Eat Right India
सही भोजन. बेहतर जीवन.

# THE PURPLE BOOK


## A Handbook on Diets for Diseases

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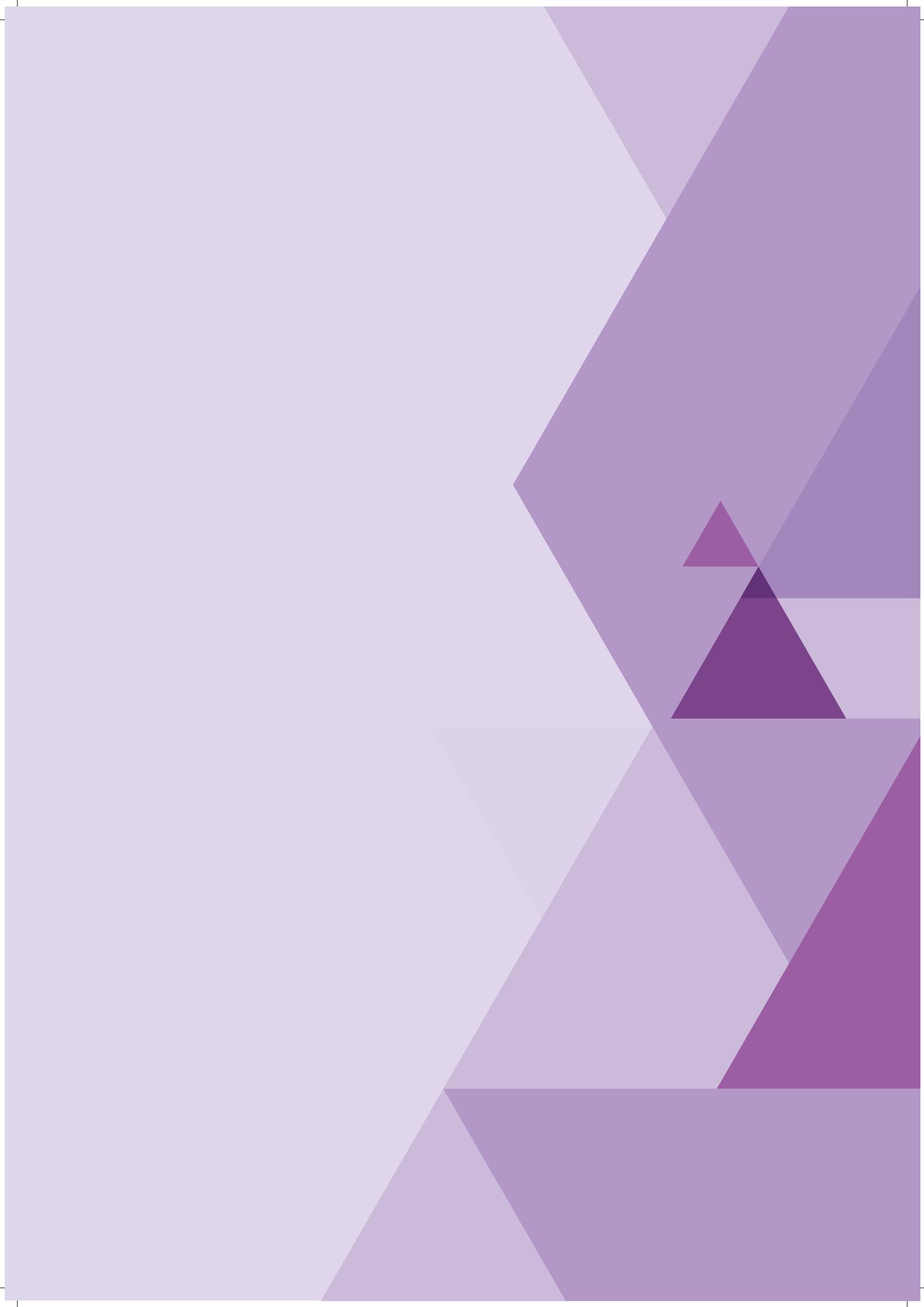
सत्यमेव जयते
FOOD SAFETY AND STANDARDS AUTHORITY OF INDIA
*Inspiring Trust, Assuring Safe & Nutritious Food*
Ministry of Health and Family Welfare, Government of India



**P**eople's
**U**ser-friendly
**R**esource for
**P**ractising and
**L**earning to
**E**at –
**PURPLE** Book on
Diets for Diseases

# THE PURPLE BOOK

1st Edition
26th December 2019

The Purple Book serves as a simple guide for general dietary recommendations and advice on diets for diseases. This book is not intended to be a substitute for a professional consultation from a qualified expert for medical treatment or advice on specific or individual dietary requirements for diseases.

For more information, visit our website
**www.eatrightindia.gov.in**

Write to us at
**snf.hospital@fssai.gov.in**
with your suggestions and questions

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# PREFACE

The Food Safety and Standards Authority of India (FSSAI) is pleased to present to you the first edition of 'The Purple Book: People's User-friendly Resource for Practising and Learning to Eat–PURPLE–Book on Diets for Diseases'.

This book has been developed specially for hospitals, clinics and medical treatment centres that do not have access to professional dieticians and nutritionists. This book serves as a guide for practicising dieticians, nutritionists and doctors to understand basic dietary recommendations for certain common diseases. It draws from the Clinical Dietetics Manual by the Indian Dietetic Association (IDA). Through simple explanations and suggestions on which foods to eat and which ones to avoid, this book guides people during medical conditions.

The book covers forty seven medical conditions such as high blood pressure, metabolic disorders, gut-related diseases, kidney and bone disorders, allergies and nutritional deficiencies, cancer, neurological disorders and so on.

It is complementary to the maternal nutrition toolkit developed by National Centre of Excellence and Advanced Research on Diets (NCEARD). This toolkit specifies Dos and Don'ts for pregnant women in disease conditions. It is available at http://www.nceardladyirwin.in/ToolkitFrame.aspx?flag=9#

This book has been written by leading professionals in dietetics and nutrition and carefully vetted by an expert committee. I am especially grateful to Ms. Sheryl Salis and her team at Nurture Health Solutions, Dr. Rajiv Yeravdekar, Dean, Faculty of Health Sciences and Dr. Kavitha Menon, Professor, Nutrition and Dietetics Programme from Symbiosis International University, Dr. Jagmeet Madan, President of Indian Dietetic Association and Dr. Subba Rao M. Gavaravarapu, Scientist at the National Institute of Nutrition for their valuable contribution to this project. I would also like to thank Ms. Rijuta Pandav from FSSAI for coordinating this project.

FSSAI would welcome any suggestions and feedback on this publication so that 'The Purple Book' becomes a trusted resource book and part of all Indian hospitals and clinics.

**PAWAN AGARWAL**
Chief Executive Officer
Food Safety and Standards Authority of India

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CHAPTER 01

# INTRODUCTION

*"The fate of a nation depends on the way that they eat."*

– Jean Anthelme Brillat-Savarin

# INTRODUCTION

India has made tremendous leaps in terms of expanding its healthcare facilities. These have been complemented with enhanced research, diagnostic, health management and healthcare delivery efforts. Post-economic liberalisation era witnessed great changes in the health environment of our people. Life expectancy at birth has improved from 59.7 years in 1990 to 70.3 years in 2016 among women, and from 58.3 years to 66.9 years for men. With improved health system and treatment most people survive mortality from communicable, maternal, neonatal, and nutritional diseases (CMNND) but they appear to develop Non-communicable disease (NCDs) in their later lives. No wonder, there is a great change in the disease profile of the country in the last two decades or so. As of 2016, the death rate due to NCDs and/or injuries was over twice that of CMNNDs. Today, NCDs are the leading cause of death in people above 40 years of age. Among NCDs, cardiovascular diseases are emerging as the leading cause of death, followed by chronic respiratory diseases, cancers, and diabetes and so on. Among the leading non-communicable diseases, the largest disease burden or DALY rate increase from 1990 to 2016 was observed for diabetes, at 80%, and ischaemic heart disease, at 34%. These diseases are the result of significant lifestyle changes, this situation is getting worse with ageing population, increasing urbanisation and sedentary lifestyle.

As more Indians live well into adulthood and old age, they are increasingly likely to experience poor health from disabling conditions. The contribution of years lived with disability (YLDs) to the total disease burden (DALYs) has increased in India from 17% in 1990 to 33% in 2016. Back in the 1990s, over 61% of the deaths were from communicable, maternal, neonatal, and nutritional diseases such as anaemia, tuberculosis, and diarrhoea, it has reduced to 33% in 2016. As India's population structure moves further toward a higher proportion of elderly, these diseases will likely make an increasingly important contribution to the country's disease burden and will require stronger efforts to address them.

While this transition is underway in India, the burden of infectious diseases still continues to take its toll on our people. Despite the reductions achieved, certain diseases of infectious origin such as diarrhoeal diseases, lower respiratory infections, iron-deficiency anaemia, preterm birth complications, and tuberculosis still remain some of the leading causes of disease burden. The proportion of total disease burden caused by infectious and associated diseases is highest among children, which contribute to the disproportionately higher overall disease burden suffered by children below 5 years of age.

Added to this, India today confronts the triple burden of malnutrition, with problems of undernutrition, overweight/obesity and associated NCDs and micronutrient deficiencies co-exiting among the people across the economic and social spectrum, albeit in slightly varying proportions.

## Diet, Health and Disease

Diet plays an important role not only in prevention but also in management of various diseases. Eating is, after all, like a bank account. Good food choices will mean good investments for the future. The relationship between diet, health and disease is complex. Food is a pre-requisite of living but it is the quality of diet that determines the disease pattern a population. Nutrients and foods usually interact with genes in a benign manner but sometimes, this interaction can have fatal outcomes. There is an increasing recognition that nutrients have the capacity to directly regulate the metabolic processes by impacting the expression of enzymes, receptors, hormones and other proteins. While the cause of all these diseases has a source in food and diet, the first line of treatment of these are also nutrition therapy. Modification of diet, personalised according to the disease concerned such as limiting the amount of precursor that is not metabolized properly, may be the key. But simple dietary management in disease condition needs professional guidance.

## Why the PURPLE book?

Today, due to the penetration of Information and Communication Technologies and new media tools, there is an information deluge on diets to prevent and even to manage disease conditions. Often times the credibility of such information cannot be vouched for. With science being dynamic and nutrition research evolving, there is confusion even among the dietitians and nutrition counsellors. People often look up to doctors for dietary advice, who may also not be well equipped. While there are sources available for dieticians and nutritionists, these are highly technical and not easily understood by non-professionals. This book fills this gap and thus aims to be a basic but credible resource on diets for common diseases. Further, this book takes an applied approach to the existing guidelines available to make it user-friendly. It covers common lifestyle ailments and certain infectious diseases in which dietary intake is critical in prevention and management. However, this is not a substitute for individual clinical consultation with a professional. Therefore, this book has been aptly named the PURPLE (People's User-friendly Resource for Practicing and Learning to Eat) Book on Diets in Disease conditions.

## What does this book offer?

The book draws from the latest nutrition research and contemporary science from world over and contextualises the information for the Indian user – both professionals and common people. Experienced dieticians and nutritionists from all over the country have compiled these dietary guidelines to be followed in various non-communicable and communicable disease conditions. The information provided here is to be treated only as a general dietary recommendations for prevention and management of disease conditions. This could also serve as a ready reckoner for practicing dietitians and diet counsellors. This has to be used only for dietary advice in conjunction with the regular treatment regimen and is not a substitute for professional dietary advice, which may be sought for personalising diets based on individual concerns as well as the severity and stage of disease(s) and co-morbidity.

## How was this book developed?

Conceived by Shri Pawan Agarwal, Secretary, Government of India and CEO, FSSAI, the concept of this book was announced on 16$^{th}$ October 2019, World Food Day, in the presence of the Honourable Health Minister, Dr. Harsh Vardhan at the Food Safety and Standards Authority of India (FSSAI). This book has been written and vetted by expert dieticians and nutritionists in the country based on their voluntary interest in working on this book and coordinated by FSSAI. A expert vetting committee was set up to examine and deliberate on the initial draft of this book. Thereafter, a complete plan for the book was developed, including the diseases to be covered and under which sections they would be categorized and the content, style and tone of the book, keeping in mind the gaps that would be filled by the book. Existing chapters were then assigned to various authors and members of the vetting committee to be developed further and then subsequently be vetted. This book was finalized after multiple revisions and edits by the writers and the vetting committee members.

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# ASSESS YOURSELF

**Weight status –** The first step to assess yourself is to know about your weight status. There are a few terms which are used for the same. They are:

**Ideal Body Weight –** It is the optimum range for the weight of a person that allows him or her to be healthy and is expressed in relation to the height of a person. The most commonly used simplest equation is the BROCA Index

| | | |
|---|---|---|
| BROCA INDEX | (for adult men) | IBW (in kg) = Height in cms – 100 |
| eBROCA INDEX | (for adult women) | IBW (in kg) = Height in cms – 105 |

**Body Mass Index (BMI) -** It is the ratio of weight and height of an individual and is computed by dividing the weight in kilograms by the square of the height in meters.

BMI = weight (kg)/height (m2)

The Asian Cut off are followed for Indians. These help us to know whether we are normal, overweight, obese or underweight so far as our weight status is concerned.

**Asian-Indian specific cut-off for BMI**

| Underweight | Normal | Overweight | Obese |
|---|---|---|---|
| <18.49 | 18.5–22.9 | 23.0–24.9 | >25 |

**Waist Circumference:** It is the most important measurement which we can empower ourselves to take on a regular basis. We can use a good quality non stretchable tape and take the measurement just above our navel. This is a simplest way to know if we are accumulating body fat around our waist. This is of importance as increase in this visceral fat directly correlates to abnormality in our biochemical parameters like blood glucose, triglycerides and cholesterol.

**The Cut off recommended for Asian Indians is Less than 80 cm (Less than 32 inches) for Women and Less than 90 cm (Less than 35 inches) for Men.**

**Waist to Height Ratio: Adiposity- The new determinant of Health Risk**

- **Waist in inches/height in inches* 100= WHtR**
- **eg: a Male with a 32 inch waist who is 5'10" (70 inches) would divide 32 by 70, to get a WHtR of 45.7 percent.**

| WOMEN - Waist to Height Ratios |
|---|
| Under 35: Abnormally Thin |
| 35 to 42: Extremely Slim |
| 42 to 49: Healthy |
| 49 to 54: Overweight |
| 54 to 58: Seriously Overweight |
| Over 58: Extremely Obese |

| MEN - Waist to Height Ratios |
|---|
| Under 35: Abnormally Thin |
| 35 to 43: Extremely Slim |
| 43 to 53: Healthy |
| 53 to 58: Overweight |
| 58 to 63: Seriously Overweight |
| Over 63: Extremely Obese |

Body composition – In simple words, body composition relates to the percentage of Body Fat, Muscle, Water and Bone in the body. The Muscle is the healthy tissue and should be increased. Excess Body fat is an unhealthy state as it leads to hormonal changes making the internal environment inflammatory. Each individual should have an optimum Bone Density as it helps in preventing fractures and enable a person to take up normal physical activity and exercise which is essential to maintain joints. Hydration of the body is dependent on many factors including the body composition. The muscle mass is the most hydrated tissue of the body and thus higher the muscle mass, higher is the water content in the body. On the other hand higher the Body Fat lower is the water content in the body.

The Body Composition can be measured by many methods. Most of the portable Body Fat Analyser use Bioelectrical Impedance Methods.

**A golden rule for adult men to keep the body fat less than 25 percent and women less than 35 percent. Please check your body composition regularly and see that the Body Fat is decreasing and Muscle Mass is increasing.**

## How do we safeguard ourselves and maintain good health?

**Simple steps to follow:**

1. **Be wise when you fill your plate….** Half of your plate should be veggies (lightly cooked or raw or steamed).
2. **Get a lot of plant proteins in your daily diet-** Pulses, dals, Peas, beans, nuts , oilseeds.
3. **Get good quality invisible fats in your diet -** High Omega 3 and MUFA . Select from black chana, Chawli or Lobia, Urad dal, Rajmah, Soyabean, walnuts, almonds, tilseeds, melon seeds, chia seeds, methi seeds, Green leafy vegetables, Bajra flour—all these foods give you good quality fats.
4. **Use limited quantity of cooking oil** (3 teaspoon per person per day) preferably Omega 3 and MUFA rich oil. Choose from Rice Bran, Olive, soyabean or use a blended oil.
5. **SAY NO to refined flour and saturated fats, trans fats-** Foods like khari, ghutli, pav, rumali roti, doughnuts, pastries, cakes, biscuits are all based on refined flour and saturated fats. Instead use whole grains based products with good quality fats.
6. **Use prebiotic foods** like raw banana, whole chana, Bajra flour which are rich in Resistant starch which is a prebiotic. Enhance the prebiotic effect by steaming and cooling or roasting with limited fat.
7. **Get a Probiotic source-** beneficial live microorganism of specific species (Bifidobacteria and Lactobacilli) in your daily diet.
8. **Avoid indiscriminate use of antibiotics…..** and **self-medication…!**
9. **Get Exercise** of a minimum of half an hour to one hour every day and Count your steps – with a minimum of 10,000 per day

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CHAPTER 02

# HIGH BLOOD PRESSURE

# HYPERTENSION (HIGH BLOOD PRESSURE)

Hypertension is also known as a "silent killer" as it comes with no prominent warning signs or symptoms. High blood pressure, if left untreated, can lead to various health complications including life threatening ones like heart disease, kidney disease and stroke. Therefore, it is advised to regularly monitor the blood pressure.

## What is High Blood Pressure?1

High blood pressure, or hypertension, is when the blood pressure is raised consistently. Blood pressure has been categorized as Normal(<120/80 mmHg), Elevated (120-129/<80 mmHg), Hypertension Stage 1 (130-139/80-89 mmHg) and Hypertension Stage 2(≥140/≥90 mmHg)(AHA.2017).

It is important to get your blood pressure checked atleast twice on at least two different occasions one after another before a diagnosis is reached. Due to fluctuations in blood pressure values owing to stress, activity levels, meal timings and other factors, it is also advised that the blood pressure should be self-monitored and an 'out of office' blood pressure recorded to confirm the diagnosis.

## When am I at a risk of Hypertension?

Everyone is at a risk of developing hypertension though some people with the following conditions are more prone to develop it.

a. Over-weight or Obesity
b. Diabetes Mellitus
c. Dyslipidemia
d. Smoking
e. Poor fitness levels/Sedentary lifestyle
f. Poor dietary habits
g. Stress
h. Sleep apnea
I. Advancing age

## What can I do to know ifI am at risk of hypertension?

It is important that you get yourself checked regularly if you have any of the above conditions. Some basic tests can be done to assess your risk for hypertension. These tests are fasting blood glucose levels, complete blood count, lipid profile, thyroid hormone levels, urinalysis, electrocardiogram, uric acid levels, and urinary-albumin to creatinine ratio.

## Can hypertension develop because of any other disease?

Yes, it can. A number of pre-existing conditions can lead to hypertension- this type of hypertension is known as Secondary hypertension. Some of these Pre-existing conditions are

a. Chronic renal disease
b. Peripheral artery disease
c. Reno vascular disease
d. Primary aldosteronism
e. Obstructive sleep apnea
f. Drug induced hypertension(non-steroidal anti-inflammatory drugs, steroids/androgens, caffeine, decongestants etc.)
g. Alcohol induced hypertension
h. Cushing's syndrome etc.

## Should I follow a special diet for controlling my blood pressure levels?

It is best to follow a balanced diet with an emphasis on whole grains, fruits and vegetables. It is important to remember that all nutrients are essential for the body and unless specifically suggested, none should be eliminated. DASH diet is recommended in management of hypertension to maintain blood pressure levels in the desired range.

## TEN MUST DO POINTS FOR HYPERTENSIVES:

1. **Increased intake of vegetables, fruits, and whole grains.** Vegetables can include all green, orange and coloured seasonal vegetables, such as leafy vegetables, gourd vegetables, fruits like apples, guava, pomegranate, watermelon, citrus fruits; whole grain cereals and millets like wheat, ragi (finger millet), jowar (sorghum), barley, bajra (pearl millet) etc. **DASH (Dietary Approach to Stop Hypertension) diet** helps to control and prevent high blood pressure. It mainly consists of whole grains, legumes, fruits, vegetables, low fat dairy products, poultry, fish, unsalted nuts and seeds.

2. **Incorporating good quality fat and antioxidants** by incorporating at least a defined amount of unsalted nuts like 20-25 almonds OR 6-8 halves of walnuts OR 25 to 30 gms of cashew nuts with a strict control on the visible fat like cooking oil (not more than 10 ml per day which is one level tablespoon per day per person). Add Omega 3 rich food sources like pulses, green leafy vegetables, Bajra flour, flax seeds etc.

3. **Use oil in rationed amounts (3tsp/day/person) which is high in MUFA and Omega 3** fatty acid. Look for a combination blend of Rice bran oil and soyabean Or Use MUFA rich oil like groundnut oil, olive oil (for low heat preparations like salads, sauted vegetables) along with Omega 3 rich mustard oil.

4. **Including good amounts of low-fat proteins** through fat-free or low-fat dairy products especially curds and milk, low fat preparations of a fish, poultry and eggs.

5. **Increase intake of Potassium and Magnesium** – the cardio protective minerals through whole grains, green leafy veg, fruits, dals.

6. **Reduction in foods that are high in saturated fat,** such as butter, ghee, margarine, full-fat dairy products, frozen desserts, bakery products like khari, gutli and refined starch or maida based products like rumali roti and naan.

7. **Reduction in the intake of sodium** by reducing salt intake (3gms/½ tsp per day) and restricting the consumption of packaged or ready to eat foods. Limit the intake of bakery products such as rusks, cakes, pastry. Avoid consuming salted products such as papads, pickle, ready-to-eat packaged & processed foods. Make it a habit to read food labels. Add lemon, tamarind, kokum, vinegar, garlic, dry mango powder, other spices and herbs to enhance the taste of meals.

8. **Restrict the consumption of sugar-sweetened beverages and sweets.**

9. **Be physically active: Reduce weight and watch your waistline** - A minimum of 30 minutes to one hour of aerobic activity 5 times a week will help you lower your blood pressure. Aim to reduce 5 -10 percent of your body weight. Do Pranayam and breathing exercises for relaxation and decreasing stress.

10. **Ensure to take the medication as advised by the doctor at a defined time.** Monitor your blood pressure regularly and DO NOT CHANGE MEDICATION WITHOUT DOCTORS ADVICE.

11. **Cut down on alcohol and quit smoking.**

## Frequently Asked Questions (FAQs)

**1 Should I stop salt completely from the diet?**

WHO guidelines permit 5 gm of salt /1 tsp per day for a healthy individual. It is important to know that it's not salt per se that is the culprit- we have to understand that there is a difference between salt and sodium. Salt is composed of Sodium and Chloride of which Sodium is 40% and Chloride 60%.

