soda.
6. Alchohal of sweet beverages.
7. Dried fruit and nuts.
8. Fruits as per allowance.

Foods Allowed Liberally

1. All vegetables, Lime juice, Clear Soups, Peppa water.

SUGGESTED RECIPES

Low - Calories Recipes Mixed Vegetable Soup

Ingredients

- | | |
|------------------------|--|
| 2 chopped tomatoes | 1. Heat the Oil and fry the onion. |
| 2 tsp chopped cabbage. | 2. Add the tomatoes, cabbage, capsicum, bayleaves in 3 tea cups of boiling water and boil for 4-5 minutes. |
| 2 tsp chopped onion | 3. Add salt & pepper serve hot. |
| 2 tsp chopped capsicum | 4. No. of serving—3. |
| Oil - 2 tsp. | |
| Bayleaves - 2 | |
| Salt & Pepper to taste | |

RICE & MOONG DAL IDLI

- | | |
|---|---|
| Rice- $\frac{1}{2}$ teacup | 1. Soak the rice, dal and fenugreek seeds in water for 5-6 hrs. |
| Moong Dal- $\frac{1}{2}$ tea cup | 2. Grind the soaked ingredients in a mixer and leave the batter aside for at least 8 hours or preferably over night |
| Fenugreek (Methi) seeds $\frac{1}{4}$ teaspoon | 3. Add Meetha soda and salt and pour a little mixtures into the cavities of small idli maker. |
| Meetha soda—a pinch | |
| Salt-To taste | |

4. Steam in a cooker for a few minutes. Repeat for the remaining mixture.
5. Serve hot with chutney. No. of servings-8
Calories—66
Fat-0.4 gms
Protein = 3 g
CHO = 13 g

PANEER PALAK METHI ROTIS

For the Dough

Wholewheat flour (Atta) —1 tea cup
Oil—1 tsp.
Methi & Palak—1/2 teacup finely chopped
Fresh curds—1 tsp.
Chilli powder—1/2 tsp.
Turmeric powder (Haldi) —1/4 tsp.
Sugar—1/2 tsp.
Salt—To taste.

For the topping

Methi & Palak—
1/2 teacup
finely chopped

Grated Paneer—1 tbsp.

For the Dough

1. Mix the ingredients and knead into a dough. Add more curds if required to make the dough.
2. Divide into portions and roll out into rotis.
3. Cook on a tawa on both sides.
At the time of serving sprinkle a little topping on top of each roti.
Place below the grill for 1 minute.
Serve hot.
No. of servings—6.

PLAIN PARATHAS*For the Dough*

Wholewheat flour
—1 teacup
Salt—1/4 tsp.
Oil —1 tsp.

For cooking

Melted butter—
2 tsp

For the Dough

1. Mix all the ingredients and enough water to make a soft dough.
2. Divide the dough into portions and roll out each portion into rounds.
3. Cook on a tawa very lightly for a few seconds.
4. Put a portion of the desired stuffing in each parantha and fold. Arrange on a greased baking tray.
5. Brush the paranthas lightly with oil and bake in a hot oven at 200°C until light pink in colour (about 5 mins).
Alternatively, cook on a tawa on both sides and brush lightly with oil.

Serve hot curds.

No. of serving—12

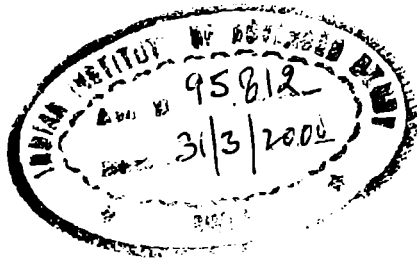
Baked Paneer in Spinach with Tomato Gravy

For the Spinach

Spinach—3 teacups
 Chopped Onion—1/2
 Chopped Plain flour—
 1 tsp
 Green chillies—1-1/2
 Chopped Oil—1 tsp
 Salt to taste

For the Spinach

1. Cook the spinach without adding any water.
2. When cooked, blend in a mixer.
3. Heat the oil and fry the onion.
4. Add the flour and fry again.
5. Add the green chillies, spinach, and salt and cook for 1 minute.
6. Mix the spinach with the paneer, vegetables and salt and spread in a baking dish.
7. Pour the tomato gravy on top.
8. Grate a little of the paneer.



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