Sodium plays an important role in retaining water in the body and thus can result in fluctuations of blood pressure or increase the edema. To regulate sodium intake we can quantify the salt intake per day. The recommendation is 3 gm per day which is half teaspoon per person per day.

**2 How much salt should be consumed every day?**

Half teaspoon of salt/day is the recommendation for people with hypertension. In case of high blood pressure, it should be reduced, under the guidance of a clinical nutritionist/dietician and treating physician. Some medicines used to reduce high blood pressure have an effect on how the kidneys work and may result in loss of sodium through urine, in such cases, salt should not be reduced.

Usually, salt restriction is also advised in certain kidney and liver diseases. At times, simple cases of edema are also relieved by reducing the salt. Natural foods do not majorly add significantly to the total sodium intake. It is important for us to understand that sodium is added to different foods as a preservative, eg- pickles, papads, bread, biscuits, wafers, ready to eat foods, sauces etc. So, we need to take into consideration the amount of sodium we consume from all sources.

**3 Instead of regular table salt, should I take low sodium table salt?**

There is a basic chemistry behind "low sodium salt" and the use of salt substitutes. Most advertisements and marketing strategies promote low sodium salts containing potassium. Even though potassium is good for the heart and muscles, it has its own drawbacks resulting in tremors, abnormal heart activity and high levels of potassium in the blood. This salt should be restricted in people with diabetes, individuals taking certain medications and people with kidney and some liver diseases.

**4 What are the Food Labeling terms for sodium content?**

| |
|---|
| Sodium – free: Less than 5mg per standard serving; cannot contain any sodium chloride |
| Very low sodium: 35mg or less –per standard serving |
| Low sodium: 140mg or less –per standard serving |

**5 I can't exercise if I have hypertension?**

Exercise is an integral part of the treatment and management strategy to control hypertension. In very rare cases when blood pressure is uncontrolled and unstable will exercise be restricted completely owing to complications. All others can undertake both aerobic and strength training exercises. It is important to talk to your healthcare professional to discuss your medical condition and the exercise plan best suited to you.

| Foods to exclude |
| --- |
| Extra Salt, Salt shaker on dining table, Pickle, papad, canned foods, preserved food, sauces, jams, jellies, ketchup ,instant soups, soup cubes, packaged foods. |
| Salted(nuts, chips, bread, popcorn etc) |
| Bakery products such as biscuits, cookies, bread, cakes, donuts, waffles, puffs, khari etc. Fried snacks and savouries |
| Smoked, processed, or cured meats, pork, beef, red meat, egg yolk and salted and dried fish. |
| Avoid use of margarine, vanaspati & butter. |
| Avoid reheating and reusing of oil. |

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CHAPTER 03

# METABOLIC DISORDERS

# OBESITY

## What is Obesity?

Overweight is a state in which the body weight exceeds the standard weight for height. Obesity is a condition of chronic, multifactorial metabolic disease characterized by an increase in body fat store resulting in adverse metabolic, biochemical and psychosocial health consequences. It is a gateway to ill health and is currently one of the leading causes of disability and death, affecting adults, adolescents and children worldwide. Obesity is a precondition for various chronic diseases like diabetes, cardiovascular diseases, cancer, stroke, arthritis etc.

## How do I know if I am obese?

The common diagnostic metrics for overweight and obesity include Body Mass Index (BMI), waist circumference, and percent body fat. BMI is known to vary based on the race, gender and age. The Indian cut offs are as given below:

| Cut offs | | Classification |
|---|---|---|
| Obesity | Overweight | 23-24.9 |
| | Class I Obesity | 25-29.9 |
| | Class II Obesity | 30-34.9 |
| | Class III Obesity | >35 |
| Percent Body Fat | Women | >32% |
| | Men | >25% |
| Waist Circumference | Women | >80 cms |
| | Men | >90 cms |

## What should I set as my goals if I am overweight or obese?

a. Focus on weight management and attaining ideal body weight.
b. Improve quality of life by exercising daily.

## GUIDELINES FOR DIETARY AND LIFESTYLE CHANGES TO REGULATE OVERWEIGHT OR OBESITY

1 **Consume whole grains in rationed amounts:** Whole grains contain all edible parts of grain and are high in soluble and insoluble fiber. It thus regulates the absorption of carbohydrates and provides an early satiety and prolong gastric emptying time and slow nutrient absorption. And thus highly beneficial in reducing the overall calorie intake during the day.

2 **Protein containing food should be part of every meal:** Include protein containing foods like pulses, legumes, eggs, lean portion of chicken, fish. Choose proteins from any of the protein choices in every meal of the day. These foods improve satiety and thus helps in portion control.

3 **Raw vegetables should be part of every meal:** Vegetables in raw salad form should be part of every meal. Fiber content in the vegetables gives an early satiety and also slows down the absorption of carbohydrates from the meal thus reducing the spike in blood sugar levels.

4 **Healthy snacks as** fruits/Nuts to be consumed between meals. Replace your snacks with Fruits and Nuts in **defined quantity:** Whole fruits (and not as fruit juices) and defined portions of nuts (Almonds, walnuts, Pitachio) should be consumed between meals. The portion size should be considered while choosing the fruit and the quantity in which it is consumed.

5 **Eat Healthy Breakfast, high in protein and dietary fibre every day and get adequate sleep (7 HOURS) daily:** Adequate sleep is required for regulating the body's metabolism. About 7-8 hours of sleep per day is needed to maintain a good metabolism.

6 **Involve in 45-60 minutes of physical activity every day:** Combination of aerobic and resistance training is recommended.

## Frequently Asked Questions (FAQs)

### 1 What are the causes of obesity?

The two most important causes of obesity are wrong dietary habits coupled with insufficient or lack of physical activity. In addition, other factors like genetic, environmental and cultural factors can also cause obesity.

### 2 What are the health consequences of obesity?

- Obesity is likely to develop into a number of health problems in adults namely:
- cardiovascular disease
- insulin resistance (often an early sign of impending diabetes mellitus
- musculoskeletal disorders (especially osteoarthritis - a highly disabling degenerative disease of the joints)
- some cancers (endometrial, breast and colon)
- disability

### 3 Can childhood obesity be prevented?

Yes, childhood obesity can be prevented to a large extent by following measures:

a. Early initiation of breastfeeding in neonates and exclusive breastfeeding for first 6 months of life.

b. Introduction of adequate and safe complementary foods at 6 months along with continued breastfeeding up to 2 years of age or beyond.

c. In school aged and adolescent children along with dietary modifications indulgence in daily physical activity should be encouraged.

### 4 How much of physical activity should one indulge in to reduce obesity?

Exercise recommendation should be a combination of aerobic and resistance exercises which include muscle strengthening. People who are inactive should be advised to start walking for 15-20 minutes and slowly increase time to 30minutes and slowly increase the intensity at weekly interval. In addition to this there should be 15-30 minutes of resistance training daily. Physical activity for a minimum of 5 days/week is recommended.

### 5 What is the recommended fluid intake in obese people on a daily basis?

Fluid intake recommendation varies based on individuals and specific populations. The minimal intake of water per day is around 1.5-2 liters (8-10 glasses), this intake can be increased during hot climate.

### 6 What is the ideal calorie intake in obesity?

As it is commonly said no one size fits all, the calorie requirement varies individually. Calorie requirement depends on a number of factors like category of BMI, level of physical activity, any co morbid conditions (if present) along with obesity etc.

## MYTHS AND FACTS

**MYTH: Skipping meals will help in weight loss.**

**FACT:** Skipping of meals leads to weight loss in initial stages, though if followed for a long period of time causes a reduction in basal metabolic rate. Reduction in basal metabolic rate ceases the weight reduction and a plateau is reached. Skipping meals for a long period of time can also lead to nutritional deficiencies.

**MYTH: Exercising is better than dieting for weight loss.**

**FACT:** There is no evidence showing that exercise alone can lead to weight loss. Though there are huge health benefits of exercise, weight loss in obesity can be achieved only when combined with the right kind of diet.

**MYTH: Combining resistance training and aerobic activity leads to weight loss.**

**FACT:** Resistance training increases lean body mass thus adding to the ability of the body to use more of energy and it thus increases the bone mineral density. Aerobic exercise is important for cardiovascular health through increasing the resting metabolic rate, calorie expenditure, energy deficit and loss of fat.

**MYTH: Men and women have a difference in body composition and this influences the rate of weight loss.**

**FACT:** Men have a higher lean body mass and resting metabolic rate. This difference in body composition is largely due to the female hormones namely estrogen and progesterone. Hence the difference in body composition leads to a faster weight loss in men when compared to women.

**MYTH: Snacking contributes to weight gain.**

**FACT:** Of course, consumption of frequent snacks is never compensated for the main meals and replacing a main meal with snacks on a regular basis can lead to weight gain. It is also the type of food consumed as snacks that often can lead to weight gain. If you take healthy snacks low on calories, sugars and fats, once in a while, it may not be harmful

## Foods to include and exclude

| Foods to include | Foods to exclude |
|---|---|
| Whole grain cereals like whole wheat, brown rice, millets like sorghum (jowar), pearl millet (bajra), finger millet (ragi/nachni), foxtail millet, quinoa | Refined foods like biscuits, cookies, bread, cakes, doughnuts, waffles, khari, toast |
| Dal & pulses like red gram dal, bengal gram dal, lentils, kidney beans, chickpea, green gram etc. | Fried foods such as wafers, vadas, samosa, pakodas, chivda, farsan |
| Egg, fish such as mackerel (bangada), hilsa, katla, rawas (Indian salmon), halwa (black pomfret), tarle (sardines); and chicken (without skin) | Smoked, processed or cured meats, pork, beef, red meat, fried chicken and fried fish |
| Low-fat milk and milk products like curd, buttermilk and cottage cheese (paneer) | Whole milk and milk products, milk shakes, ice cream. |
| All vegetables (to be consumed in cooked and raw form as salads)<br>Seasonal fruits (portion size to be considered) | High salt and preservative containing foods like pickle, papad, canned foods, sauces, ketchup and packaged foods. Sugar and carbonated beverages like fruit juices, aerated drinks, |
| Use oils rich in poly and mono-unsaturated fatty acids (liquid at room temperature) sparingly. | Avoid use of margarine, vanaspati, butter. Avoid reheating and recycling of oil |

## Servings for different food groups (as per the requirements):

| Food group | No. of servings | Serving size |
|---|---|---|
| Whole grains | 3-5 | 30g |
| Pulses and legumes/non veg | 2-3 | 30g |
| Vegetables | 4-5 | 100g |
| Fruits | 2-3 | 150g (raw) |
| Low fat dairy | 2-3 | 150 ml |
| Fats and sugar | Sparingly | - |

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# PRE-DIABETES

## What is Pre-daibetes?

Pre-diabetes is a condition where blood glucose levels are higher than normal but not high enough to be diagnosed as diabetes. Some micro and macrovascular complications of diabetes can be evident at pre-diabetes stage.

## What are the symptoms?

There are no distinct symptoms of pre-diabetes.An absolutely normal looking adolescent or young adult or adult can have prediabetes. Regular monitoring of blood sugar especially in high risk population can detect prediabetes. Fasting blood sugar between 100 to 125 mg/dL and/ or 2-hour sugar after 75-g glucose load between 140 to 199 mg/d and/or HbA1c level between 5.7 to 6.4% is defined as pre-diabetes.

## What happens if one has prediabetes?

People with prediabetes have high risk of developing type 2 diabetes in future. Progression from prediabetes to diabetes can be delayed or prevented with lifestyle modification and some pharmacological agents. Reducing 5 to 7% body weight in overweight individuals with prediabetes has been found to reduce the risk of developing diabetes by almost 58%.

## "TEN MUST DO POINTS" FOR THE MANAGEMENT OF PREDIABETES:

### DIETARY AND LIFESTYLE GUIDELINES FOR THOSE WITH PRE-DIABETES

1. **There is no 'one-size-fits-all' eating plan for those with prediabetes.** The diet must be modified based on cultural background, socioeconomic conditions, personal preferences, co-morbidities, and activity levels.
2. **Total energy intake should be appropriate to attain weight management goals.** Often hypocaloric diet is prescribed to overweight individuals. Macronutrient distribution should be based on individualized assessment of current eating patterns and metabolic goals
3. **The carbohydrate foods selected should be rich in dietary fibers, vitamins, and minerals but low in added sugars, fats, and sodium.** Eat variety of whole grains. Avoid refined grains, sugar, sweets and sweetened beverages. Reducing overall carbohydrate intake improves glycemic control. Sugar substitutes can be used occasionally to reduce overall calorie and carbohydrate intake.
4. C**hoose from fish, lean meat, pulses, beans and nuts and Limit red meat, processed meat (hot dogs, sausage, bacon) and cheese.** Limit dairy to 1 to 2 servings a day. It has been seen that high-protein eating plans and inclusion of plant-based proteins result in greater weight and improved lipid profile in people with prediabetes.
5. **Fats: Limit total fat intake to less than 30% and saturated fat intake less than 10% of total calorie intake. Avoid trans fats. Use healthy oils for cooking; be mindful of the quantity.** Roast, broil, grill, steam or bake instead of deep-frying or pan-frying.
6. **Replace the unhealthy snacks with handful of nuts (25-30 gms) choose from almonds, cashews, walnut and pistachio**
7. **Prefer high-fiber and low glycemic index foods.** Include at least 20 g of fiber per 1000 kcal preferably through food (vegetables, pulses, beans, fruits, and whole grains) and not supplements. Very high fiber intake may cause flatulence, bloating, and diarrhea.

8 **Eat fruits and vegetables of all colors.** Greater the variety – the better! Aim for minimum 4-5 servings of vegetables and 1-2 servings of fruits portion daily

9 **Limit Sodium to less than 2,300 mg (less than 1 tsp common salt)** daily

10 **Replace sugar-sweetened beverages** with water as often as possible. Drink water and liquids like lime water, buttermilk, jal-jeera (with limited salt).

11 **Multivitamins or mineral supplementation has not been supported by evidence without deficiencies.** People taking metformin are recommended to have annual assessment of vitamin B12 status. Supplementation is advised if deficiency is present. Herbal supplements (fenugreek, cinnamon, turmeric) are also not supported by enough evidence but can be used as food ingredients in the diet.

## ADDITIONAL TIPS FOR INDIVIDUALS WITH PRE-DIABETES:

- **Calorie saving tips:** Avoid snacks and eating out where size and content of meals cannot be controlled. When eating out, share main course with a friend or family member or take half of the meal home for lunch the next day. Be careful with salad dressings and toppings; the calories can add up very fast! Cut calories by eating smaller servings of usual food. Eat fewer and smaller portion size of desserts and treats such as ice cream, cake and cookies. Try saving these for special occasions.
- **Have healthy replacements.** Choose lower-calorie snacks, such as popcorn instead of potato chips. Choose fruit instead of cake, chocolates or cookies.
- **Track Your Progress.** Write down the details of your daily diet. Monitor and record your weight weekly. Writing things down makes one aware of the total intake and aids weight loss.
- **Habits:** Avoid tobacco and alcohol consumption. It has been observed that smoking and regular alcohol consumption can hasten the progression to diabetes in individuals with prediabetes.
- **Physical activity:** Minimum 150 minutes of moderate or 75 minutes of intense physical activity per week at intervals of no longer than 48 hours is recommended. Overweight people may need more intensive physical activity for optimum weight loss and maintenance.

### Foods to include and exclude:

| Foods to include | Foods to exclude |
|---|---|
| Whole grains, millets, pulses and legumes, sprouts | White rice, refined flours (bread, bakery items) |
| All fresh vegetables, salads and fruits | Potato, sago, processed fruits and fruit juices |
| Egg, fish, chicken – lean pieces | Red meat, organ meat, fried meat, processed, canned and frozen fishes, processed and frozen meat |
| Low fat milk and its products like paneer, curds | Butter, cream, cheese, mayonnaise |
| Soy and its products (tofu) | Junk food, bakery products, fried foods, salted foods, packaged foods, roadside foods, foods containing artificial colors and sweeteners |

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# DIABETES

## What is diabetes?

Diabetes is a disorder where the body does not produce insulin at all (Type 1 Diabetes) or produces insufficient insulin or cannot utilise insulin efficiently (Type 2 Diabetes). Symptoms if any may include weakness, unintentional weight loss, blurred vision, increased urination, hunger and thirst. Poor glycaemic control would lead to micro and macro vascular complications such as diabetic neuropathy, cardio myopathy, neuropathy, foot amputations etc. Lifestyle modification plays an important role in prevention and management of diabetes and its complications.

**Thus, the categories of FPG (Fasting plasma glucose) values are as follows:**

- FPG <100 mg/dl = normal fasting glucose;
- FPG 100–125 mg/dl = IFG (Impaired fasting glucose)
- FPG ≥126 mg/dl = Provisional diagnosis of diabetes

The diagnosis must be confirmed, as described below

**The corresponding categories when the OGTT is used are the following:**

- 2-h post load glucose <140 mg/dl = normal glucose tolerance;
- 2-h post load glucose 140–199 mg/dl = IGT (impaired glucose tolerance);
- 2-h post load glucose ≥200 mg/dl = provisional diagnosis of diabetes

Patients with IFG and/or IGT are now referred to as having "pre-diabetes" indicating the relatively high risk for development of diabetes in these patients.

If overweight, try to achieve ideal weight to improve glycemic profile.

## Diet and physical activity guidelines:

- Include all food groups in the diet. Maintain diet diversity
- Macronutrient distribution should be based on individualized assessment of current eating patterns and metabolic goals.
- The carbohydrate foods selected should be rich in soluble and insoluble dietary fibre, vitamins, and minerals but low in added sugars, fats, and sodium. Choose on food sources low in glycemic index and low glycemic load. Choose on complex carbohydrates, consume a variety of whole grains. Avoid simple carbohydrates such as refined grains, sugar, sweets and sweetened beverages. Reducing overall carbohydrate intake aids in improved glycaemic control.
- For protein, choose from skimmed milk and its products, pulses, beans fish, lean meat, and nuts. Limit red meat, processed meat (hot dogs, sausage, bacon) and cheese.
- Limit total fat intake to less than 25% and saturated fat intake less than 7% of total calorie intake from fats. Avoid trans fats. Use healthy oils for cooking; be mindful of the quantity. Roast, broil, grill, steam or bake instead of deep-frying or pan-frying.
- Consume timely, nutritionally balanced meals in specified quantities as advised by the Dietician
- Prior to the main course, consume a salad or sprouted whole gram or unstrained vegetable soup (without cream or corn flour)
- Include fibre rich sources such as whole grains, legumes, pulses and vegetables in all the meals

- Restrict the consumption of visible sugars-palm sugar, jaggery and honey.
- Can include fenugreek seeds in daily diet in the form of powder or sprouted seeds before major meals
- Only USFDA approved artificial sweeteners may be recommended based on their Acceptable Daily Intake (ADI). Gut dysbiosis may occur on consumption of artificial sweeteners.
- Aim for less than 1 level teaspoon of salt (i.e. less than 2,300 mg of sodium) per day.
- Instead use lemon, kokum, amchur powder, vinegar or herbs to add flavour to the food.
- Ensure to include 2-2.5 litres of water to meet daily water requirement unless advised by your doctor.
- If you choose to consume alcohol, do so in moderation. Not more than two drinks per day for men and not more than one drink per day for women and individuals above 65 years of age (1 drink equal-360 ml Beer or 150ml Wine or 30ml Whiskey/Gin/Vodka/Rum) provided there is good glycemic control, no dyslipidemia and the carbohydrates and calories are calculated within daily total energy requirements with a go ahead from the treating physician.
- Regular moderate intensity exercise will help to improve physical & mental wellbeing. An easy way to start exercising is to walk for 30 minutes a day. One can also try swimming, cycling, or any other moderate-intensity activity. However, consult a doctor before embarking on any exercise regime.

**Foods to include and exclude:**

| Foods to include | Foods to exclude |
|---|---|
| Whole grain cereals & millets like Sorghum (jowar), pearl millet (bajra), finger millet (ragi/nachni), foxtail millet etc. | Refined flours, Bakery products– biscuits, cookies, rusk, bread, cakes, donuts, waffles. |
| Dal & pulses like kidney beans, chickpea, green gram etc. | - |
| Low-fat milk and milk products like curd, buttermilk and cottage cheese (paneer) | Whole Milk and milk products, Cream |
| Egg white, fish such as mackerel (bangada), hilsa, katla, rawas (Indian salmon), halwa (black pomfret), tarle (sardines); and chicken (without skin).<br>Whole Egg yolk in moderation based on dyslipidemic status | Smoked, processed or cured meats, pork, beef, red meat, fried chicken and fried fish |
| Choose low GI and Low GL fruits and vegetables<br>Greens & other Vegetables (4-5 portions)<br>Seasonal fruits :In Moderation<br>(1-2 portions based on glycemic control) | Fruit juices, Dates, Raisins |
| Handful of mixed nuts (Almonds, Walnuts, Pistachios) replacing one cereal exchange based on discretion of consulting dietician.<br>Oil 500ml//month per person<br>Blend of oils etc based on discretion of consulting dietician | Palm oil, margarine, vanaspati, butter.<br>Avoid reheating and recycling of oil |
| | Carbonated beverages, Proprietary Drinks Milk Sweets, ice cream and chocolates<br>Fried snacks and savouries such as vadas, samosa, pakoras, chivda, farsan, wafers etc. |

The above list provides only a broad outline on the foods to be included and excluded, one needs to consult a qualified dietician to help identify the portion size, method of cooking and accompaniments to include the various food ingredients consumed regularly based on their clinical condition.

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# POLYCYSTIC OVARY SYNDROME (PCOS)

Endocrine and metabolic diseases consist of a vast range of conditions. Conditions arising from endocrine disorders may cause the body to over or under produce certain hormones. Examples are hyperthyroidism and hypothyroidism. Metabolic disorders arise from underlying endocrine/hormonal insufficiency which affects the body's ability to process certain nutrients.

## What is Polycystic ovary syndrome (PCOS)?

Polycystic ovary syndrome (PCOS) is the most common endocrine system disorder in women of reproductive age, which appears as a set of symptoms and disorders with mild to severe protests in the functioning of reproductive, hormonal and metabolic systems. This syndrome is characterized by irregular menstruation, polycystic ovaries and hyperandrogenism, insulin resistance, and obesity.

## What are the common signs and symptoms of Polycystic ovary syndrome (PCOS)?

Symptoms of this syndrome include the endocrine system and reproductive signs which occur in the shape of amenorrhea (no menstruation for more than 6 months), hirsutism (male like hair growth on body), obesity, acne, male pattern hair and reproductive disorders. This syndrome also increases the risk of diseases like type 2 diabetes, hypertension, lipid disorders, cardiovascular diseases and malignancies, such as breast and endometrial cancer.

## What dietary and lifestyle changes are required in treatment of PCOS?

- Nutritional management plays an important role in treatment of PCOS. Weight loss in patients with PCOS proves to be beneficial.
- Dietary modifications must be designed to enhance insulin sensitivity and weight loss. This includes decreasing the total caloric intake with moderate (45-55% of total calories) amount of complex carbohydrates and avoiding sugar and sugary drinks
- It can be achieved by incorporating complex carbohydrates such as whole grain cereals, sprouted legumes and pulses, seasonally available vegetables and fruits in moderate quantity.
- Food sources of good quality protein should be included in the diet Ensure they are included in all the meals. Choose from –low fat milk, curd, dals, sprouted legumes, paneer, eggs, chicken, fish etc.
- Saturated fats and trans-fats from the diet should be avoided This includes avoidance of hydrogenated fats, fried foods, bakery products, fast foods etc.
- Supplementation of vitamin D3 and chromium picolinate is helpful to improve glucose tolerance, insulin sensitivity.
- Regular physical activity under the guidance of an expert plays a vital role in improvement.

## BUSTING NUTRITION MYTHS

**MYTH: All dairy products should be avoided to lose weight.**

**FACT:** Dairy products are rich sources of not only protein but also calcium and vitamin D to some extent. Both micro nutrients being very essential for PCOS, low fat dairy products must be part of daily diet.

**MYTH: No fruits are allowed.**

**FACT:** Even though fruits contain carbohydrates in forms of fructose, it also contains variety of vitamins, antioxidants and dietary fibre. Consuming seasonally available whole fruits (instead of juices) will be beneficial.

## Foods to include and exclude:

| Foods to include | Foods to exclude |
|---|---|
| Whole grain cereals (wheat, jowar, bajra, nachni, daliya, oats etc.) | Maida, Bakery products (white bread, toast, patties) |
| All dals/pulses and sprouted legumes, soybean | Deep fried snacks - shev, chips, farsan, samosa, vada |
| Low fat milk and milk products such as curd, paneer, buttermilk etc. | Ready to eat and canned products |
| Egg, lean meat (chicken) and fish | Red meats, organ meat. |
| 4 to 5 portions of seasonal vegetables, green leafy vegetables | Fast foods – pizza, burger etc. |
| Seasonal fruits (preferably consume fruit with skin than juices) | Carbonated beverages, soda |
| Nuts, dried fruits and oilseeds | Hydrogenated fats. |
| | Butter, cream& ghee in small quantities only. |
| | Sugar , sweets (mithais), pastries etc |

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# GESTATIONAL DIABETES MELLITUS (GDM)

## What is Gestational Diabetes?

Gestational diabetes mellitus (GDM) is a type of diabetes that develops during pregnancy. It is usually diagnosed in 24 to 28 weeks of pregnancy. Globally, around 15% pregnancies are affected by GDM and its prevalence is rising rapidly. This type of Diabetes is usually temporary, but it also indicates a high risk of future Diabetes in the mother as well as offspring. GDM is characterized by increased risk of macrosomia (larger baby) and birth complications in absence of euglycemic fetal environment. Women with GDM have a higher risk of developing to type 2 diabetes subsequently. Children born to mothers with GDM also carry a higher risk of developing obesity and type2 diabetes in future. Lifestyle change is an essential component of management of GDM and may suffice for the treatment of many (70 – 85%) women. It includes medical nutrition therapy, physical activity, weight management depending on pre-gestational weight and regular blood glucose monitoring. Improved glycemic control may help reduce the risk of complications.

Blood glucose targets for women with GDM:

- Fasting: <95 mg/dL
- One-hour post meal: <140 mg/dL
- Two-hours post meal: <120 mg/dL

Average of 7 point glycemic profile being 105 mg/dL

## What are the major risk factors of GDM?

Family history, overweight, sedentary lifestyle, polycystic ovary syndrome and belonging to an ethnic group with high risk of Diabetes are the usual risk factors.

## What's the therapy to keep blood glucose levels normal?

For the first week, it would be attempted to attain normal blood glucose level with Medical Nutrition Therapy. If euglycemic status is not achieved, then anti-diabetic medication preferably insulin is initiated.

## Dietary and lifestyle guidelines:

- The daily diet should provide adequate calories to promote fetal and maternal health with appropriate gestational weight gain and maintain euglycemic status throughout the period of gestation.
- The recommended composition of the diet is ~50 to 55% of the Total Energy Intake(TEI) from Carbohydrates , 15-20% of TEI from Proteins and 25-30% of TEI from healthy fats preferably.
- The portion size, Glycemic index (GI), Glycemic load (GL) of the meal influence the post meal glucose excursions. Therefore, the total intake of carbohydrates should be controlled and monitored.
- Very low carbohydrate diets can lead to starvation induce ketosis. It is recommended to have minimum of 175 g of carbohydrate, 70 g of proteins, and 28 g fibers in daily diet of a GDM mother.
- Avoid fasting, feasting or skipping meals. Gap between each meal and snack should be at least 1 and half hour to 2 hours for improved glycemic control.

- When only on Medical Nutrition therapy, in absence of good post prandial blood glucose control,in single value abnormality for example post dinner a split meal plan can help improve blood glucose control.
- Avoid weight reduction during the gestational period, prefer a carbohydrate controlled plan.

## TEN POINTS TO MANAGE GESTATIONAL DIABETES

1 **A Carbohydrate controlled meal plan:** The main aim of Medical Nutrition Therapy in GDM is to plan a carbohydrate-controlled meal plan that promotes adequate nutrition along with appropriate weight gain and achieve normoglycemia. Usually a 1-hour split carbohydrate breakfast is suggested because controlling morning blood glucose is usually difficult due to insulin resistance being the highest in the mornings. It is always suggested to meet a Registered Dietitian for a carbohydrate-controlled meal plan.

2. **Inclusion of dietary fiber:** A minimum of 4 servings of a variety of non-starchy vegetables such as leafy greens, brinjal, tomato, ladies-finger, variety of beans, peppers, mushrooms, broccoli, all types of gourds and cabbage and a serving of whole, skinned fruits such as Apple, green apple, guava, pear, berries, orange, avocado is recommended. To avoid hyperglycemia in the mornings better to avoid fruits in the morning or midmorning. Prefer to consume them in the evening or bedtime as a heathy carbohydrate snack to prevent nocturnal hypoglycemia and early morning starvation ketosis provided the blood glucose is within the target range.

3. **Restrict consumption of refined products and replace with Complex carbohydrates:** Whole grains and legumes which are also rich sources of insoluble fiber are preferred overrefined cereals. Consuming foods rich in complex carbohydrates such as wheat, bajra, jowar, ragi, whole pulses and fruits and vegetables with skin should be preferred over simple sugars such as fruit juices, honey, carbonated beverages, sweets, puddings, pastry, white bread, naan, rumali roti etc. They are not only devoid of fibre but also raise the post prandial blood glucose.

4. **Include protein rich foods:** Choose protein sources such as lean chicken, whole grams, dals, beans, nuts, freshwater fish, egg white, low fat paneer, low-fat milk or low-fat cheese. Avoid other processed meats.

5. **Keep the calcium intake at a watch:** Choose 2-3 servings of lowfat/skimmed milk, curd, paneer and yoghurt.

6. **Artificial Sweeteners:** USFDA approved sweeteners for pregnancy in moderation is Sucralose. Saccharin and cyclamate is contradicted during pregnancy. Non-Nutritive Sweeteners better avoided in view of Gut Dysbiosis.

7. **Choose healthy fats:** Include healthy calories a handful of variety of nuts (almonds, walnuts and pistachios) as a healthy snack option within the Total Energy intake. Choose healthy oils (rice bran, groundnut, gingelly oil etc or a blend of oils) in moderation for cooking or to flavor foods.

8. **Alcohol:** According to WHO there is no safe amount and type of alcohol which can be preferred during pregnancy. Hence, alcohol should be strictly prohibited. Avoid alcohol and tobacco in all forms.

To meet the macro and micronutrient requirements during the gestational period it is wise to include a variety of food ingredients from the various food groups.

- Grains and millets: Wheat bajra, jowar, ragi, oats, basmati or brown rice in moderation .
- Plenty of fresh, local and seasonal vegetables and fruits of low GI and Low GL preferred in moderation.
- Vegetable protein: Pulses, sprouts, tofu, Nuts-(Almonds/Pistachios/Walnuts)

- Animal proteins: Eggs (in moderation) Lean chicken and freshwater fish
- Low fat Milk and milk products: curds, paneer, cheese
- Include iron rich foods like leafy vegetables like drums stick leaves, roasted bengal gram, curry leaves, mint leaves along with regular consumption of Amla for improved iron absorption.
- Prefer steaming, boiling, roasting or sautéing. as methods of cooking.
- Avoid visible sugars (palm /brown /white), jaggery, honey, sweets, fruit juices and carbonated beverages.

## Frequently Asked Questions (FAQs)

### 1 Will blood sugars become normal after delivery?

Most women will have normal blood glucose levels after delivery. Some women will continue to have diabetes and medications will be prescribed. Please keep in mind, Gestational Diabetes is a fore runner of future diabetes. It is important to eat healthy and be active and get to a healthy weight even if the blood glucose is normal.

### 2 Will the baby be born with Diabetes Mellitus?

No. It is important that the GDM mother maintains tight control on blood glucose levels so that the baby is born without any abnormality. But it is important to make sure that after delivery the baby should not gain too much weight. Children of GDM mothers are prone to developing diabetes if obese.

### 3 Is breast feeding good for the baby?

Breastfeeding is the best thing that the mother can do for her child. Breast milk has the right proportion of nutrients, boosts immunity, does not cause obesity (usually) and also allows baby-mother bond to strengthen.

### 4 Can one exercise during GDM?

Being physically active is very important. Women can usually continue the exercise routine that they are used to prior to getting pregnant. However, it is always advisable to check with your Obstetrician if the activity is safe. Being active helps with good glucose control, limits post-natal weight gain.

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CHAPTER 04

# DYSLIPIDEMIA

# DYSLIPIDEMIA

## What is dyslipidemia?

With changing lifestyles and increasing stress levels, an array of medical problems have emerged. From issues that are visible, like obesity to ones that are not visible to the naked eye, like abnormal lipid levels. Dyslipidemia is the abnormal levels of blood lipids (e.g. triglycerides, cholesterol and/or fat phospholipids) in the blood. In developed countries, most dyslipidemias are hyperlipidaemias; that is, an elevation of lipids in the blood. This is often due to diet and lifestyle, though genetics and family history also plays a major role.

## What are blood lipids?

Blood lipids are the fats that are circulating in the blood and are considered normal if they are in the normal range. Dyslipidemia is a condition where the levels of any of the blood lipids may be deranged. These are typically,

- High levels of low-density lipoproteins (LDL), or the bad cholesterol
- Low levels of high-density lipoproteins (HDL), or the good cholesterol
- High levels of triglycerides
- High cholesterol, which refers to high LDL and triglyceride levels

## Can thin people also have Dyslipidemia?

Yes, dyslipidemia is not a disease of only obese people. It very often affects the thin and normal weight people as well. Early detection is important to prevent complications and get the raised or abnormal levels back to normal with dietary, lifestyle and behavioural changes.

## Am I at risk of developing Dyslipidemia?

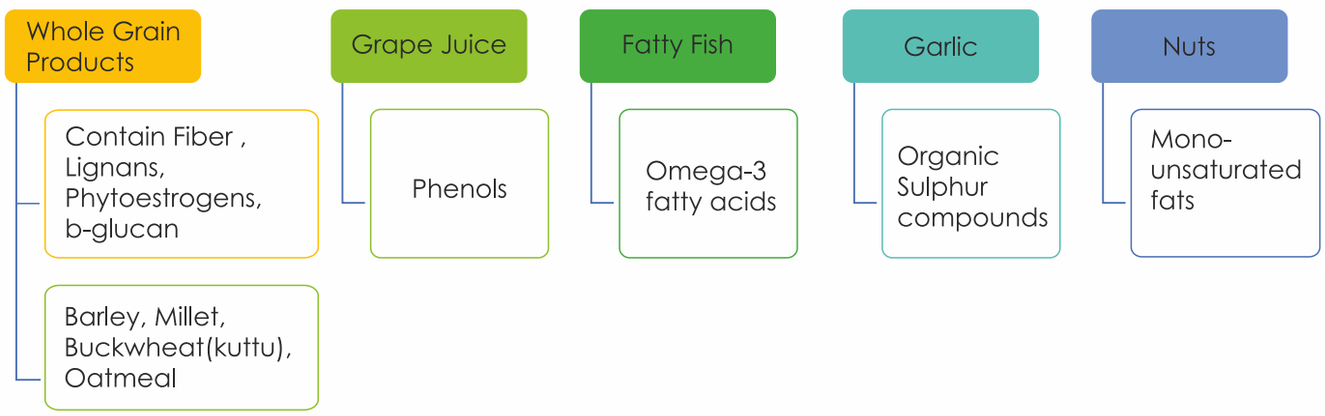
Yes, each of us leading a sedentary lifestyle, with irregular meal timings, high stress levels or unhealthy dietary practices are at a risk of developing dyslipidemia. It is more often seen in elderly people but there is an increasing number of younger adults with abnormal lipid levels as well.

## Dietary and lifestyle guidelines:

- The most important aspect in maintaining your blood lipid levels is to have a balanced diet which is nutritionally adequate.
- All nutrients- Carbohydrates, fats and proteins are needed by the body and hence should be included in the daily intake.
- The key is to limit bad fats, increase good fats and limit the intake of refined flour (Maida) and excessive sugar from the diet.
- It is essential that you follow the portion sizes of each food group to maintain cholesterol and triglyceride levels.

## Tips to control cholesterol levels

1. **Exercise Regularly-** Following a prescribed exercise regime which includes both aerobic and strength training. Atleast 30 min exercise daily should be pursued for 5 days a week.
2. **Make healthy dietary choices-** A diet rich in fiber and unsaturated fats and low in saturated fats, refined flour and sugar help in maintaining normal lipid levels.
3. **Avoid tobacco and alcohol-** Alcohol and tobacco initiate changes in the body and drastically affect the lipid levels. Avoiding alcohol intake and tobacco can lead to raising the good cholesterol levels as well.
4. **Know your family history-** If your immediate family members and parents have high cholesterol levels, then you should get yourself checked often as you may suffer from a condition called as Familial Hypercholesterolemia.
5. **Include functional foods in your diet-**




## Summary:

- Ensure that you eat your meals on time.
- Eat nutritionally balanced meals.
- Start your main meals with a salad or a clear unstrained soup.
- Include a vegetable in every meal.
- Restrict the use of sugar, jaggery, and honey.
- Include omega-3 fatty acid rich sources such as mackerel (bangada), flaxseeds, walnuts, soybean oil and chia seeds.
- Oils such as groundnut oil, mustard, gingelly, rice bran oil are recommended. Olive oil can be used for stir frying or as a salad dressing. It is important to note that caloric value of all oils is the same. Restrict the quantity to 3 level teaspoons per day.
- Ensure that you indulge in regular physical activity. Moderate intensity exercise will help to improve cholesterol and triglyceride levels. Consult your doctor for the recommendation of any exercise or activity program that is safe for you.
- Consumption of alcohol, aerated drinks, refined foods such as sugar and refined flour and its products like bread, biscuits and bakery items increases triglyceride levels. Keep them to the minimum.
- If you choose to consume alcohol, do so in moderation. Not more than two drinks per day for men and no more than one drink per day for women and individuals above 65 yrs of age. (1 drink equals - 360 ml Beer or 150ml wine or 30ml whiskey/gin/vodka/rum).
- Avoid use of tobacco and stop smoking.

## Foods to include and exclude:

| Food Group | Foods to include | Foods to exclude |
|---|---|---|
| Cereal, millets and their products | Whole grain cereals & millets like Sorghum (jowar), pearl millet (bajra), finger millet (ragi/nachni), foxtail millet etc. | Bakery products– biscuits, cookies, bread, cakes, donuts, waffles, khari, toast etc. |
| Pulses and Legumes | Dal & pulses like kidney beans, chickpea, green gram, sprouts etc. | Fried foods- Farsan, dal |
| Milk and their products | Low-fat milk and milk products like curd, buttermilk and paneer | Cream, whole fat milk, ice cream and chocolates |
| Meat and their products | Egg (not more than 3 whole egg/week), Egg, fish such as mackerel (bangada), hilsa, katla, rawas (Indian salmon), Halwa (black pomfret), tarle (sardines); and chicken (without skin) | Red meat – pork, beef, red mutton, Smoked, processed, or cured meats, bacon, salami, sausages, fried chicken and fried fish. |
| Vegetables and Fruits | All vegetables and seasonal fruits | Fried foods – chips, wafers, vadas, samosa, pakodas.<br>Fruit juices, aerated drinks. |
| Miscellaneous | Oils such as canola, olive, peanut, safflower, sesame.<br>Nuts and Seeds like Flax seeds, Sunflower seeds and Walnut. | Salty foods- pickle, papad, canned foods, sauces and ketchup, packaged foods<br>Avoid use of margarine, vanaspati, butter. Avoid reheating and recycling of oil |

## Frequently Asked Questions

### 1 Is all Cholesterol bad for me?

Not all cholesterol is bad for you. Cholesterol has some important work in the body like production of hormones, and building cells. Cholesterol is transferred in the body in the form of lipoproteins which are- LDL(Low Density Lipoproteins), also common considered the bad cholesterol and the HDL(High Density Lipoproteins), also known as the good cholesterol. High levels of LDL are associated with increased risk of heart disease and stroke where as high levels of HDL are considered protective for the heart.

### 2. Nothing can be done to bring down cholesterol levels once they are high?

In most cases, the cholesterol levels can be controlled and maintained within normal ranges by regular exercise, cessation of smoking, avoiding alcohol intake and eating a healthy diet which is low in saturated and trans fats, high in fibre and low in simple sugars.

### 3. Is it true that high cholesterol levels without any symptoms will not affect me?

High cholesterol levels may not reflect any signs and symptoms externally but lead to accumulation of fats in the arteries thus leading to stiffening and narrowing of the arteries. This can increase the risk of heart diseases and stroke among other complications.

**4. Are there any side-effects if I cut down on oil completely?**

Yes, there can be major side-effects if you remove oils completely from your diet. Fats are an important component of our diet. In very rare conditions do we need to limit them completely from the diet, and weight loss certainly is not one of those rare conditions. Of course, there are "good" and "bad" fats, though. It can lead to malnutrition with hollowing of the cheeks, dark circles under your eyes, evident balding, mood swings, varied vitamin and mineral deficiencies, dryness of skin, extreme weakness and a resigned out look towards life among other complications.

**5. So which are the good fats?**

Everything in moderation is good. For fats, almost 30% of your diet should be composed of fats. Saturated fats like butter, ghee, cream should be restricted. A daily consumption of 15-25 ml or 3-5 teaspoon of oil will provide the essential amount of fat soluble vitamins and essential fatty acids. The best way is to rotate oils in your cooking- soybean oil, peanut(groundnut) oil, sunflower oil and safflower oil. Include the good fats, limit the saturated fats and avoid the bad fats!

**6. So, should ghee be stopped completely?**

You do not have to completely stop ghee. You can still consume 1 tsp daily of ghee (leaving you with 4 tsp daily of oil). But, ghee being high in saturated fats should be restricted further. As for our ancestors, they were used to doing a lot of heavy physical labour, without eating junk and processed foods, were not exposed to all the pollutants and radiations, and never really had a sedentary life.

**7. Should I start with healthy fats, which will be omega-3 fatty acids supplements?**

No, supplementation should be consumed for an indefinite period of time or without a prescription. We may be looking at future toxicities and side-effects. Not all people would need supplements of Omega-3 fatty acids. Flaxseeds, walnuts, certain fishes are very good sources of it. Even if you have 2 tsp of flaxseeds per day, you cater for your omega3 fatty acid needs. Omega-3 fatty acids are the good fats, as they have anti-inflammatory effect and help in protecting the blood vessels from atherosclerosis.

**8. Should I follow a Vegan diet or Mediterranean diet or Gluten free diet or Keto diet?**

A traditional diet is nutritionally adequate and rich in fibre and good fats. A modified diet is helpful in some special cases and should be followed on advice only. A Mediterranean diet has been proven in various studies to be beneficial in lowering cholesterol levels and is typically high in vegetables, fruits, whole grains, beans, nut and seeds.

**9. Do I change my diet while taking statins?**

Have a balanced diet, low in saturated fats, exercise regularly and avoid alcohol.

**10. What precautions should I take while taking statins?**

Avoid grapefruit, seville oranges and other citrus fruits which have furanocoumarins in them. Also, let your doctor know about all the supplements and herbal medicines that you are consuming.

**11. Which oil should I use for daily cooking and which one do I use for deep frying?**

Again, going back to the chemistry oils, we need to use oils which have high smoke point for frying. The following table can explain the different smoke points of oil and hence their different usage.

| Oil | Description | Smoke Point |
|---|---|---|
| Almond oil (refined) | Used in sautéing, stir fry. | High |
| Canola oil (refined) | All-purpose oil | Med-High |
| Coconut Oil (unrefined) | Good for soups, curries and baked goods | Med |
| Corn Oil | Used in deep frying | High |
| Olive oil (extra virgin) | For cold dishes, salads, dipping bread | Low-High |
| Sesame Oil (refined) | For stir frying, searing meats | Med-High |
| Soybean Oil | High omega-3 fatty acids. Regular cooking | Med |
| Flaxseed Oil | For salads. Not to be heated | Low |
| Safflower Oil | Regular cooking | Low-Med |
| Peanut Oil | Regular cooking. Concerns with allergies and use of Genetically modified peanuts. | Low-Med |

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CHAPTER 05

# NON-ALCOHOLIC FATTY LIVER DISEASE (NAFLD)

# NON-ALCOHOLIC FATTY LIVER DISEASE (NAFLD)

## What is NAFLD?

Nonalcoholic fatty liver disease (NAFLD) is a condition in which excess fat is stored in the liver. The excess fat causes damage to the liver tissue leading to fibrosis. If left untreated, it can lead to serious liver damage and in extreme conditions liver failure.

## What Causes NAFLD?

- Obesity (High body fat especially central obesity or increased waist circumference)
- Insulin resistance (Inefficient insulin in the body which favors fat deposition)
- Abnormal levels of fats in the blood, which may include: High blood triglyceride levels
- High blood cholesterol levels (High VLDL, High Triglycerides, High LDL).
- High blood pressure.
- Higher than normal blood glucose levels.
- Type 2 diabetes

## Dietary and lifestyle guidelines:

- Weight loss is recommended in overweight or obese individuals. A weight loss of 5 -10 percent helps in the reversal of NAFLD.
- Ration your portions of energy dense foods whole grain cereals, nuts, seeds, legumes. Ensure to eat nutritionally balanced meals. Make sure that you include fiber rich foods, good quality and quantity of protein and rationed amounts of good quality carbohydrates in each meal.
- Fill half your plate with seasonally available vegetables in your meals
- Opt for low fat non-vegetarian proteins source like fish (at least twice a week), deskinned chicken, egg and low-fat dairy products.
- Cut down or eliminate refined carbohydrates-based products and refined sugars, fruit juices, jellies and jams.
- Avoid foods and beverages containing high-fructose corn syrup (HFCS) & sugar such as candy, pastries, donuts, cake, cookies and aerated drinks. It is recommended to read food labels to understand the ingredients used and the fructose content of packaged foods.
- Include vitamin E rich foods such as almonds, pumpkin seeds, sunflower seeds and avocado.
- Include vitamin C rich foods such as amla (gooseberry), guava, citrus fruits, bell peppers, and broccoli.
- Restrict the quantity of oil to 3 level teaspoons per day as caloric value of all oils is the same. Oils such as groundnut oil, gingelly oil, rice bran oil can be included.
- Increase physical activity. Recommended physical activity is 150 minutes of moderate intensity exercise per week (30 minutes of activity 5 times a week), increasing to 30-45 minutes daily. However, consult a doctor before embarking on any exercise regime.

## Foods to include and exclude:

| Foods to include | Foods to exclude |
|---|---|
| Whole grain cereals & millets like sorghum (jowar), pearl millet (bajra), finger millet (ragi/nachni) | Biscuits, cookies, bread, cakes, donuts, waffles, khari, toast - Bakery product |
| Low-fat milk and milk products like curd, buttermilk and cottage cheese (paneer). | Whole Milk and Milk Products like Khoa, Cheese |
| Egg, fish such as mackerel (bangada), hilsa, katla, rawas (Indian salmon), halwa (black pomfret), tarle (sardines); and chicken (without skin). | Smoked, processed, or cured meats, pork, beef, red meat, fried chicken, fried fish and dried fish. |
| Seasonal fruits (refer portion size list) & vegetables, garlic. | Fruit juices, sugar sweetened aerated drinks, alcohol, ice cream, jellies, jam and chocolates. |
| Nuts and seeds like unsalted almond, walnuts, brazil nuts, flaxseeds, chia seeds, sunflower seeds. Roasted Chivda / Baked Farsan | Avoid margarine, vanaspati, butter, reheating and reusing oil which is a major source of trans fat.<br>Fried foods- wafers, vadas, samosa, pakodas, chivda, farsan. |

## MYTHS AND FACTS

**MYTH:** Fatty liver disease can only happen if you are an alcoholic.

**FACT:** It is a myth to say that the people who have uncontrolled intake of alcohol or abuse alcohol are only at risk of fatty liver disease. It is proven today that if we eat food which is laden with refined carbohydrates, poor quality fats in large amounts and have sedentary lifestyles, we favor fatty depositions in the liver which in turn cause damage to the liver.

**MYTH:** Obesity cannot lead to damage of the liver (liver cirrhosis).

**FACT:** Obesity means accumulation of excess fat in the body. This excess fat can deposit in the liver and starts damaging the functioning of the liver. If we do not control this trend of fat deposition, fats being a factory of hormones tend to create an inflammatory or undesirable environment in the body causing damage to liver cells leading to cirrhosis. In the long run, if attention is not paid to this progression it may lead to cancer of liver.

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CHAPTER 06

# GUT RELATED DISEASES

# GASTRITIS

## What is gastritis?

Gastritis is the inflammation of gastric lining (mucosa) due to the irritation to the stomach lining due to a causative factor. There is a disrupted balance between formation of caustic gastric acid and maintenance of protective mucosal barrier. Gastritis and Gastric ulcers are associated with insufficient mucosal protection. It can be acute or chronic in nature.

## What causes gastritis?

- Imbalance between stomach fluids & its ability to defend itself – against powerful juices, acid & pepsin – contributes to acid formation.
- H.Pylori infection, consumption of **NSAIDS (Pain killers) make** stomach vulnerable to harmful effects of acid and pepsin. They interfere with stomach's ability to produce mucus and bicarbonate affect blood flow to the stomach and cell repair. Drugs like aspirin, ibuprofen, and naproxen sodium, Diclofenac – are acidic and block prostaglandins.
- Lifestyle factors - type A personality (who is driven, competitive, ambitious, and always on the edge) susceptible to stress, alcohol intake, smoking, major surgery / severe illness.

## What are the symptoms?

Dyspepsia - upper abdominal pain or discomfort.

Nausea and Vomiting

## Dietary guidelines to help decrease reflux/stomach acid

- Eat a nutritionally adequate diet include a wide variety of foods, omitting the foods causing discomfort.
- Regularity in meal timing is a must consume small frequent meals – eat three small meals and three snacks evenly spaced throughout the day. It is important to avoid periods of hunger or overeating. Eat slowly and chew foods well. Be relaxed at mealtime.
- Include a good source of protein (milk, meat, egg, cheese, etc.) at each meal and snack.
- Avoid eating within 3 hours before bedtime. Bedtime snacks can cause gastric acid secretion during the night.
- Cut down on caffeine-containing foods and beverages (coffee, tea, and cola drinks), citrus and tomato products, and chocolate if these foods cause discomfort.
- Foods containing flavonoids, like apples, celery, cranberries (including cranberry juice), onions, and tea may inhibit the growth of H. pylori.
- Milk and cream feedings should not be used as antacid therapy. Although milk protein has an initial neutralizing effect on gastric acid, it is also a very potent stimulator. Hourly feedings of milk have been shown to produce a lower pH than three regular meals.
- Avoid caffeine-containing beverages and decaffeinated coffee as they can cause increased gastric acid production
- Antacids should be taken as per the physician's prescription.

## EVERY DAY EAT AT LEAST

- 2-3 servings of meat, poultry, dry beans, eggs or nuts.
- 2-3 servings of milk, yogurt or cheese.
- 3-5 servings of vegetables.
- 2-4 servings of fruit.
- 6-11 servings of bread, cereal, rice or pasta
- Use fats, oils and sweets sparingly.

## Foods to be included and excluded:

| Food Groups | Foods to include | Foods to exclude |
|---|---|---|
| Cereals, Millets and their products | Rice, malted grains, wheat, Potatoes, Sweet potatoes | Refined flour, Corn, Bakery products – Breads, biscuits, khari, Corn starch. |
| Pulses and legumes | All Dals, soy chunks well cooked | Beans, egumes, whole pulses like chole, rajma |
| Milk and meat products | Paneer, Curd (fresh), Buttermilk (Fresh), Milk in limited quantity, cheese etc.<br>Chicken soup, meat soups (non – spicy) Eggs poached, boiled (as per tolerance) | High fat milk, large volume of milk shakes, strong tea/coffee.<br>Non-vegetarian food preparation having spicy, curries / gravy.<br>Fried / spicy and processed meat. |
| Vegetables and fruits | Well cooked vegetables, leafy vegetables, vegetable soup, non – spicy preparation.<br>All seasonal fresh fruits as tolerated | Increased amount of raw salad / fatty dressings, Spicy and oily gravy vegetables.<br>Orange, lemon, pineapple, juices, frozen, canned to be avoided. |
| Miscellaneous | Sugar, jaggery, honey as per tolerance | High fat high sugar products. Cookies, ice-creams with chocolates. |
| Nuts and Oil Seeds | As per tolerance | Increased number of nuts may give acidity. |

## To relieve symptoms…

- Take your medications as prescribed.
- Get plenty of rest.
- Reduce stress.
- Decrease cigarette smoking.

## MYTHS AND FACTS:

**MYTH:** **Eating citrus fruits can give you gastritis.**

**FACT:** Citrus fruits does not increase the stomach acidity to cause gastritis. In fact, vitamin C in the citrus fruits will help in the healing process.

**MYTH:** **Going hungry can cause gastritis.**

**FACT:** Skipping a meal can cause the gastric acid to irritate the stomach lining. In addition, when we are very hungry, we tend to eat too much food, which can cause the digestive system to become increasingly sensitive. It's best to eat five to six small meals per day, and enjoy what's on your plate.

**MYTH:** **Antacids cure gastritis.**

**FACT:** Antacids helps in reliving the symptoms of gastritis temporarily. For long term benefits, lifestyle modification if helpful.

**MYTH:** **Drinking lots of water helps.**

**FACT:** Daily fluid requirement varies among individuals, but it ranges between 2 and 3 liters per day. Drinking too much water also alters the pH of your stomach which can intensify symptoms of gastritis. The best way to treat gastritis is naturally, with a few simple lifestyle changes: eating more fruits (except citrus) and vegetables, avoiding smoking and excessive drinking, and learning to face difficulties calmly.

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# GASTROESOPHAGEAL REFLUX DISEASE (GERD)

## What is GERD?

Gastroesophageal reflux (GERD) is a chronic disease that occurs when stomach contents flow back (reflux) into the food pipe (esophagus). It is usually caused by failure of the muscle closure (called the lower esophageal sphincter) between the stomach and the esophagus. The backwash of stomach acid irritates the lining of the lower esophagus and causes the symptom of heartburn.

## What causes GERD?

Most often, the cause is a weak or poorly working muscle sphincter at lower end of the esophagus. Irregular eating habits increased abdominal fat, certain foods, cigarette smoking may lead to reflux. Certain conditions like hiatal hernia and pregnancy may cause GERD. Keeping a healthy body weight can help relieve the symptoms.

## What are the foods that trigger GERD?

- Coffee
- Citrus fruits
- Tomatoes
- Carbonated beverages
- Chocolate
- Peppermint, Garlic onion
- Fatty foods
- Spicy foods

## Dietary and lifestyle guidelines:

- Maintain Ideal Body Weight
- Include a good source of protein (milk, meat, egg, cheese, etc.) at each meal and snack.
- Avoid diet rich in fats, fried foods like wada, samosa, farsan, wafers etc. Spicy foods and fibrous foods causing irritation to the inflamed esophagus.
- Eat three small meals and three snacks evenly spaced throughout the day. It is important to avoid periods of hunger or overeating.
- Eat slowly and chew foods well. Be relaxed at mealtime.
- Cut down on caffeine-containing foods and beverages, citrus and tomato products, and chocolate if these foods cause discomfort.
- Foods containing flavonoids, like apples, celery, cranberries (including cranberry juice), onions may inhibit the growth of H. pylori, and hence recommended
- Caffeine-containing beverages (coffee, tea, and cola drinks) and decaffeinated coffee cause increased gastric acid production and hence must be restricted.
- Avoid eating within 3 hours before bedtime. Bedtime snacks can cause gastric acid secretion during the night.
- Sit up while eating and for 1 hour afterward. Avoid lying down, bending over or straining or exercising immediately after meals.
- Avoid tight-fitting garments, especially after a meal.
- Antacids should be taken as prescribed by the physician.

## How to relieve symptoms?

- Take your medications as prescribed.
- Get plenty of rest.
- Reduce stress.
- Decrease cigarette smoking.

## Foods to be included and excluded:

| Food Groups | Foods to include | Foods to exclude |
|---|---|---|
| Cereals, Millets and their products | Rice, malted grains, wheat, Potatoes, Sweet potatoes | Refined flour, Corn, Bakery products – Breads, biscuits, khari, Corn starch. |
| Pulses and legumes | All Dals, soy chunks well cooked | Beans, legumes, whole pulses like chole, rajma |
| Milk and meat products | Paneer, Curd (fresh), Buttermilk (Fresh), Milk in limited quantity, cheese etc<br>Chicken soup, meat soups (non – spicy) Eggs poached, boiled (as per tolerance) | High fat milk, large volume of milk shakes, strong tea / coffee.<br>Non-vegetarian food preparation having spicy, curries / gravy.<br>Fried/spicy and processed meat. |
| Vegetables and fruits | Well cooked vegetables, leafy vegetables, vegetable soup, non–spicy preparation.<br>All seasonal fresh fruits as tolerated | Raw salads, fatty dressings, spicy and oily gravy vegetables.<br>Orange, lemon, pineapple, juices, frozen, canned to be avoided. |
| Miscellaneous | Sugar, jaggery, honey as per tolerance | High fat high sugar products. Cookies, ice-creams with chocolates. |
| Nuts and Oil Seeds | As per tolerance | Increased number of nuts may give acidity. |

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# CONSTIPATION

## What is constipation?

Constipation is a symptom and not a disease. Constipation may be acute or chronic, with the latter usually being defined as a duration of greater than three months.

Functional Constipation: Must include 2 or more of the following:

- Straining during at least 25% of defecation
- Lumpy or hard stools in at least 25% of defecation
- Sensation of incomplete evacuation for at least 25% of defecation
- Sensation of anorectal obstruction/blockage for at least 25% of defecation
- Manual maneuvers to facilitate at least 25% of defecation (eg, digital evacuation, support of the pelvic floor)
- Fewer than 3 defecation per week

## What are the symptoms?

- Straining or difficulty passing stools
- Painful bowel movement
- Hard, dry or small stools and feeling bloated

## What causes constipation?

Constipation may occur due to an improper lifestyle involving failure to establish regular eating and elimination habits. A faulty dietary habit such as inadequate fibre and fluidintake, excessive consumption of refined foods coupled with sedentary lifestyle are the causes of constipation.

## Dietary and lifestyle guidelines:

Constipation can be managed by simple dietary modification, consuming a high insoluble fibre diet along with plenty of fluids and step up in physical activity will often help relieve the problem.

1. **Consume a high fibre diet:** Dietary fibre is the part of the food that the human digestive tract cannot digest. It is found in foods of plant origin, such as grains, cereals, fruits, vegetables, legumes, nuts and seeds. Dietary fibre is of two types: soluble and insoluble fibre. Insoluble fibre or 'roughage' is the chewy outer skin and fibre of seeds, fruit, vegetable and grains. It adds to the bulk, creating larger and softer stools. Avoid apple without skin when constipation is chronic.

   - **How much Fibre should you take?**

   Total dietary fibre intake of 25 – 40 gm /day is recommended for adults. The easiest way to achieve is to emphasize on a lot of natural fresh foods especially vegetables and fruits every day. To find out how much fibre is in packaged foods we need read the nutrition label of the food item. The food label should tell you the amount of fibre per serving present in the food item.

   - **Dietary tips to increase fibre intake**
   - Include a minimum of 5 - 7 servings of fruits and vegetables a day (one serving is 1 cup of vegetable or 1 medium sized fruit; 2-3 cups of vegetables (one raw and 2 cooked ) a minimum of two fruits per day).
   - Include a minimum of 5 servings of whole grain products a day. Choose whole grain cereals and their products.

- Include whole and sprouted legumes, beans and seeds.
- Do not sieve the flour when making chapatis to retain the fiber. Use unpolished rice instead of polished rice.
- Consume unstrained soups.
- Gradually increase the fibre in the diet to allow your body to get used to it.
- Note: Excessive consumption of fibre too soon may cause bloating, and abdominal discomfort.

2. **Drink plenty of fluids daily**

   Dehydration can be one of the causes of constipation. It is important that you are drinking enough fluids daily to promote regular bowel movements.

   Daily fluid requirement is around 30 – 35 ml / kg body weight. As a general recommendation one should drink 10 – 12 glasses of fluid a day. Fluids such as water, fruit and fresh vegetable juices, soups, butter milk are few examples of healthy fluids. Drinking fluids that are warm or hot may also help improve constipation. Alcohol and caffeine-containing beverages (i.e. regular tea/coffee, colas) can contribute to dehydration and therefore should be limited/avoided if you have constipation.

3. **Increase your physical activity**

   A lack of physical activity can sometimes lead to constipation. Getting enough physical activity is important to help keep the bowels moving and to help manage constipation. A brisk walk for 30 minutes 3-4 times a week is recommended.

4. **Use of Laxatives**

   Based on a Physicians discretion and prescription

## MYTHS AND FACTS:

**MYTH:** **You should have a bowel movement daily.**

**FACT:** Varies from person to person. Although having a bowel movement once a day is common, it is fine to go a day or two without one or even have more than one a day.

**MYTH:** **Eating a high-fibre diet will prevent constipation.**

**FACT:** It is important to consume a high-fibre diet to treat constipation, but consuming a high fibre diet alone cannot prevent it. There are many factors that can cause constipation, such as certain medications, neurological disorders, and psychological issues.

**MYTH:** **Constipation is not a serious health issue.**

**FACT:** Constipation can be very serious. Untreated constipation can lead to hemorrhoid, diverticulitis, anal fissure etc. It can also greatly impact a person's quality of life due to uncomfortable and persistent symptoms, such as fatigue, bloating, and abdominal discomfort.

**MYTH:** **Castor oil is a cure for constipation.**

**FACT:** Castor oil is a powerful laxative. But like other laxatives, it should not be used long-term. Overusing laxatives can affect the body's ability to absorb nutrients. Always consult an expert before using it.

## Foods to include and exclude

| Food Group | Foods to include | Foods to exclude |
|---|---|---|
| Cereals, Millets and their products | Whole cereals and Millets – Whole wheat, wheat bran, bajra and products, brown rice, oats etc. | Refined cereals like maida and its products like bread, bakery items, pasta, noodles white polished rice, sago (sabudana) etc. |
| Pulses and Legumes | Whole and sprouted legumes, beans etc. | - |
| Milk and Meat products | Low fat milk, curd, buttermilk, lean meat in moderation | - |
| Vegetables and Fruits | Green leafy vegetables, beans, all vegetables and fruits with skin, dry fruits like dates, prunes, figs, raisins etc. | Fruits and vegetable without skin eg. Apple, Fruit juices, carbonated and caffeinated beverages |

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# DIARRHOEA

Diarrhoea is an extremely unfavorable condition that is known to impact one's daily life and activities. Though it is one of the most common causes of morbidity and mortality in children, it also affects a huge number of adult and elderly populations. It is a condition which is both preventable and treatable.

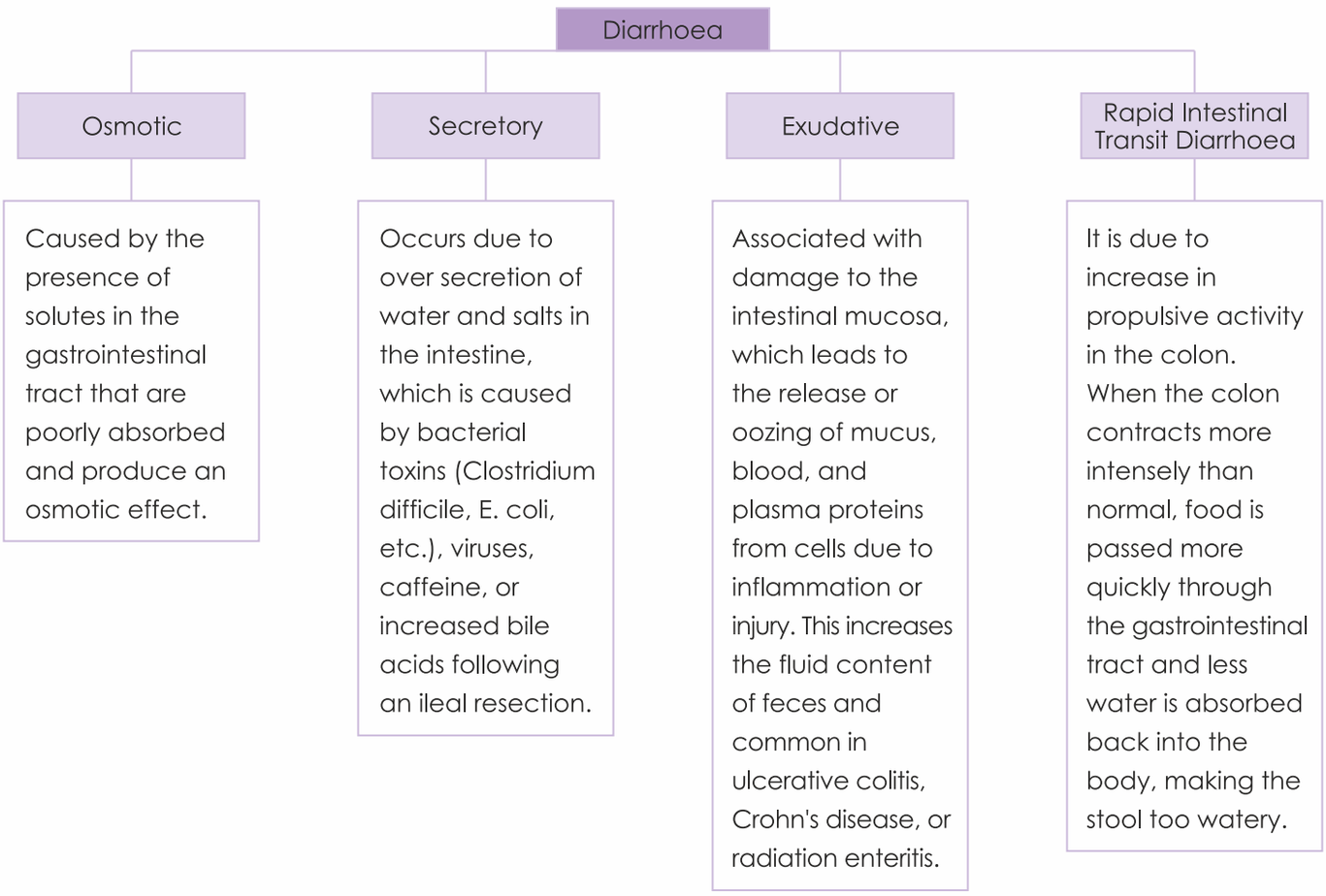
## What is Diarrhoea?

The passage of three or more liquid stools per day (or more frequent passage than is normal for an individual) is known as Diarrhoea. It is usually a symptom of intestinal tract infections caused by bacteria, virus and parasites which are spread through contaminated food or drinking water, or person to person due to poor hygiene.

## What are the types of clinical diarrhoea?

- Acute watery diarrhoea – lasts several hours or days, and includes cholera;
- Acute bloody diarrhoea – also called dysentery; and
- Persistent diarrhoea – lasts 14 days or longer.

## Classification of Diarrhoea



## What are the major causes of Diarrhoea?

- Infections (Bacterial, Viral, Parasitic)
- Food allergy and intolerances
- Digestive tract disorders
- Abdominal surgeries
- Long term use of certain medications, laxatives or side effects of medication
- Stress and anxiety
- Malnutrition
- Traveler's diarrhoea

## Dietary Guidelines:

- **Fluid management:** Nutritional care during diarrhoea includes replacement of lost fluids and electrolytes by increasing the oral intake of fluids high in sodium and potassium. Include fluid in forms of water, coconut water, rice kanji, buttermilk, diluted juices, soups, broths and oral rehydration solutions. Pectin rich foods like apple and other soluble fibre may help in controlling diarrhoea.
- **Starchy foods** like rice, sago, potato, bananas should be included. Restrict the intake of high fibre vegetables and fruits, lactose and large amount of sugar.
- **Consume small frequent meals** evenly distributed throughout the day. Spicy foods, fatty and fried foods should be restricted. Caffeine and alcoholic beverages should be avoided. Artificial sweeteners, sugary syrups and beverages should be limited as it may worsen the diarrhoea.
- **Probiotic rich foods** like curds, buttermilk and probiotic dietary supplements helps in the management of diarrhoea.
- **Oral Rehydration Therapy:** Oral Rehydration Therapy (ORT) is a fluid replacement treatment widely used to prevent the incidence of dehydration among diarrhoeal patients. It includes consumption of glucose and electrolyte rich fluids in intervals. ORT is known to be an effective treatment to reduce mortality rates due to diarrhoea.

## Composition of Oral Rehydration Solution by World Health Organization

| New Oral Rehydration Solution | Grams/Litre | Percentage |
|---|---|---|
| Sodium chloride | 2.6 | 12.683 |
| Glucose, anhydrous | 13.5 | 65.854 |
| Potassium chloride | 1.5 | 7.317 |
| Trisodium citrate, dihydrate | 2.9 | 14.146 |
| TOTAL | 20.5 | 100.00 |

**Home-made ORS:** one glass of boiled and cooled water adds one pinch of salt and one tsp sugar.

## Foods to include and avoid:

| Food Group | Foods to be included | Foods to be avoided |
|---|---|---|
| Cereal, grains and products | White rice and rice products, white bread, cereal soups | Whole wheat, wheat bran and products, brown rice, rye. |
| Pulses and legumes | Dehusked and unsprouted pulses, dal soups | Beans, peas, whole lentils, nuts and seeds, chickpeas. |
| Milk and Meat products | Low fat cheese, curd, buttermilk, cottage cheese, lactose free milk. | Fried meats, fish and poultry, raw milk, cream, bacon, canned fish. |
| Fruits and vegetables | Skinless fruits, diluted fruit juices and vegetables like potatoes, clear vegetable soups. | Prunes, berries, dates, dried fruits, figs, raw and sprouted vegetables, leafy vegetables. |
| Fats and sugars | Limited use of fats and oils including ghee and butter. | High fructose beverages, syrups, fried and greasy foods. |

## MYTHS AND FACTS:

**MYTH:** **Infectious diarrhoea may stop soon, if the patient stops eating.**

**FACT:** Replenishing the body fluids and nutrients is essential for early recovery. The daily need of macro and micronutrients does not change and body needs a better nutritional support to fight infections and maintain nutritional status. Strengthening immune system with a proper diet helps the body to fight against infections.

**MYTH:** **Drinking plain water is enough to cure diarrhoea**

**FACT:** Diarrhoea causes a massive loss of fluid along with electrolyte depletion, from the body hence replenishment of fluids with electrolytes are necessary. ORT is known treatment to achieve optimum hydration status and electrolyte balance.

**MYTH:** **Diarrhoea is never dangerous**

**FACT:** Diarrhoeal disease is the leading cause malnutrition and second leading cause of death in children under five years old. Long term dehydration is not only fatal but also may lead to death.

**MYTH:** **Breastfeeding should be stopped during diarrhoeal episodes of the baby**

**FACT:** Unless there are any contraindications, breast feeding should be continued even if the baby has diarrhoea as breast milk is always said to be the best. The breast milk contains certain antibodies and other immune protective factors that help to fight infections.

**MYTH:** **Only liquid diets are allowed in diarrhoea**

**FACT:** Diarrhoea needs comprehensive care where nutrition plays an important role. Depending on the severity and type of diarrhoea, even if liquid diet is prescribed initially, the plan of treatment to should aim to put the patient to semi solid and then to solid diet as soon as possible, as liquid diet may not provide optimum nutrition required during this condition and patient may soon start to deteriorate on his/her nutritional status.

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# INFLAMMATORY BOWEL DISEASE (CROHN'S DISEASE AND ULCERATIVE COLITIS)

## What is Inflammatory Bowel Disease?

Inflammatory Bowel Disease (IBD) is referred as umbrella of disorders that involves chronic inflammation of the digestive tract. The two conditions that are said to be the forms of IBD are–

**1. Crohn's Disease**

Crohn's disease is a chronic inflammatory state of the gastrointestinal tract.

Can affect any part of the GI tract (from the mouth to the anus)—Most often it affects the portion of the small intestine before the large intestine/colon. The entire thickness of the bowel wall can be affected by Crohn's Disease.Symptoms include diarrhoea, occasionally with blood as well as abdominal pain, loss of appetite, nausea, weight loss,fever, fatigue and, at times, rectal bleeding.

**2. Ulcerative Colitis**

The condition of ulcerative colitis is known to be an idiopathic disorder with chronic inflammation of colonic mucosa that starts in the rectum and proximally extends in a continuous manner through part of or the entire colon. The characteristic symptom of this disease is the occurrence of bloody diarrhoea. The reasons for developing ulcerative colitis may be due to genetic, environmental and hyperactive intestinal immune system.

## What are the differences between Crohn's Disease and Ulcerative Colitis?

| Crohn's Disease | Ulcerative Colitis |
|---|---|
| Can affect anywhere in the GI tract (mouth to anus) | Can only affect the colon |
| Transmural inflammation (fistula, etc.) | Superficial inflammation |
| Skip lesions | Continuous disease (no skip lesions) |
| Granulomas | No granulomas |

## What causes IBD?

- Inflammatory reactions in the gut may be aggravated by abnormal immune responses to microbes
- Genetic predisposition
- Bacterial or viral invasions
- Environmental factors – lifestyle and dietary faults

## What are the common symptoms of IBD?

- Diarrhoea
- Fever and fatigue
- Abdominal pain and cramping
- Blood in the stool
- Reduced appetite
- Unintended weight loss

## When do you need medical attention for IBD?

If changes in bowel habits are persistent or if any of the signs and symptoms of inflammatory bowel disease are often experienced for prolonged period, it definitely calls for medical attention. Although IBD isn't usually known to be fatal, but in some serious cases, it may cause life-threatening complications.

## How can dietary modifications help in IBD?

IBD cannot be cured or relived permanently through dietary changes, but dietary modifications may greatly help

- To relief symptoms and control the aggravation of symptoms
- To achieve optimum nutritional status and avoid malnutrition and weight loss.

## Dietary Guidelines:

- Small and frequent meals may improve the condition.
- High fibre foods to be avoided during symptomatic stage/in presence of strictures and gradually can be reintroduced when symptoms subside in absence of strictures
- Drinking optimum amount of water is advised to avoid dehydration.
- Foods with probiotics i.e. yoghurt, fermented curd, may be helpful.
- Specific vitamin and mineral supplementation may be useful to compensate the malabsorption if any
- Avoid fried, greasy and spicy foods which are potential gastric irritants.
- Importance of Anti-Inflammatory diet
- This diet aims to limit intake of some carbohydrates, such as gluten-based grains, refined sugar, and certain starches that are known to trigger the growth of inflammatory bacteria in the gastrointestinal tract, and also consume natural pre and probiotics to restore the anti-inflammatory environment. It is better to restrict dairy, gluten if symptoms of IBS are present along with IBD.

## Concept of FODMAP- how does it help in IBD?

- FODMAP is stands for Fermentable Oligo, Di and Monosaccharides, and Polyols, grouped together on the basis of the length of their carbohydrate chains. Foods containing these forms of carbohydrates may worsen the symptoms of IBD only when they have symptoms of Irritable Bowel Syndrome. These foods are poorly absorbed in the small intestine and are highly osmotic.

| Food Group | Foods to include | Foods to exclude |
|---|---|---|
| Cereal, grains and products | All cereals without husk / sieved to cut down on insoluble fibre and to be taken in a soft cooked, gruel form | Wheat and wheat products, brown rice. |
| Pulses and legumes | Dehusked and unsprouted pulses and legumes.Moong split dhal preferred | Beans, corn and corn products, peas, sprouted beans and legumes in symptoms with IBS |
| Milk and Meat products | Lactose free skimmed milk, low fat curd, low fat home-made soft cheese, buttermilk.<br>Soymilk, Tofu are recommended based on tolerance<br>Well-cooked and lean cuts of chicken, boiled egg white based on tolerance | Raw milk, cream, sour cream, fried and processed meats like sausages, bacons etc. chewy cuts of meat, fried eggs. |
| Fruits and vegetables | Peeled and well-cooked fruits and vegetables, strained fruit and vegetable juices/soups<br>Preferable soft cooked apple without skin and banana<br>Tender coconut water | Skinned and raw fruits and vegetables, sprouted vegetables, leafy vegetables. |
| Fats and sugars | Sugar /jaggery <2 tea spoon /day<br>Blend of oil, Rice bran, groundnut, ghee, butter based on tolerance. | Sweet juices, sweetened beverages, carbonated beverages, proprietary drinks sugar or high fructose corn syrups.<br>Safflower, sunflower, rapeseed, cotton seed oil<br>Oily and fried foods,<br>Margarine. vanaspati, bakery, processed foods.<br>Alcohol |

- Depending on the severity of active disease diet may vary from oral feeds to semi elemental enteral feeds or parenteral nutrition in case of toxic megacolon, obstruction, HOF > 500ml/day or as indicated .

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# FOOD INTOLERANCE: LACTOSE INTOLERANCE

## What is food intolerance?

Food intolerance is known as non-allergic food hypersensitivity or difficulty in digesting certain foods. Food intolerance is different from an allergy. It is not caused by an immune reaction. Food intolerance will cause discomfort, but it is not dangerous. Patterns of common allergens differ across regions and cultures. Common foods containing allergens are dairy, eggs, peanuts, tree nuts such as walnuts, almonds and cashews, fish, shellfish, soya, wheat, sesame top the list.

## What is lactose intolerance?

Lactose intolerance is the most common form of food intolerance. It relates to insufficiency of the disaccharide enzyme 'lactase' which is found in the greatest quantity in the outer membrane of the mucosal cell of the jejunum.

The degree of lactase deficiency may vary in individuals. Lack of lactase prevents the break down the disaccharide sugar- lactose present in milk, to glucose and galactose; it passes unchanged into the large intestines where it gets converted to lactic acid by the bacteria. This deficiency is gene related and often seen in infants and young children, but may also be present in adults.

## What are the symptoms of lactose intolerance?

The common symptoms associated with lactose intolerance are diarrhoea, abdominal pain/cramps, flatulence, bloating after consumption of foods containing lactose leading to undernutrition and weight loss sometimes.

## What are the dietary guidelines to treat lactose intolerance?

- Dietary modifications should be made according to lactase activity in an individual. In Individuals with very low level of lactase activity,all milk products must be eliminated. Substitutes of milk can be incorporated.
- Enzyme such as Lactaid and Maxilact are available. Addition of these to the milk or milk products can help digest 90% of lactose in milk and thus minimize symptoms of lactose intolerance.
- In patients with moderate level of lactase activity, intake of milk is restricted depending on the tolerance. Fermented and cooked milk products (buttermilk, curds, custards, porridges and cottage cheese or when mixed with cereals, cocoa etc.) are better tolerated.
- Substitute milk and milk products by giving soya sources like- tofu, soymilk, soy curd, nut milk eg almond milk, rice milk, coconut milk, groundnut and sesame milk etc.
- Calcium & Vitamin D supplements may be recommended by your treating physician.
- Lactose free foods if available commercially like lactose free milk, ice cream, cottage cheese etc. can be included in daily diet.
- Education on reading food labels is also crucial.
- A well-balanced diet with modifications pertaining to lactose intolerance is essential.
- Macronutrients viz. energy, protein, fats and carbohydrates as per RDA suitable for age & gender should be provided.

## MYTHS AND FACTS:

**MYTH:** **Complete elimination of milk and milk product is required in patients with lactose intolerance.**

**FACT:** Lactose intolerance is dose specific and some dosage of lactose in form of fermented milk products can be tolerated and consumed by the individual.

## Foods to be included and excluded:

| Foods to include | Foods to exclude |
|---|---|
| | (This would depend on individual's tolerance to lactose containing foods and must be excluded depending on severity of symptoms) |
| All locally consumed staple cereals and whole grains<br>All variety of dals/pulses and sprouted legumes<br>Fermented milk products - Curd, Buttermilk, yoghurt, cheese<br>Soymilk, tofu, almond milk, rice milk, groundnut milk<br>All seasonal fruits and vegetables<br>Sugars and fats in limited quantity as per patients age and activity. | Milk (whole/ toned/ skimmed etc.), milk solids, milk powder, paneer, sweets prepared using milk or milk solids, chocolate, cream, milk biscuits /cookies<br>These words on food label indicate presence of lactose:<br>Milk, milk solids, whey, dry milk powder, skimmed milk powder etc. |

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# FOOD INTOLERANCE: GLUTEN INTOLERANCE (CELIAC DISEASE)

## What is Celiac Disease?

Celiac disease or Gluten Intolerance is a disorder of the small intestine, caused by consumption of dietary gluten products in susceptible people. In people with celiac disease, gluten containing foods (wheat and wheat products, barley) brings about an immune response in the body, causing inflammation and damage to the small intestine.

## What are the symptoms?

Some of the symptoms of celiac disease include diarrhoea, abdominal pain and constipation.

## Dietary and lifestyle guidelines?

- Celiac disease can be treated by eliminating gluten containing food sources completely from the diet.
- Read food labels and look for gluten free or no gluten on the food label. Avoid buying products which mention the following names on the label such as flour, atta, refined flour, all-purpose flour, malt, cereal additives, hydrolyzed wheat starch, wheat germ oil, and durum.
- Avoid processed and packaged products if the composition and method of preparation is not known.
- Avoid using the cooking utensils used to prepare gluten-containing foods. Keep all cookware separate for cooking gluten free foods.
- Include probiotics to improve gut health. Consult your doctor to know about the same.
- Points to take note of: Oats are gluten free, however they may be processed in a plant which makes gluten containing products so there may be cross contamination. Always buy gluten free oats. They are easily available at supermarkets.

## Foods to be included and avoided:

| Food Group | Foods to include | Foods to exclude (Gluten containing sources) |
|---|---|---|
| Cereal, Millets and Their Products | Rice, rice flakes, jowar, bajra, ragi, corn, amaranth, quinoa, buckwheat, gluten free rolled or steel cut oats, sago. | Wheat and wheat products, rye, barley, semolina (rava), dalia, wheat vermicelli, couscous, refined flour and products made from it like white bread, multigrain bread, pasta, biscuits, khari, crackers, toast, croutons, cake, cookies, pizza, burger etc. |
| Pulses and Legumes | Whole pulses and legumes, soy and soy products | - |
| Milk and Meat Products | Dairy products such as milk, paneer, curd, buttermilk, egg & poultry, fish | - |

| Food Group | Foods to include | Foods to exclude (Gluten containing sources) |
|---|---|---|
| Vegetables and Fruits | Seasonal fruits and vegetables | - |
| Miscellaneous | Unsalted nuts and seeds | Oats, Beer, Spices may be contaminated with gluten for eg: asafoetida (hing). |

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CHAPTER 07

# GASTROINTESTINAL DISORDERS

# CHOLECYSTITIS

## What is Cholecystitis?

Gall bladder is an important part of the human digestive system. It collects and stores bile, which helps body to breakdown and digest fats. Cholecystitis is an inflammation of gall bladder and it usually develops when a person has gall stones.

## What are gall stones?

There are three types of gall stones - cholesterol stones, mixed stones and pigmented stones. Mixed stones composed mainly of cholesterol and forms of calcium; are the most common. Multiple calculi may cause Cholecystitis.

## What are the symptoms of Cholecystitis?

There are two types of cholecystitis - acute is the sudden inflammation of the gall bladder that causes marked pain in upper centre or right side of abdomen, often after taking meals; with nausea, vomiting, fever and jaundice. Chronic cholecystitis is lower intensity inflammation that lasts a long time. It may cause intermittent mild abdominal pain which comes and goes or no symptoms at all. Walls of gall bladder get damaged leading to thickened, scarred gall bladder which can shrink and lose its ability to store and release bile.

## What are the risk factors for Cholecystitis?

Several modifiable and non-modifiable factors predispose the risk of cholelithiasis and thereby cholecystitis. Some of them are poor dietary habits, obesity, heredity. Women are more at risk than men, especially those with multiple pregnancies, on hormone replacement therapy (HRT) or birth control pills. Healthy dietary habits and being physical active can lower the risk.

## THE MUST DO "TEN POINTS" CHECKLIST FOR CHOLECYSTITIS

- Losing and regaining weight repeatedly may lead to gall stones. Therefore, refrain from 'crash dieting ". Aim for losing weight at a slower pace, upto 0.5 kg a week with lifestyle modification
- Prefer leaner cuts of chicken or fish and egg whites. Use skimmed milk and milk products
- Avoid red meats, egg yolks, fried foods, bakery products and other foods high in saturated fats and trans fats
- Control the overall consumption of fat in daily diet, avoid coconut and groundnut
- Take small, frequent, 5-6 meals rather than 2 bigger meals. Consumption of high fibre foods such as green leafy vegetables, salad vegetables, fruits, sprouts, beans, whole grains, millets, hand pounded rice which will help in cholesterol regulation in body
- Cut down on refined carbs and carbonated beverages
- Vitamin C rich fruits like amla, guava, orange and lemon may help reduce the risk of cholelithiasis
- Research shows, adequate calcium intake in the form of skimmed milk and milk products, ragi, green leafy vegetables may protect against formation of gall bladder calculi.

## Foods to include and exclude:

| Foods to include | Foods to exclude |
|---|---|
| Whole grains, millets, hand pounded brown or red rice | Refined flour eg. Maida. Bakery products – cakes, pastries, cream biscuits, cookies.<br>Milk Sweets, mithai, chocolates |
| Sprouts, beans, legumes.<br>Walnuts and Almond in restricted quantity | Cashews, groundnuts and coconut |
| Skimmed milk and milk products. | Full fat milk and milk products |
| Egg whites, lean cuts of chicken and fish. | Cheese, cream, mayonnaise |
| Green leafy vegetables, salad vegetables, fruits, citrus fruits – amla, guava, orange, lemon | Egg yolk, red meat, shell- fish, chicken with skin |
| Blend of oil as cooking medium to a minimum | Palm oil, coconut oil, hydrogenated fats (vanaspati), margarine |
| Restrict sugar/honey/jaggery to less than 2 teaspoon per day | Savouries, fried, greasy foods |
| Tender Coconut water and unsweetened fresh fruit juice and soups when very symptomatic | Alcohol, Carbonated beverages and high energy drinks |

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# CIRRHOSIS OF LIVER

## What is Cirrhosis of Liver?

Cirrhosis of Liver is a condition in which there is destruction of the liver cell leading to scaring of tissue and finally liver failure. It is a serious and irreversible disease.

## What are the symptoms?

There may not be any symptoms until liver is badly damaged. Some people in early stage may experience symptoms like; feeling tired or weak, poor appetite, unintentional weight loss, nausea and vomiting, pain in abdomen. As liver function gets worse; symptoms as bruising and bleeding easily, mental confusion, memory loss, sleep disorders, swelling or oedema, bloating called ascites, severe itchy skin, dark coloured urine are seen.

Cirrhosis may be caused due to viral infection like hepatitis viruses, alcohol abuse, malnutrition especially vitamin A, E and C deficiency and due to toxins in food.

## Dietary Guidelines:

**A cirrhosis diet plan should be crafted by Qualified Dietitian with the help of Doctor and healthcare team.** What you eat and drink every day is especially important to ensure adequate nourishment, to provide liver protective foods and to avoid worsening your cirrhotic condition.

Dietary management of cirrhosis is not a one-size-fits-all approach. **It should be tailored based on one's overall health, individual needs and the complications if any.** But there are some common dietary guidelines.

1. **A high calorie diet is advisable,** but due to nausea the food intake is affected. It is advised to consume small nutritious meals, including starchy foods like sago, all cereals products like chapati, paratha, idli, rice – dal khichari, plain rice, pasta, vegetables like sweet potatoes, potatoes, carrots, fruits like banana, custard apple, sapota, fruit jam etc.
2. **A high protein diet** (1.2 gm / kg body weight) is necessary for the regeneration of liver cells. The protein intake should be spread throughout the day. Each meal should include protein rich foods like skimmed milk or powder, low fat cottage cheese, plant based protein sources as soy bean, tofu, sprouts, dried beans, pulses, ground nuts in combination with cereal preparations like rotis, parathas, khakara, rice and millets. Non vegetarians can have small portions of lean poultry without skin, fresh caught fish and egg whites. Avoid red meat, sea food.
3. **Limit fats to 20 gm per day,** as in cirrhosis, production and supply of bile digestion and absorption of fat is affected. Medium chain triglycerides are better digested and absorbed in the absence of bile salts, hence include coconut oil in the diet. Avoid high fat foods like cream, khoa, cheese, ghee, fried foods, saturated fats like margarine, vanaspati etc.
4. **Consume regular small meals every 2-3 hour.** A late night high carbohydrate snack – like a banana, rice pudding, roti – jam roll etc is advisable.
5. If your appetite is not good and not able to eat snacks, take high protein, high calories health drinks like fruit juices, low fat fruit smoothies / shakes.
6. **In case of ascites,** that is accumulation of fluid in the abdomen; salt is restricted to not more than 3 gm that is around half teaspoon per day. While reducing salt, try using fresh herbs and spices in moderation for cooking and flavouring meals. Fluids may be restricted to 800 -1000 ml / day depending of the individuals condition.
7. **Avoid alcohol** – any amount is unsafe as it is potential cause of liver damage; it contributes to malnutrition and other health concerns.
8. Dietary supplement can be included based on a physician / qualified dietitians discretion.

## Foods to be included and excluded:

| Food group | Foods to include | Foods to exclude |
|---|---|---|
| Cereal, Millets and their products | Whole grains cereals, millets and their products like jowar, bajra, barnyard millet, foxtail millet, oats, brown rice. | High fat bakery products like cream biscuits, cream roll, khari biscuits. Ready to eat / instant cereals, oat meals, salted popcorn, crackers, chips. |
| Pulses and Legumes | Plant based proteins – dried beans, soybean, pulses, sprouts, tofu, unsalted nuts and seeds like sunflower/melon. | Ready to eat packed foods. Canned, processed, snacks or meals like canned beans, salted pulses etc. |
| Milk and Meat Products | Low fat dairy – skimmed milk, curd, buttermilk, lean meat - steamed fish, lean chicken etc. | Full fat dairy products, processed red meat – ham, bacon, sea foods, organ meat. |
| Fruits and vegetable | Fresh produce, fruits and vegetable especially starchy vegetables and fruits, fresh juices. | Canned vegetables and fruits, ready to eat soups / vegetables. |
| Miscellaneous | Use coconut oil for cooking, fresh herbs. | Pickles, papad, chutney, readymade sauces and ketchups, fried foods, margarine, table salt, sea salt, mixed seasonings, gravy mixes, salad dressings. |

## BUSTING THE MYTHS:

**Myth:** **One should eat a bland fat free diet in cirrhosis**

**Fact:** A low fat, palatable meal can be consumed, as it will encourage intake of food which otherwise is affected due to nausea.

**Myth:** **Spirits are worse for liver than wine and beer.**

**Fact:** All alcoholic beverages contain alcohol in it, which can lead to liver damage. Hence better avoided.

## References:


1. Scaglione S, Kliethermes S, Cao G, et al. The epidemiology of cirrhosis in the United States: a population-based study. Journal of Clinical Gastroenterology. 2015;49(8):690–696.
2. L. Kathleen Mahan, Janice L. Raymond. 14th edition. Krause's Food & Nutrition Care Process.
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# PANCREATITIS (CHRONIC)

Pancreas is the one of the important organ in the body which is responsible for secretion of various digestive enzymes required for digestion of foods as well secretion of hormones which are involved in maintaining blood sugar levels. Acute pancreatitis is the inflammation of pancreas with sudden onset. Frequent and recurrent episodes of acute pancreatitis leads to chronic pancreatitis over a period of time.

## What is chronic pancreatitis?

Chronic pancreatitis is inflammation of pancreas leading to permanent damage to pancreas. There is reduction in the size (atrophy) of pancreatic cells and abnormal growth of fibrous tissue in the pancreas. It results in loss of the digestive ability and metabolic disturbances like abnormal blood glucose levels, blood lipid levels. Weight loss and malnutrition is the outcome of the disease condition.

## What are the causes?

History of acute pancreatitis and recurrent episodes of the same. Alcohol consumption and smoking are the two major and preventable risk factors for pancreatitis. The causes are autoimmune (your immune system mistakenly destroys healthy tissues) disorder, pancreatic injury from gallstones, viruses or trauma, narrowing of pancreatic duct, hypertriglyceridemia (abnormal levels of fat in the blood), cystic fibrosis (genetic disorder).

Symptoms include severe abdominal pain after meal, steatorrhea (fatty stools), loss of appetite, nausea, vomiting, and diarrhoea. Weight loss, muscle wasting and decrease immunity can be seen in later stages.

## What are the complications associated with chronic pancreatitis?

Maldigestion and malabsorption of nutrient leading to malnutrition, leading to poor quality of life, uncontrolled blood glucose levels (diabetes), abnormal blood lipid levels (dyslipidemia), infections in the pancreas, pancreatic cancer.

## Dietary Guidelines:

Nutrition therapy is the corner stone of management of chronic pancreatitis. It aims to improve the nutritional status, facilitating weight gain and preventing further deterioration.

- Increase energy intake: In order to promote weight gain, high energy intake (35kcals/kg) will be necessary. Increase your food intake by having small frequent meals which are energy dense. Encourage intake of three major meals and two snacks in between.
- A high protein diet is advised with emphasis on low fat protein sources like skimmed milk, low fat curd, cottage cheese, dairy alternatives like almond milk, soy milk, rice milk, tofu etc. Egg whites, lean poultry and lean meat, fish can be included
- Low fat diet is fundamental: Among nutrients fat is most difficult to digest and intake needs to be lowered in case of chronic pancreatitis. Limit intake of visible fat to 20 gm per day, especially the saturated fats Alternative methods of cooking like steaming, boiling, baking, and grilling can be used. Preferably use Medium Chain Triglyceride (MCT) oils like coconut oil for cooking. These fats are easy to digest and do not require pancreatic enzymes for their digestion. Avoid fried and stir-fried foods. Select low fat dairy foods like skimmed milk, cottage cheese (paneer). Prefer lean meat and fish over red meat, fatty fish and processed meat.

- Watch your fiber and antioxidant intake: Adding high amounts of fiber in the diet is not recommended as it may increase the bulk of the meal, reducing the nutrient intake. Adequate intake of fruits and vegetables is necessary, as it provides natural antioxidants.
- Refrain from alcohol, smoking and tobacco products: This is particularly important to slow down your disease progression and preventing further complication.
- Carefully read nutritional labels: Check the amount and type of fat in the product. Look for quantity of trans-fats. The term 'Zero trans-fat' is used for product having less than 0.5g of trans- fat. So when you are consuming processed food keep eye on portion size. Select foods with low fat, non- fat, fat free or light fat category. Also check for sugar content. Avoid foods with too much of sugar, jaggery, and honey.

**Medicines and pancreatic enzymes** prescribed by the physician should be consumed as directed.

## Foods to be included and excluded:

| Food Group | Foods to include | Foods to exclude |
|---|---|---|
| Cereal, millets and their products | Whole grain cereals – wheat, jowar, bajra, rice and their products | Refined flour, bakery and processed foods- biscuits, doughnuts, cakes, pastries, khari biscuits and ready to eat food items |
| Pulses and Legumes | Dals, Legumes, Pulses | Fried dals |
| Milk and Meat products | Skimmed milk, paneer, curd, buttermilk, yoghurt. Dairy alternatives – almond milk, soy milk, rice milk, tofu etc.<br>Egg whites, lean poultry and lean meat, fish. | Full fat milk, cream, cheese, khoa<br>Red meat, organ meat, egg yolk |
| Vegetables and Fruits | All fresh fruits and vegetables cooked in less oil. | Fried potato chips, canned vegetables and fruits |
| Miscellaneous | Coconut oil | Oily and fried foods, vegetable fat – vanaspati, ghee. |

## MYTHS AND FACTS:

**MYTH: Alcohol and nicotine are not contraindicated once we recover from acute pancreatitis**

**FACT:** Alcohol and nicotine are irritants for pancreas and can re-precipitate the acute pancreatitis which if not controlled can be fatal.

**MYTH: Fruits and vegetables are not recommended in pancreatitis.**

**FACT:** Majority of the patients of chronic pancreatitis have limited appetite and also need to assess their insulin levels and blood glucose levels regularly. The use of fruits and vegetables which are rich in soluble fibre and have low glycaemic index in a soft and easy to digest forms are recommended. The forms can be thick stews, lightly cooked vegetables which are without skin and seeds like gourds, capsicum etc.

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3. Escott-Stump, Sylvia. (2008) Nutrition and diagnosis-related care / Philadelphia: Wolters Kluwer Health / Lippincott Williams & Wilkins
4. The National Pancreas Foundation: https://pan

# FOOD-BORNE HEPATITIS

## What is hepatitis?

Hepatitis is an inflammation of the liver. Hepatitis A, B, C, D and E are the most common forms of hepatitis in the world; but other infections, toxic substances (e.g. alcohol, certain drugs) and autoimmune diseases can also cause hepatitis. Hepatitis A and E spread through oral fecal route. Hepatitis A and E are self- limiting. Hepatitis B, C, D are spread through contact with an infected person's blood and blood products; semen and saliva. Hepatitis B, C, D viruses can cause acute or chronic infections. These chronic infections can lead to complications such as cirrhosis, liver failure and liver cancer. Early diagnosis and treatment can prevent or lower chances of developing these complications.

## What are the symptoms?

Acute infection may occur with limited or no symptoms or may include symptoms include jaundice with yellowish skin and sclera of the eyes, dark yellow urine, extreme fatigue, loss of appetite, nausea, vomiting, abdominal pain, grey coloured stools etc.

## Dietary Guidelines:

People with hepatitis need to follow healthy lifestyle to minimise damage to the liver.

There's no special diet for hepatitis.

**Choose**

- Home cooked food with normal salt
- Based on tolerance to include seasonings
- Boiled water for drinking
- Avoid dining outside home
- Avoid fruit juices, chutneys, vegetable or fruit salads and non-vegetarian foods outside home
- Avoid Alcohol
- Need to follow a healthy, diverse and balanced diet.

## References:


1. Surveillance for Viral Hepatitis – United States, 2017. Centers for Disease Control and Prevention, Division of Viral Hepatitis website. www.cdc.gov/hepatitis/statistics/2017surveillance/index.htm External link. Reviewed September 10, 2019. Accessed September 11, 2019.
2. Hepatitis B FAQs for health professionals. Centers for Disease Control and Prevention website. www.cdc.gov/hepatitis/hbv/hbvfaq.htm External link Updated August 4, 2016. Accessed October 17, 2016.
3. U.S. Preventive Services Task Force. Screening for hepatitis b virus infection in nonpregnant adolescents and adults: U.S. Preventive Services Task Force recommendation statement. Annals of Internal Medicine. 2014;161(1):58–66.
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CHAPTER 08

# KIDNEY DISORDERS

# NEPHROTIC SYNDROME

## What is nephrotic syndrome?

Nephrotic syndrome is a disorder characterized by losses of large quantities of protein in the urine (at least 3.0 gm/day). Due to such large losses, the protein concentration in the blood decreases. This in turn leads to the movement of water from blood compartment to the tissues. Hence, generalized swelling develops. As water moves out of blood compartment, the kidneys tend to retain salt and water. This further increases the swelling of the body. An additional component of Nephrotic Syndrome is the increase in level of fats in the body.

## What are the complications of Nephrotic Syndrome?

1. Malnutrition
2. Swelling of face and legs
3. Low level of protein in the blood
4. Increased level of fats in the blood
5. High risk of thrombosis
6. Increased risk of infection
7. If persistent, progressive loss of renal (kidney) functions.

## What is the treatment?

Treatment is as follows:

1. Dietary Treatment
2. Medical Treatment

## Dietary Guidelines:

1. **Proteins:** Studies show that a protein intake of 0.8 gm/kg/day (50% protein of high biological value) can decrease proteinuria, without adversely affecting serum albumin. Additional protein is prescribed to match urinary losses i.e. 1 gm for 1 gm of protein lost in urine. In children we should give proteins as per the recommended daily protein allowance at different ages.

   **Helpful tips**

   a. To use besan / soya flour in chapatti flour

   b. To use milk / curd to make dough for chapatti.

   c. To use sprout in salad and cooked vegetable like potato, sweet potato, suran, arbi.

   d. To use nuts / dry fruit powder in cooked dal / vegetables.

   e. Eat frequent meals.

2. **Calories:** A calorie intake of 35 - 50 Kcal/kg/day for adults and 100 - 150 Kcal/kg/day for children is recommended. Nephrotic patients characteristically have elevated levels of fat in blood (hyperlipidemia). Therefore, the total calories coming from fat should be reduced to 30% and cholesterol intake should be less than 300 mg/day.

**Helpful tips:**

a. Eat frequent meals.

b. To add arrowroot flour to wheat flour.

c. Apply oil/ghee on chapattis.

d. To use root vegetable like potato, sweet potato, Yam (suran), Taro root (arbi).

e. To add sugar or jaggery in dal or vegetable (for people without diabetes).

f. To use sago in the diet.

g. To have desserts made with arrowroot or sago.

3. **Sodium:** A low salt diet is prescribed to prevent edema. A dietary prescription of 1 - 4 gm of salt per day would be appropriate depending upon the patient's acceptance and degree of odema.

**Helpful tips:**

a. You can add new flavours like Lemon Juice, Onions, Green chillies to make your food palatable.

b. Avoid the use of salt while cooking.

c. Use the prescribed amount of salt only.

d. Avoid salted foods like pickles, papad, chutney, sauces, salted nuts and chips, seasoning mixtures containing salt, e.g. Soya sauce, Garlic salt, chat masala, etc.

e. Avoid baked foods like cakes, biscuits, toasts, khari, pizza as they contain sodium in the form of baking powder.

f. Avoid instant foods like noodles, macaroni, soup cubes, corn flakes, because of high sodium content.

g. Avoid processed cheese and salted butter but can have home made salt free butter.

h. Avoid organ meat like liver, kidney, brain and sea foods like crab, lobster, prawns and dried fish.

4. **Potassium:** This may have to be supplemented if the patient is on diuretics (medicine which makes patient pass more urine). Diuretics increase potassium loss.

5. **Fluid/Liquid:** Odema in nephrotic syndrome may be difficult to control. Salt and fluid / liquid restriction is essential.

**Helpful tips:**

a. Drink very cold water.

b. Use a candy or peppermint or ice cube to quench your thirst.

c. Use flavored ice cubes.

d. Instead of milk use paneer, use hung curd, have thick dal.

e. Use a small cup or glass to have liquids.

f. Avoid salty and fried foods. This will help to decrease thirst.

g. Foods counted in Liquid are Tea / Coffee / Milk / Curd / Lassi / Buttermilk / Soup / Ice-Cream / Soft Drink / Custard / Jelly Medical Treatment: For Nephrotic Syndrome steroids are used for treatment. When steroids are used for long, they may cause effects. Always follow the advice of your Doctor for your medical treatment.

## Reference:


- Handbook of Nutrition and Kidney Disease By Mitch
- Diet in Chronic Kidney Disease By Patel

# RENAL CALCULI (KIDNEY STONES)

## What are kidney stone?

Kidney stones are a crystal solid mass formed within the kidneys. Kidney stones develop when urine becomes "saturated" with insoluble compounds containing calcium, oxalate, phosphate, urates. Initially, stone formation does not cause any symptoms. However later, symptoms such as intense cramping pain, backache, bloody urine, urinary tract infections and blockage of urine flow may be experienced. Stones differ in size, shape, and chemical compositions. If left untreated, it can lead to kidney disease.

Kidney stones are commonly classified as follows:

1. Calcium Stones (Calcium Oxalate and Calcium Phosphate)
2. Struvite or Magnesium Ammonium Phosphate Stones
3. Uric acid Stones or Urate
4. Cystine Stones
5. Drug induced Stones

Check with your doctor which type of kidney stones you have and follow the diet accordingly.

## What are the risk factors associated with kidney stone formation?

Lifestyle habits such as excessive intake of animal protein and salt and deficiencies of fiber and alkaline foods such as fruits and vegetables.

1. Hypertension/High Blood Pressure
2. Obesity
3. Hyperoxaluria (high oxalates in urine), hyperuricosuria (high urate in urine), and history of gout (defective metabolism of uric acid) and high calcium levels in urine
4. Inadequate water intake (dehydration)
5. Recurrent urinary tract infections
6. Genetic predisposition/inherited disorders

## Dietary recommendations for high oxalate levels

High calcium and oxalic acid levels in the urine can result in the formation of calcium oxalate stones.

## Dietary guidelines:

- Dehydration is one of the main causes of development of kidney stones. Stay well- hydrated. Increase water consumption to 12-15 glasses each day unless advised against by your doctor.
- Avoid large dose of vitamin C supplements.
- Restrict consumption of high salt containing food sources such as bakery and processed food, pickles and papad.
- Plant protein such as dal & legumes, milk products should be preferred over animal protein such as poultry, fish and red meat.
- Dietary calcium sources are preferred to calcium supplementation because supplements may be associated with an increased risk of stone formation.

## DIETARY RECOMMENDATIONS FOR URIC ACID STONES

Uric acid stones are caused because of high levels of uric acid in the urine.

Reasons for high uric acid levels are

1. Dehydration
2. Increased alcohol intake
3. Purine rich foods
4. Obesity
5. High fructose intake

### Dietary guidelines:

- If overweight, it is advisable to lose weight gradually.
- Include nutritionally balanced meals at regular intervals throughout the day.
- Include vitamin C rich sources such as gooseberry (amla), guava and oranges as it can help to lower uric acid levels.
- Stay well-hydrated. Increase water consumption to 12-15 glasses each day unless advised against by your doctor
- Avoid foods and beverages containing high-fructose corn syrup (HFCS) & sugar such as candy, pastries, donuts, cake, cookies and cold drinks. It is recommended to read food labels to understand the ingredients used and the fructose content of packaged foods.
- Restrict the consumption of fructose containing foods such as fruit juices. Speak to your dietician to know the type and amount of fruit you can eat in a day.
- Liver breaks down purines from food and produces a waste product called uric acid. Therefore, purine rich foods must be avoided.
- Stay physically active and exercise regularly. However, consult a doctor before embarking on any exercise regime.

### Foods to be included and excluded:

| Food Group | Foods to include | Foods to exclude |
|---|---|---|
| Cereal, millets and their products | Whole grain cereals & millets like Sorghum (jowar), pearl millet (bajra), finger millet (ragi/nachni), foxtail millet etc. | Yeast or yeast containing food products like bread and naan |
| Pulses and Legumes | Lentils, soy and soy products | - |
| Milk and Meat products | Egg, Low fat dairy products such as milk, curd, plain yogurt, cottage cheese (paneer). | Organ meats (heart, kidneys, liver, tongue), Red meat, shrimps, mackerel, sardines, fish egg, sausages |
| Vegetables and Fruits | Peas, spinach, cauliflower, asparagus, brinjal Mushrooms, sapota (chickoo), custard apple (sitaphal) | - |
| Miscellaneous | Unsalted nuts and seeds | Aerated drinks, alcohol especially beer, sugar sweetened beverages |

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# CHRONIC KIDNEY DISEASE (CKD)

## What is Chronic Kidney Disease?

Chronic Kidney Disease (CKD) is the term used when there is an irreversible loss in kidney function. This condition is usually progressive and eventually a stage is reached when practically entire kidney function is lost. This is called End Stage Kidney Disease (ESKD). Since treatment options for ESKD are limited and very expensive efforts should be made to delay progression of CKD. Diet plays an important role in this matter. The diet must be individualized because the severity and cause of CKD may vary from patient to patient; further one must also consider dietary habits of a person while prescribing him a diet.

## Dietary guidelines:

- **Protein:** Most of the waste products normally excreted by the kidney are derived from proteins in the diet. Studies suggest that dietary protein restriction reduces the rate of decline in kidney function and thus delays the need for dialysis and renal transplantation. Therefore, patients with CKD are often advised to restrict protein in the diet. However, it must be remembered that body uses protein to build, maintain and repair body tissue. It is therefore very essential to maintain sufficient protein intake. The minimum protein intake required for a person is 0.6 gm/kg/day with more than 50% being from high biological value (HBV) sources. If 50% of the dietary protein is not of HBV, as it happens in vegetarian subjects, the requirement would be 0.8 gm/kg/day.

  **Helpful Tips**

  a. Use the prescribed amount of Protein in the diet
  b. Use Rice and Rice Products to restrict protein
  c. Use Arrowroot flour instead of Besan
  d. Restrict Non-vegetarianfoods
  e. Restrict use of Milk / Milk Product / Dal / Pulses / Dry fruit

- **Calorie:** All of us spend energy not only while working, but even during resting state. In fact, the energy spent while resting, called Resting Energy Expenditure (REE) constitutes the largest portion of total energy expenditure. The energy that we spend comes from the carbohydrates, fats and proteins in the food that we eat. The energy requirement in patients with CKD is similar to that required in healthy subjects i.e. 35-50 Kcal/kg of body weight, depending on the work done by the individual. Since dietary protein has to be used for maintaining and repairing body tissues, the energy should come from carbohydrates and fats. If the caloric intake is inadequate, proteins of the body are used as a source of energy. This will not only lead to malnutrition but also lead to production of a greater amount of waste products of protein breakdown.

  **Helpful Tips**

  a. Eat frequent meals.
  b. To add arrowroot flour to wheat flour.
  c. Apply oil/ghee on chapattis.
  d. To use root vegetable like potato, sweet potato, suran, arbi. To add sugar or jaggery in dal or vegetable (for non-diabetics).
  e. To use sago in the diet.
  f. To have desserts made with arrowroot or sago.

- **Sodium:** As the renal failure progresses, the excretion of sodium by the kidneys decreases, leading to sodium and fluid retention, this in turn causes high blood pressure and swelling. In such cases, dietary sodium has to be restricted. intake of sodium by most Indians is 150-200 mEq/day (corresponding to 9-12 grams of salt).

  Remember the words "Salt" and "Sodium" should not be confused even though they are related. Salt (sodium chloride) contains about 40% sodium. With careful planning, small amount of salt can be added in the diet.

  **Helpful tips:**

  a. You can add new flavours like Lemon Juice, Onions, Green chillies to make your food palatable.

  b. Avoid the use of salt while cooking.

  c. Use the prescribed amount of salt only.

  d. Avoid salted foods like pickles, papad, chutney, sauces, salted nuts and chips, seasoning mixtures containing salt, e.g. Soya sauce, Garlic salt, chat masala, etc.

  e. Avoid baked foods like cakes, biscuits, toasts, khari, pizza as they contain sodium in the form of baking powder.

  f. Avoid instant foods like noodles, macaroni, soup cubes, corn flakes, because of high sodium content.

  g. Avoid processed cheese and salted butter but can have homemade salt free butter.

  h. Avoid organ meat like liver, kidney, brain and sea foods like crab, lobster, prawns and dried fish.

- **Potassium:** With advanced kidney damage, potassium eaten in an "average" diet cannot be excreted by the kidneys. This can lead to high potassium concentration in the blood which can cause serious heart problems and even sudden death. To prevent this, potassium in the diet must be controlled.

  **Helpful Tips:**

  a. You can take one fruit per day. Preferably a low potassium fruit like Apple / Pear / Guava.

  b. You can take one cup of tea or coffee per day.

  c. You can reduce the amount of potassium in the vegetables if you cut them into small pieces and cook them in generous amount of water and discard the water. This process also leads to loss of water-soluble vitamins. It is therefore necessary to take a capsule of water-soluble vitamin daily.

  d. Avoid coconut water, products made from coconut and fruit juices.

  e. Avoid chocolates, cocoa and aerated drinks.

  f. All dry fruits, nuts and oil seeds, non-vegetarian food, millets, pulses and legumes are good source of potassium.

- **Phosphorus:** Phosphorus is widely distributed in bones and teeth. The excess amount is continuously excreted in the urine by the normal kidney. However, in renal failure, the phosphorus excretion is impaired leading to accumulation of phosphorus in the body. This causes an increase in calcium – phosphorus products. In such condition patient is advised to take phosphate binders. Antacids (Gelusil, Digene, Alludrox), calcium carbonate and calcium acetate are the commonly used phosphate binders. Most of the antacids contain either magnesium hydroxide or aluminum hydroxide.

  **Helpful Tips:**

  a. All foods that are high in protein are high in phosphorus

  b. Restrict Non-Veg Foods

  c. Restrict use of Milk / Milk Product / Dal / Pulses / Dry fruit

- **Fluid/Liquid:** In most cases of advanced kidney disease, the urine output drops. When this happens, it is necessary to restrict intake of liquids (fluids). The excessive fluid intake results in swelling, high blood pressure and difficulty in breathing. The fluid intake must not exceed the amount advised by the physician or dietician. In a few cases where the urine output is adequate fluid restriction may not be necessary.

  **Helpful tips:**

  a. Drink very cold water.

  b. Use a candy or peppermint or ice cube to quench your thirst.

  c. Use flavoured ice cubes.

  d. Instead of milk use paneer, use hung curd, have thick dal.

  e. Use a small cup or glass to have liquids.

  f. Avoid salty and fried foods. This will help to decrease thirst.

  g. Foods counted in Liquid are Tea / Coffee / Milk / Curd / Lassi / Buttermilk / Soup / Ice-Cream / Soft Drink / Custard / Jelly

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2. Bharat V. Shah, Zamurrud M. Patel, 2016. Role of low protein diet in management ofdifferent stages of chronic kidney disease - practical aspects. BMC Nephrology.17: 156

# DURING DIALYSIS

Dialysis is a process that removes the waste products and helps to maintain volume and composition of body water - the most important and indispensable function of the kidneys. Dietary modifications are needed for patients on Dialysis. Following are general guidelines for dialysis patients.

**Note: These are general guidelines that must be followed in patients on Dialysis. It is important to remember that diet will vary according to the requirements of individual patients. Patient should contact their Dietician for individualized Diet Plan.**

## Helpful Hints to Increase Calorie and Protein Intake

a. Include root vegetables like potato, sweet potato, suran, and arbi to increase the calories.
b. Have home-made desserts like kheer, sheera, rasgulla, and gulab jamun.
c. Soya flour or besan can be added to wheat flour to made chapati.
d. Consume dry fruits in between meals. Can use powdered dry fruits to thicken soups, instead of corn flour.
e. Commercial Protein supplements can be used after consulting your Doctor or Dietician.

## Helpful Hints for Sodium Restriction

a. You can add new flavors like lemon juice, onions, green chillies, vinegar, tamarind pulp and amchur powder (Everest) to make your food palatable.
b. Avoid use of salt while cooking but you may add the specified amount for the day separately.
c. Avoid use of salt substitutes. They contain potassium and could increase your potassium levels.
d. Avoid salted foods like cheese, salted butter, papads, pickles, chutneys, sauces, salted nuts, salted chips, popcorn and other canned products, instant foods like noodles, macaroni, soup cubes and cornflakes because of high sodium content.
e. Avoid baked food items like cakes, biscuits, pizzas, breads as they contain sodium in the form of baking powder.

## Helpful Hints for Potassium restriction:

a. You can take one fruit per day. Preferably a low potassium fruit – Pear, Apple.
b. You can take one cup of tea or coffee per day.
c. You can reduce the amount of potassium in the vegetables if you cut them into small pieces and cook them in generous amount of water and discard the water. This process also leads to loss of water-soluble vitamins. It is therefore necessary to take a capsule of water-soluble vitamin daily.
d. Avoid coconut water, products made from coconut and fruit juices, chocolates, cocoa and aerated drinks, dry fruits, nuts and oil seeds, non-vegetarian food, pulses and legumes are good source of potassium.
e. Salt substitutes like LoNa (low sodium)should be avoided because they are high in potassium.

## Helpful Hints for Fluid Control

a. Fluids include any liquid at room temperature: water, ice, tea, coffee, curds, buttermilk, fruit juices, jelly, ice cream, soup, dal, gravies and any other drink.

b. In the morning fill a bottle with your fluid allowance and as the fluids are consumed, pour of the equal amount of water. The water left in the bottle is the amount of fluid which remains. This will be a good guide to the amount of fluid consumed.

c. Always drink from a small cup or a glass.

d. Avoid salty and fried foods. This will help to decrease thirst.

## Helpful Hints for Phosphorus Control

a. Take phosphate binders with or after each meal as prescribed by the physician.

b. Some common phosphate binders are, calcium carbonate and calcium acetate.

c. At times, these binders cause constipation so consult your physician before taking any laxatives.

d. Do not forget phosphate binders on dialysis days, because phosphates are not adequately removed during dialysis.

e. Food high in phosphate includes milk and milk products, cereals, legumes, cocoa and all nuts.

f. Cereals contain 40 – 80% phosphorus in the form of phytin, which is not available to the body.

## References:


1. Patel, Diet in Chronic Kidney Disease
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# KIDNEY TRANSPLANT

## What is kidney transplant?

Kidney Transplant is a transfer of a healthy kidney from one person into the body of a person who has little or no kidney function. The main role of the kidneys is to filter waste products from the blood and convert them to urine. Loss of kidney function, known as end-stage chronic kidney disease or kidney failure, is the reason for needing a kidney transplant. After Kidney Transplant there is an improvement in appetite. The medicines used post-transplant also improves appetite. If one increases a lot of weight after transplant medical complications like Hyperlipidemia, Diabetes Mellitus, and Hypertensioncan occur.

## Dietary guidelines:

- Have small frequent meals.
- Have a sterile diet.
- Avoid raw fruits, vegetables, undercooked meat, unpasteurized milk etc.
- Include complex carbohydrates like whole grains, cereals, pulses etc. to avoid spike in blood glucose levels.
- Avoid simple carbohydrates like sweets, cakes pastries, etc.
- Include high biological value protein in the diet- milk, paneer, cereal pulse combination, etc.
- Avoid deep fried foods, papads, pickles, processed foods, salad dressings, sauces etc.
- Include adjuncts such as tamarind, oregano, thyme, etc instead of salt wherever possible.
- You can add new flavors like lemon juice, onions, green chillies, vinegar, tamarind pulp and amchur powder (Everest) to make your food palatable.

## Lifestyle modifications:

- Maintenance of a healthy diet should be encouraged.
- Physical activity at a level similar to that recommended to age and co-morbidity in general population is advised.
- Alcohol consumption should be restricted.
- Recreational drug use should be avoided.
- The use of over-the-counter medications should be discouraged.

## References:


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2. Handbook of Nutrition and Kidney Disease By Mitch
3. Transplantation Dr. BV Shah

CHAPTER 09

# GOUT

# HYPERURICEMIA (HIGH URIC ACID LEVELS)

## What is Hyperuricemia?

It occurs when there is an excessive amount of uric acid in the blood. High uric acid levels in severe cases can lead to a painful type of arthritis called gout. Gout is a type of arthritis that causes swelling and pain in joints due to excessive accumulation of uric acid in blood.

Gout is a condition characterized by the deposition of monosodium urate crystals in the joints or soft tissue. The four phases of gout include asymptomatic hyperuricemia, acute gouty arthritis, intercritical gout and chronic tophaceous gout. The peak incidence occurs in patients 30 to 50 years old, and the condition is much more common in men than in women. Patients with asymptomatic hyperuricemia do not require treatment, but efforts should be made to lower their urate levels by encouraging them to make changes in diet or lifestyle.

## What are the reasons for high uric acid levels?

| Increased Urea Production | | Decreased Renal Excretion of Urate | |
|---|---|---|---|
| | **Causes** | | **Causes** |
| **Nutritional** | Excess purine, ethanol, fructose consumption, or products made from High Fructose Corn Syrups | **Drugs** | Ethanol, cyclosporine (Sandimmune), thiazides, furosemide (Lasix) and other loop diuretics, ethambutol (Myambutol), pyrazinamide, aspirin (low dose), levodopa (Larodopa), nicotinic acid (Nicolar) |
| **Hematologic** | Myeloproliferative and lymphoproliferative disorders, polycythemia | **Renal** | Hypertension, polycystic kidney disease, chronic renal failure (any etiology) |
| **Miscellaneous** | Obesity, psoriasis, hypertriglyceridemia | **Miscellaneous** | Obesity, sarcoidosis, toxemia of pregnancy |

## MYTHS AND FACTS

**MYTH:** **All purine-rich foods raise serum uric acid levels to the same extent**

**FACT:** Adenine and hypoxanthine are considered to be the most uricogenic of all purines, in comparison to guanine and xanthine

**MYTH:** **A strict low-purine diet is crucial in the treatment of hyperuricemia and gout**

**FACT:** It is not only a low-purinediet but also an alkaline diet that significantly affect serum uric acid levels due to more rapid and easier elimination of this compound with urine

**MYTH:** **Purine-rich diet affects uric acid levels to the same extent in all patients**

**FACT:** Obese hyperinsulinemic patients and the elderly are affected by a high-purine diet to a greater extent than patients with normal weight and those of younger age

**MYTH:** **In every case of gout, protein should be eliminated from the diet, due to the fact that protein-rich foods contain large amounts of purines**

**FACT:** Proteins exhibituricos uric properties and should be neither totally eliminated nor even significantly limited in the diet; moreover, milk and dairy products facilitate uric acid excretion due to their alkalizing effects on systemic fluids

**MYTH:** **The quality of fats (especially animal fats) is the main factor determining the amount of uric acid produced**

**FACT:** In the case of gout, it is the quantity rather than quality of fats that is of greater importance, because uric acid excretion depends mostly on the levels of ketone compounds which are formedirrespective of the quality of fats if there is too much fat in the diet

**MYTH:** **The quality of alcohol determines the development of gout**

**FACT:** Alcohol increases the risk of gout and should be eliminated from the diet in all cases; however, the most potent factor responsible for hyperuricemia and gout is occasional consumption of large quantities of alcohol, especially beer

## Dietary Guidelines:

A gout diet should include normal intake of basic nutritional components, vitamins, and minerals.

- Being overweight is one of the major factors in increasing the risk for high uric acid levels. Thus, it is advisable to lose weight gradually.
- Include nutritionally balanced meals at regular intervals throughout the day.
- Include vitamin C rich food sources like gooseberry (amla), guava and oranges as it can help to lower uric acid levels.
- An important, unfortunately often ignored, recommendation is adequate fluid intake in order to facilitate uric acid elimination Dehydration is one of the causes of high uric acid levels. Stay well-hydrated. It is recommended to increase water consumption unless advised against by your doctor.
- Alcohol, coffee, black tea and cacao must be eliminated from the diet.
- Restrict the consumption of fructose containing foods, More importantly, avoid soda or soft drinks and juices that are sweetened with high-fructose corn syrup. Avoid foods high in HFCS -high fructose corn syrup such as candy, pastries, donuts, cake, cookies. It is recommended to read food labels to understand the ingredients used and the fructose content of packaged foods.
- The optimal culinary treatment method is cooking, stewing in a large amount of water (especially with respect to meat). Frying and baking are to be avoided
- Carbohydrate-rich foods facilitate the excretion of urate from the body, whereas high-fat diet increases re-uptake of these compounds in the renal tubules.
- Stay physically active and exercise regularly. It is advisable to consult your doctor before embarking on any exercise regime.

## Foods to include and exclude

| Food group | Foods to include | Foods to exclude |
|---|---|---|
| Cereal, millets and their products | Whole grain cereals & millets like sorghum (jowar), pearl millet (bajra), finger millet (ragi/nachni), foxtail millet etc. | Yeast or yeast containing food products like bread and naan |
| Pulses and Legumes | Lentils, soy and soy products (in moderate amounts) | - |
| Milk and Meat products | Low fat dairy products such as milk, curd, plain yogurt, cottage cheese (paneer), egg | Organ meats (heart, kidneys, liver, tongue), red meat, shrimps, mackerel, sardines, fish egg, sausages |
| Vegetables and Fruits | Seasonal fruits especially cherries | Purine rich foods like Peas, spinach, cauliflower, asparagus, brinjal, mushrooms, sapota (chickoo), custard apple (sitaphal) |
| Miscellaneous | Unsalted nuts and seeds | Aerated drinks, alcohol especially beer, sugar sweetened beverages, sugary foods, foods containing high fructose corn syrup. |

## Purine Content of Foods

| Purine Content: 0 to 50mg per 100 gm. | Purine Content: 50 to 150mg per 100 gm. | Purine Content 150 to 1000mg per 100 gm. |
|---|---|---|
| • Fruits<br>• Vegetables: All, except those in Group B<br>• Cereals: Allexceptthose in Group B<br>• Dairy Products (Milk, creams, yogurt, cheese, eggs - bearing in mind the high fat content of most dairy products)<br>• Fats, with in reasonable calorie limits (most cooking oils,"shortening," salad dressing)<br>• Nuts: Not peanuts or cashews, and preferably not salted nuts | • Chicken, Mutton, Sausages Fish: Except those in Group C<br>• Whole grain Bread and Pasta, Whole Grain Cereals<br>• Lentils, Soya Beans, Bean Curd, Tofu, Tempeh, Miso, Hummus, Peas and Beans (including Chickpeas)<br>• Peanuts, Peanut Butter, Cashews, Ground Nuts<br>• Cauliflower, Broccoli, Kale, Brussels Sprouts,<br>• Spinach, Asparagus, Avocado, and Mushrooms | • Organ Meats (Kidney, heart, liver)<br>• Hilsa (herrings), Bangda (Mackerel), Fresh water fish, Fish eggs, Zinga (Prawns)<br>• Yeast<br>• Jams, jellies, chocolates, ice creams, preserved and canned sweetened food |

In summary, a gout diet must be adequately balanced in terms of individual nutrients, must include low-purine, low high fructose corn syrup and alkalizing foods and provide adequate amount of fluids to prevent dehydration.

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CHAPTER 10

# BONE DISORDERS

# OSTEOPOROSIS

## What is Osteoporosis?

Our bones are a living tissue and their function is to give structure to our body, enable us to move and protect our organs. Osteoporosis is a condition where the bones lose its mineral, deteriorate in its microarchitecture and become thin and fragile. This causes pain and increases the risk of fractures especially low impact fractures. The pain and fractures make everyday activities extremely difficult. Many people do not know that they have Osteoporosis until they fracture a bone. In some instances, fractures can even go undetected. Hence Osteoporosis is called a 'silent disease'. The most common fractures due to Osteoporosis are of the hip, forearm and spine.

## How is Osteoporosis Diagnosed?

A dual energy x-ray absorptiometry, a non-invasive technique, is used to measure bone density. The bone density is measured at Spine, Femurs and Forearms. Your bone density is compared to a group of young adults of same gender and a 'T-score' is generated. As per WHO guidelines, if the T-score is less than -2.5, then one is diagnosed to have Osteoporosis. If the 'T-score' is between -1.0 to -2.5 then you are diagnosed to have Osteopenia indicating a status of Pre-osteoporosis.

## How to prevent Osteoporosis?

Prevention of Osteoporosis begins in early life with optimal bone growth and development during youth. Bone grows continually from birth till mid 20s attaining maximum strength and size. An increase of 10% in the peak bone mass during childhood decreases the risk of Osteoporotic fractures during adulthood by 50%. Hence it is important to ensure optimal bone growth during youth. However, after 40 years of age, getting your bone density checked yearly will warn you if osteopenia has developed or bone density has started reducing. With the right kind dietary intakes and exercise, the reduction in bone density and in turn development of Osteoporosis can be prevented.

## Dietary and Lifestyle Guidelines

1. **Consume a nutritious diet with adequate calcium intake:** Nutrition and bone health are closely associated. Poor nutrition leads to suboptimal bone health. Calcium and vitamin D are the most important nutrients for optimal bone density. Calcium is the major building block of the bone and vitamin D is required for optimal calcium absorption.
2. **Maintain adequate Vitamin D status:** Calcium and vitamin D go hand in hand. Vitamin D synthesis takes place in skin when, it is exposed to sunlight especially ultraviolet B rays. In children and adults, sunlight exposure of skin of hands, forearms and face for 10 to 15 minutes is sufficient to produce vitamin D depending on the time of the day of exposure. For elderly however, given that they may spend more time indoors, vitamin D supplement may be necessary. Food sources of vitamin D are limited and include oily fish such as salmon, sardines and mackerel, eggs, liver, and in some countries fortified foods. In India, fortification of vitamin D is limited and may not be depended upon for intake.
3. **Adequate protein intake is essential:** Adequate protein intake during growth is important for optimal bone growth and development. During adulthood it is important to maintain and later to avoid the decline in the bone density. Lack of protein affects the muscle strength and in turn increases the risk of falls and fractures.

4. **Adequate intake of fruits and vegetables has shown to reduce the risk of loss of bone density** due to multiple vitamins and minerals present in fruits and vegetables.
5. **Other nutrients such as vitamin B6, B12, vitamin A, vitamin K, magnesium and zinc** have shown to have protective effects on bone density.
6. **Exercise regularly especially weight bearing activity promises to be protective** against muscle and bone loss. Exercise helps in bone building during childhood and maintains bone during adulthood and later in life.
7. **Beware of under nutrition especially occurring due to weight loss diets and eating disorders** which are inadequate in energy and other nutrients and which also cause rapid weight loss.
8. **Avoid smoking** and second hand smoking
9. Avoid heavy drinking (not more than 1-2 serves, 2-3 times per week).

## Busting Nutrition Myths:

**MYTH: Osteoporosis occurs mostly in women and most people do not need to worry about it.**

**Fact:** Men are also affected by Osteoporosis. Worldwide, 1 in 3 women over age 50 experience osteoporotic fractures, as do 1 in 5 men aged over 50

**MYTH: Osteoporosis occurs due to lack of estrogens and hence occurs only after Menopause.**

**Fact:** Osteoporosis may occur even before menopause. Bone mineral accrual takes place till the 2-3 decade of life in women. After that bone mineral is either maintained or lost at a slow rate.

**MYTH: Osteoporosis is normal with increasing age and it is a problem only in the elderly.**

**Fact:** Everyone is at risk of developing Osteoporosis. Osteoporosis occurs due to many factors, increasing age is one of them. Other risk factors include genetic predisposition, parental history of fracture, sedentary lifestyle, dietary deficiency of calcium, biochemical vitamin D deficiency, sarcopenia, smoking, a high intake of alcohol (>4 units/day), prolonged use of various medications such as corticosteroids, proton pump inhibitors etc, low body weight and weight loss.

**MYTH: Children and Teens do not need to worry about Osteoporosis.**

**Fact:** Children and teens can build strong bones and prevent Osteoporosis in later life by exercising and getting enough calcium and vitamin D.

**MYTH: Taking calcium supplementation will avoid the risk of Osteoporosis.**

**Fact:** To prevent Osteoporosis, only calcium supplementation is not enough. A healthy lifestyle with appropriate food habits and exercise is essential. Foods rich in calcium, fruits and vegetables and protein rich foods are essential for good bone health and prevent loss of bone mass. Only optimal calcium intake is not enough as vitamin D is essential for calcium absorption. In case of Vitamin D deficiency, calcium will not be absorbed optimally. Sunlight exposure is preferred for vitamin D than taking it from supplements.

**MYTH: Calcium Supplements are better than dietary calcium.**

**Fact:** The bioavailability of calcium from milk is highest and greater than supplements. Milk and dietary calcium work better for balancing body's calcium needs.

**MYTH: If you have Osteoporosis, you will always have it.**

**Fact:** Osteoporosis can be treated and fractures can be avoided. As per the degree of Osteoporosis, it can be treated only with lifestyle changes or an additional pharmacological treatment.

## Foods included and excluded

| Food Group | Foods to include | Foods to exclude |
|---|---|---|
| Cereal, millets and their products | Whole grain cereals – wheat, jowar, bajra, rice and their products | - |
| Pulses and Legumes | Pulses and legumes such as dry chana, soyabean with the use of food pre-preparation and cooking techniques such as soaking sprouting to reduce the phytate content. | - |
| Milk and Meat products | Dairy products such as low fat milk, curds, paneer, cheese. Fatty fish varieties and saltwater fish varieties. | - |
| Vegetables and Fruits | Fruits and Vegetables especially fenugreek leaves, colocasia leaves | - |
| Miscellaneous | Foods fortified with calcium and vitamin D | Alcohol in excess of 2-3 drinks per day, Tea/Coffee more than 3 cups decreases the absorption of calcium, Soft drinks and aerated drinks containing caffeine |

## Nutrient content of rich sources of specific nutrients or food components in terms of portions consumed at one time

| Sr.No. | Source | Nutrient | portion | Content |
|---|---|---|---|---|
| 1. | Milk and Milk Products | Calcium | 1 cup | 200-300 mg |
| 2. | Ragi | Calcium | 1 bhakari | 100 mg |
| 3. | Horsegram | Calcium | 1 katori | 70-80 mg |
| 4. | Brown soyabean | Calcium | 1 katori | 60-70 mg |
| 5. | Amaranth Leaves, Drumstick Leaves, Fenugreek Leaves, Radish Leaves, Colocasia Leaves | Calcium | 1 katori | 200-300 mg |

## Food plate for osteoporosis

- A food plate to prevent Osteoporosis:
- 1 horsegram flour bhakari, ½ cup rice, 1 katori dal, 1 katori fenugreek leaves vegetable with dal, ½ cup salad, 1 cup curds

## References:


1. https://www.nof.org/preventing-fractures/general-facts/
2. https://www.iofbonehealth.org/facts-statistics#category-18
3. Indian Food Composition Tables, 2017

# RHEUMETIOD ARTHRITIS (RA)

Rheumatoid arthritis is a chronic autoimmune disease that causes progressive articular damage, functional loss, and comorbidity. Literal meaning of Arthritis is "Joint inflammation ". Till now, over 100 different types of rheumatic diseases are identified which may or may not cause inflammation. Thus, arthritis, besides joints also can affect other body parts such as heart, lungs, eyes.In this condition of rheumatoid arthritis (RA) cause of inflammation is autoimmune and unidentified, mainly responsible for damaging healthy surrounding tissues of joints leading to irreparable damage of tissues involved. This type of damage further causing deformities and crippling. RA can developat any age .

## What is Rheumatoid Arthritis (RA)?

Different arthogenic stimuli are responsible for activating the immune response of the immunogenetically susceptible host. Both exogenous infectious agents (such as Epstein-Barr virus, rubella virus, cytomegalovirus, herpes virus, human T-cell lymphotropic virus, mycoplasma, and others) and endogenous proteins such as collagen, proteoglycans, altered immunoglobulins and post-translationally modified proteins like citrullinated proteins are the causative agent that triggers an inappropriate host immune response by innate stimuli. These triggers are responsible for causing inflammation in synovial fluids of the joints giving rise to symptoms like painful stiff joints. Thus, RA differs from osteoarthritis (OA) as RA is an inflammatory joint disorder affecting at any age where as OA is a degenerative condition affecting cartilage and surrounding tissues of the joints mainly in elderly.

## What are the signs and symptoms of RA?

Swelling in one or more joints, early morning stiffness, tenderness of joints or recurring pain, Inability to move a joint normally, redness and warmth in affected area, unexplained weight loss, fever or weakness and these symptoms lasts more than two weeks.

In the long term this may cause discomfort further leading to vicious cycle of pain, stress and depression, disability to carry life long, increased use of Drugs which might cause adverse side effect and high cost of treatment -money spent in treatment may lead to poor quality of life of the family.

## Can we prevent Rheumatoid Arthritis?

Because of autoimmune nature of the condition, here is no known way to prevent it

## Dieatry and lifestyle management

1. Stick to Ideal body weight
2. Increase antioxidant rich food intake
3. Eat variety of seasonal fruits
4. Avoid refined foods and processed foods
5. Avoid long gaps in meals and do not exceed more than 3 major and 2 minor meals / day
6. Increase protein rich foods such as fish, dairy with low fat
7. Fat intake should be limited to 10 to 15 gm visible fat with rich source of omega 3 fatty acids
8. Avoid fried and stall foods
9. Be active – 1 hr daily exercise like yoga will help to improve mobility for patients with RA
10. Reduce intake of carbonated beverages and alcohol and smoking

## MYTHS AND FACTS

**MYTH:** **RA is caused by unhealthy eating, excess weight gain, and stress.**

**FACT:** This is true as being an autoimmune disease it gets triggered like unhealthy eating, excess weight gain, smoking, exposure to unhealthy environment and stress might may be responsible for initiation of the process.

**MYTH:** **Avoid "Nightshade" Veggies**

**FACT:** This is false as Bright coloured vegetables are loaded with micronutrients, hence to be included in diet.

**MYTH:** **Eat Fish to Curb Inflammation**

**FACT:** Fish rich in Omega 3 helps to reduce stiffness, hence should be consumed as per Dietician's advice.

**MYTH:** **Stay Away from Citrus**

**FACT:** Source of vitamin C – helps to build immunity and cartilage

**MYTH:** **Dairy Makes RA Worse**

**FACT:** Dairy protein helps to maintain amino acid pool and provides enough calcium to build the bones

**MYTH:** **Processed Foods Are No Good**

**FACT:** Processed and refined and fatty foods are highly inflammatory with high amount of unsaturated fats, hence better to avoid completely.

## Functional foods for RA (Amounts recommended per day)

1. Flax seeds(one level table spoon powder per day on salads, in dals, in porridge Or use as Mukhwas)
2. Walnuts: 2-3 per day

## Foods to include and exclude:

| Food group | Foods to include | Foods to exclude |
|---|---|---|
| Cereal, millets and their products | Whole grain cereals – wheat, jowar, bajra, rice and their products | Refined carbohydrates such as Maida and products |
| Pulses and Legumes | Sprouts | - |
| Milk and Meat products | Dairy products | Red meat |
| Vegetables and Fruits | Green leafy vegetables, Fresh Fruits, Colorful vegetables | - |
| Miscellaneous | Vitamin D – Sunshine and dietary sources, Vitamin E rich - Almonds, Omega 3 rich foods like fish oils, walnuts, flaxseeds | Alcohol, Processed foods - canned foods and drinks, Sugars and sweets, Fats like - trans fats, saturated fats, with high omega 6 content, Salty foods |

## Foods included and excluded

| Apple | 1 medium |
|---|---|
| Pear | 1 medium |
| Guava | 1 medium |
| Pomegranate | ½ bowl |
| Orange | 1 medium |
| Litchi | 3-4 no (small) |
| Papaya | 1 bowl |
| Pineapple | 3 slices |
| Mango | 2 slices |
| Watermelon | 1 bowl |
| Banana | 1 elaichi banana/ ½ regular banana |
| Strawberries | 5-6 no. |
| Cherries | 10 no. |
| Chickoo | 1 small |
| Grapes | 15 No. |

## Important Nutrients and Nutrient Rich Sources (Quantified in portions of food consumed)

| Foods to consume | Servings at a time | Nutrient/Amount of nutrients obtained / serving |
|---|---|---|
| Dairy products | Low fat milk – 250 ml / curd – 100 gm / Butter milk 200 ml | 300 – 500 mg / calcium |
| Sprouts | 100 gm | Source of Antioxidants and proteins |
| Green leafy vegetables | 2 servings of 100 gms each /day | Source of Antioxidants and fiber |
| Fresh Fruits | 2 servings of 100 gms each /day | Source of Antioxidants and fiber |
| Colorful vegetables | 2 servings of 100 gms each /day | Source of Antioxidants |
| Vitamin D – Sunshine and dietary sources | 30 mins of sunlight exposure at 11 am – 3 pm<br>Vitamin D tablets | 400- 1000 IU / day |
| Vitamin E rich – Almonds | 4-6 Almonds | 30 -50 mg calcium |
| Omega 3 rich foods like fish oils, walnuts, flaxseeds, Methi seeds | 10 gm flaxseeds<br>20 gm walnuts<br>Fish oil from fresh sources like Pomphret, Bangda, Rohu fish, Catfish, Catla, Silver crap. biweekly | 130 mg omega 3 FA<br>150 mg omega 3 FA<br>300 – 700 mg / 100 gm (Average ) |

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8. www.arthritis.org
9. https://www.nin.res.in/ NIN Food Atlas.

# OSTEOARTHRITIS

## What is Osteoarthritis?

Osteoarthritis is a degenerative joint disease where cartilage and associated joints are inflamed causing severe joint pain. This condition primarily affects weight-bearing joints (Knees, hips, spine). It commonly affects elderly people after 50 years of age and is primarily associated with obesity.

**Signs and symptoms of Osteoarthritis –** Patients suffer from severe joint pain and discomfort in performing daily activities like walking, cooking, bathing etc.

## Can we prevent Osteoarthritis?

Yes. Maintaining a healthy weight and appropriate physical activity at younger ages helps to prevent the initiation and progression of this condition.

## What are the "TEN POINTS PRIORITY CHECKLIST FOR DIETARY and LIFESTYLE MANTRA" to manage Osteoarthritis?

1. Maintain Ideal body weight.
2. Increase antioxidant-rich food intake.
3. Eat a variety of seasonal fruits especially rich in carotenoids.
4. Avoid refined foods and processed foods.
5. Avoid long gaps in meals and do not exceed more than 3 major and 2 minor meals / day
6. Increase protein-rich foods such as fish, dairy with low fat.
7. Fat intake should be limited to 10 to 15 gm visible fat with a rich source of omega 3 fatty acids.
8. Avoid fried and stale foods.
9. Be active – 1 hr daily exercise ( a combination of walk/swimming/Aqua aerobics and yoga will help to improve mobility for patients with OA.
10. Reduce intake of carbonated beverages and alcohol and smoking.

## IMPORTANT NUTRIENTS AND NUTRIENT RICH SOURCES (Quantified in portions of food consumed)

| Foods to consume | Servings at a time | Amount of nutrient obtained / serving |
|---|---|---|
| Dairy products | Low fat milk – 250 ml / curd-100 gm / Butter milk 200 ml | 300 – 500 mg / calcium |
| Sprouts | 100 gm | Source of Antioxidants and proteins |
| Green leafy vegetables | 2 servings of 100 gms each /day | Source of Antioxidants and fiber |
| Fresh Fruits | 2 servings of 100 gms each /day | Source of Antioxidants and fiber |
| Colourful vegetables | 2 servings of 100 gms each /day | Source of Antioxidants |

| Foods to consume | Servings at a time | Amount of nutrient obtained / serving |
|---|---|---|
| Vitamin D-Sunshine and dietary sources | 30 mins of sunlight exposure at 11 am – 3 pm<br>Vitamin D tablets | 400- 1000 IU / day |
| MUFA, Magnesium, Potassium Vitamin E rich | 20-25 Almonds | Replace unhealthy snacks with almonds |
| Omega 3 rich foods like fish oils, walnuts, flaxseeds, Methi seeds | 10 gm flaxseeds<br>20 gm walnuts<br>Fish like Pomphret, Bangda, Rohu fish, Catfish, Catla, Silver crap. biweekly | 130 mg Omega 3 FA<br>150 mg Omega 3 FA<br>300 – 700 mg / 100 gms (Average) |

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CHAPTER 11

# ALLERGIES

# FOOD ALLERGY

## What is food allergy?

Food allergy is an important public health problem that affects adults and children and may be increasing in prevalence. Food allergy is an adverse health effect arising from a specific immune response that occurs on exposure to a given food. Food allergens are specific components of food or ingredients within the food (typically proteins, but sometimes also chemical haptens) that trigger a specific immunologic reactions, resulting in characteristic symptoms. Some allergens (many a times from fruits and vegetables) cause allergic reactions primarily if eaten when raw but not when cooked. However, most food allergens can still cause reactions even after they have been cooked or are pre-digested.

## Difference between food allergy and food intolerance

**Food allergy** refers to an abnormal immune response to a particular foods in specific susceptible individuals. It can further be classified as IgE mediated and non-IgE mediated and intermediate mixed type. All the three types show varied manifestation.

**Food intolerance** refers to an adverse physiologic response to a food and may be due to inherent properties of the food (i.e. toxic contaminant, pharmacologic active component) or to pre-disposing characteristics of the host (i.e. metabolic disorders, idiosyncratic responses, psychological disorder), they may not be reproducible, and they are often dose related. It is considered that food intolerance represents most of the adverse reactions to food.

## What are the signs and symptoms of food allergy?

- Respiratory- Asthma (wheeze , cough ), Laryngeal Oedema, Infection in ear.
- Cutaneous- skin rash (dermatitis ), contact rash
- Gastrointestinal-Oral allergy symptoms, nausea , regurgitation and vomiting , chronic diarrhoea, protein losing enteropathy, blood in stool, colic, constipation, food refusal, food protein induced enterocolitis syndrome, food protein induced allergic protocolitis, food protein induced enteropathy
- Unspecified symptoms- Arthritis, migraine

**Diagnosis:** Clinical history and examination are the first-line approach in diagnosing food allergy. The evaluation of a patient with suspected food allergy begins with obtaining a thorough clinical history that considers the symptoms indicative of allergic reactions to food. Physical examination may reveal signs of an immediate acute reaction. The clinical history and examination lack sufficient specificity and sensitivity to establish the diagnosis of food allergy. In vivo (skin testing) and in vitro (food-specific serum IgEs) investigations of sensitization are essential adjunct tools in assessing patients with a suggestive clinical history of food allergy.

- **Elimination diets** are used in the management of patients suffering from food allergies, as well as a part of evaluation for food allergy, and refer to the avoidance of incriminated food.
- **Supervised food** challenges are structured protocols in which the patient ingests the suspected food under a clinician's supervision. It helps identify the causative agent, the amount of food needed for a reaction.

**Common allergens:** Corn, Dairy, bakery products (containing milk solids), Eggs, Gluten Grains (Barley, Rye, Spelt, Wheat), Shellfish/ fish, Soy, certain legumes, Processed Meats/ Beef /Pork, All processed products, Coffee, Tea, and Chocolate, Nuts - peanuts, Oils seeds (sesame seeds, niger seeds), some spices and condiments, some vegetables and fruits, food with preservatives, artificial flavours, colours etc.

**Other Triggering factors in food:** There are selected compounds in certain vegetables and fruits that may cause reactions in sensitive individuals. These compounds are called histamines, oxalates, and salicylates.

## Foods containing histamines are

- Bananas, chocolate, strawberries, tomatoes, egg whites, pork, sauerkraut, cheeses, fermented soy products, sausage, spinach, ketchup, eggplant, alcoholic beverages, smoked meats, vinegars, and (canned) fish, along with certain food additives and preservatives such as tartrazine and other food colour, benzoates, BHA, and BHT. ( butylated hydroxy anisole) and (butylated hydroxytoluene) are widely used by the food industry as preservatives, mainly to prevent oils rancidity.
- The histamine content in foods markedly varies according to storage and maturation; (e.g. leftover beef) or ripen (a green tomato vs. a ripe tomato).
- Leftover foods, especially those containing protein, should be frozen immediately. It is generally advisable to eat only food that has recently been prepared.

## Foods containing Oxalates

- Oxalates are found throughout nature in plants, animals.
- High oxalate containing foods: blackberries, blueberries, raspberries, strawberries, currants, kiwifruit, purple grapes, figs, plums, spinach,, beet greens, okra, parsley, quinoa, celery, green beans, almonds, cashews, peanuts, soybeans, tofu, soy products, wheat bran, wheat germ, cocoa, chocolate, and black tea.

## Foods containing Salicylates

- These are chemicals that occur naturally in many plants.
- The bark, leaves, roots, and seeds of certain plants store salicylates, preventing them from rotting and protecting them against harmful insects, bacteria, and fungi.
- Many common foods, such as citrus fruits and berries, certain vegetables, herbs, spices, tea, and flavour additives and prunes, and berries containing the highest amounts.
- Dried fruits and processed fruits and vegetables usually contain a higher amount of salicylates than their fresh counterparts.
- Unripened fruit (salicylate content decreases as fruit ripens)
- Unpeeled fruits and vegetables (salicylates are concentrated just under the skin)
- Raw foods, juices, and dried foods
- Products containing additives such as sweeteners, toothpaste, food colouring and flavourings, and chewing gum
- Outermost leaves of leafy vegetables, or greens of other vegetables
- Common spices and herbs that contain the highest amounts include the following: cinnamon, cumin, dill, curry powder paprika, thyme, oregano, rosemary, and turmeric (but this is anti-inflammatory also) .

## Dietary guidelines:

The aim of the allergy-focused diet history, is to investigate if there is an association between food intake and the symptoms of the individual. The first step in the nutritional management would be to assess the current nutritional status of the individual, in order to identify any nutritional deficiencies. The key treatment of food allergy is avoidance of the allergenic foods. Although this sounds very simple, dietary management encompasses more than advice on avoidance of the allergenic foods. The dietary management of food allergy are multiple and include the following:

- Obtaining relief of symptoms by avoidance of the allergenic foods
- Preventing inadvertent exposure to the allergenic foods
- Preventing the patient from unnecessary avoidance of foods
- Supporting normal growth and development for age and gender in children
- Providing an adequate, healthy, nutritionally dense, and balanced diet with appropriate alternatives for the excluded food allergens to minimize the impact on quality of life.
- Provide patient-oriented counselling and education on reading labels, safe eating at restaurants, risks of cross-contamination, and potential sources of hidden allergens is very essential. but also informing about support groups and online resources.

## Foods to include and exclude:

| Food Group | Foods to include | Foods to exclude |
|---|---|---|
| Cereals and millets | Non-gluten grains and starch: rice (all types), millet, quinoa, amaranth, tapioca,buckwheat, potato flour, jowar, ragi, bajra , rajgira etc. | Bakery products– biscuits, cookies, bread, cakes, donuts, waffles, khari, toast etc. |
| Pulses and Legumes | All lentils and legumes, split peas. | Soybean products (soy sauce, soybean oil in processed foods, tempeh, tofu, soy, soy yogurt, textured vegetable protein), some legumes (channa). |
| Milk and Meat products | Dairy substitutes: Coconut milk, rice milk, Milk substitute formula, Chicken | Dairy and eggs: milk, cheese, eggs, cottage cheese, cream, yogurt, curd, butter, ice creams, milk sweets, Pork, beef/veal, sausage, cold cuts, canned meats, shellfish, processed, smoked meat, sea foods. |
| Vegetables and Fruits | Vegetables: all raw, steamed, sautéed, juiced or sautéed vegetables<br>Fruits: whole fruits, unsweetened, allowed fruits, de-skin if needed | Corn, creamed vegetables., tomatoes, Potatoes in some cases, eggplants, peppers, paprika, salsa, chili peppers, cayenne pepper, chili powder.<br>Oranges and orange juice, some citrus fruits, and others, like dragon fruit, strawberries |

| Food Group | Foods to include | Foods to exclude |
|---|---|---|
| Nuts and seeds | Coconut, flax seeds roasted allowed | Peanuts and peanut butter, walnuts, sesame, pumpkin, and sunflower seeds, hazelnuts, almonds, cashews, nut butters such as almonds. |
| Oils | Oils: cold-pressed olive, ghee (in case of cow milk protein allergy, during initial period ghee is avoided considering it may have traces of milk solids and outside ghee is definitely not allowed), home – made can be included, once the acute relapse period is subsided. | Butter, margarine (if it is not milk solids free), shortenings, processed oils, salad dressings, mayonnaise, and spreads. |
| Miscellaneous | Beverages freshly made, green tea, coffee extract without milk or using fresh coconut milk sherbats (amla, mint, kokum, lime water), fresh coconut milk smoothies Jaggary allowed in small amounts, no artificial sweeteners.<br>Condiments/ accompaniers: vinegar, all spices, including salt, basil, cinnamon, cumin, dill, garlic, ginger, mustard, oregano, parsley, rosemary, tarragon, thyme, turmeric. | Alcohol, other caffeinated beverages, soda pop or soft drinks<br>white/brown sugars, maple syrup, high fructose corn syrup, coloured concentrates chocolate, ketchup, some chutneys, soy sauce, barbecue sauce etc. |

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# ASTHMA

## What is Asthma?

Asthma is a chronic disorder that affects the airways and is characterized by bronchial hyper-reactivity, reversible airflow obstruction, and airway remodelling. Asthma is the result of a complex interaction between environmental exposures and genetics. When people are genetically susceptible, environmental factors exacerbate airway hyper-responsiveness, airway inflammation, and atopy (tendency to develop allergic reaction) that eventually leads to asthma. Environmental factors that are linked to the development of asthma include indoor allergies (dust mites, animal allergies) and outdoor allergies (pollen and fungi). Increased risk of asthma development also has been linked to air pollution, tobacco smoke exposure, small size at birth, respiratory infection, and lower socioeconomic status.

Symptoms such as wheezing, coughing, shortness of breath, and chest tightness occur in most patients, and symptoms that worsen at night is a common feature.

## Dietary guidelines:

Dietary management of Asthma involves restricting the dietary triggers, correcting any energy and nutrient deficiencies and excesses in the diet.

- **Maintenance of a healthy body weight.** Being overweight increases the risk for asthma, it is important that the calorie intake should be adjusted to help achieve and maintain a healthy body weight. Loss of excess weight results in improved lung function.

- **Fats:** Include healthy fats rich in monounsaturated and polyunsaturated fats. Omega-3 polyunsaturated fatty acids (PUFA) have been shown to have an anti-inflammatory effect and may be of benefit in a chronic inflammatory condition such as asthma. Include foods like flaxseed, almond, walnut, soybean oil, canola oil, rice bran oil, etc. Limit the use of saturated fat and trans-fat rich foods. Example butter, lard, hydrogenated fat - margarine, bakery products etc.

- **Fruits, vegetables, and other foods high in antioxidants:** Include a variety of fruits and vegetables like green leafy vegetable, red and orange fruits and vegetables, citrus fruits etc. A daily intake of up to 7 servings of fruits and vegetables is suggested. Antioxidant supplementation may be suggested under medical guidance.

- **Avoidance of allergenic foods:** Food allergies often leads to the development of asthma, foods implicated to cause allergies are food such as peanuts, milk, eggs, tree nuts, soy, wheat, legumes, beans.

- **Dietary pattern** like the Mediterranean diet, vegetarian and vegan diets have shown to have a beneficial effect in asthma management. A reduction in the fast food consumption, sweetened beverages and salt intake helps reduced asthma symptoms.

## Foods to include and exclude:

| Food Group | Foods to include | Foods to exclude |
|---|---|---|
| Cereal, Millets and their products | Whole grains cereals, millets and their products like jowar, bajra, oats, brown rice. | High fat bakery products like cream biscuits, cream roll, khari. Ready to eat / instant cereals, oat meals, salted popcorn, crackers, chips. |
| Pulses and Legumes | Plant based proteins - dried beans, soybean, pulses, sprouts, tofu, unsalted nuts and seeds like sunflower / melon. | Soy beans, Ready to eat packed foods. Canned, processed, snacks or meals like canned beans, salted pulses etc. |
| Milk and Meat Products | In case no allergy - Low fat dairy - skimmed milk, curd, buttermilk, lean meat - steamed fish, lean chicken etc. | Full fat dairy products, processed red meat – ham, bacon, sea foods, organ meat. |
| Fruits and vegetables | Fresh produce, fruits and vegetable especially starchy vegetables and fruits, fresh juices. | Canned vegetables and fruits, ready to eat soups / vegetables |
| Miscellaneous | - | High salt foods like Pickles, papad, chutney, readymade sauces and ketchups, fried foods, margarine, table salt, sea salt, mixed seasonings, gravy mixes, salad dressings |

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CHAPTER 12

# NUTRITIONAL DEFICIENCIES

# VITAMIN A DEFICIENCY (VAD) (XEROPHTHALMIA)

Vitamin A Deficiency (lower serum retinol levels) is observed in children, especially under the age of 5 years. Additionally, a greater proportion of women of reproductive age were found to have lower serum retinol levels than normal levels.

## What is Vitamin A?

It is fat soluble vitamin. Vitamin A is active in three different forms in our body i.e. Retinol, retinal and retinoic acid. Collectively these three compounds are termed as Retinoid. The foods which are from animal source are readily digested and absorbed as retinol in the intestine. However, the plant source provides carotenoids, which is less efficient than the retinoid. Also, various proteins are linked for digestion and absorption of vitamin A in the body. Subsequent to absorption via lymph system, vitamin A is stored in the liver. The Retinol-binding protein transports vitamin A to blood. Furthermore, the actions will vary according to the receptors within each cell.

## Causes of Vitamin A deficiency:

Vitamin A deficiency mainly occurs due to inadequate stores of vitamin A in the liver. It is also dependent on the protein status as retinol binding protein acts as a carrier of vitamin A transportation on the body. Also there are several other factors such as prolonged dietary deprivation, decreased bioavailability, interference with absorption, storage, or transport of vitamin A, liver disorders and protein-energy undernutrition.

## How is Vitamin A deficiency diagnosed?

It can be diagnosed by estimating serum retinol levels and clinical evaluations via eye exam, and/or functional indicators for night blindness.

## Why body needs Vitamin A?

Vitamin A is essential for multiple functions in our body such as clear vision, maintaining normal immune functions, cell proliferation, normal organ and bone formation and growth. It also has antioxidant properties. This property of vitamin A protects the cells of our body against the effects of free radicals which may contribute to the occurrence of cardiovascular diseases, cancer etc.

**Complications related to VAD** are night blindness, xerosis, impaired immunity and hematopoiesis, xerophthalmia, Bitot's spot, corneal ulcerations, lesions, hyperkeratosis, measles and diarrhoea.

## What is the daily requirement of Vitamin A?

According to RDA, 2010 following retinol and β-Carotene is required for adequate stores in the body.

| Group | Category | Retinol (µg/day) | β-Carotene (µg/day) |
|---|---|---|---|
| Man | Sedentary/Moderate/Heavy | 600 | 4800 |
| Woman | Sedentary/Moderate/Heavy | 600 | 4800 |
| | Pregnant | 800 | 6400 |
| | Lactating | 950 | 7600 |
| Infants | 0-6 months | 350 | - |
| | 6- 12 months | | 2800 |
| Children | 1 – 6 years | 400 | 3200 |
| | 7 – 9 years | 600 | 4800 |
| Boys | 10- 17 years | 600 | 4800 |
| Girls | 10- 17 years | 600 | 4800 |

## Are there any Vitamin A fortified foods available?

In India, edible oil and milk is fortified with Vitamin A, the strategy for reduction of micronutrient malnutrition. Also, under prophylactic vitamin A program nine mega doses are schedule for under 5-year old children.

## Dietary guidelines:

- Consumption of vitamin A rich foods, both animal and plant origin.
- Breast-feeding children during the first six months of birth
- Providing children with the oral dose of vitamin A from primary health centers
- Periodic supplementation of children
- Use of vitamin A fortified oils and milk, cereal products.
- Developing kitchen gardens in Schools, households to provide green leafy vegetables and yellow or orange vegetables and fruits.

## Foods to include and exclude

| Food Group | Foods to include | Foods to exclude |
|---|---|---|
| Cereal, millets and their products | Pearl (Bajra) millet, Jowar, Ragi, Black gram | Refined flours, processed food products |
| Pulses and Legumes | Soybean seeds, Lentils, - Bengal gram, Red gram daal, Bengal gram, Green gram | Ready to eat food items |
| Milk and meat products | Vitamin A- fortified milk, fish liver oils, liver, egg yolks, butter, ghee | Tea, coffee |
| Vegetables and Fruits | Green leafy and yellow vegetables (pumpkin), carrots, peas (tender), tomato and deep- or bright-colored fruits (oranges, papayas, mango, musk melon) | Canned fruit juices |
| Miscellaneous | Vitamin A oral dose for children, Vitamin A dietary Supplements, Vitamin A–fortified dairy products and oils | Heavy dose of vitamin A |

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# VITAMIN B COMPLEX DEFICIENCIES

## What are B-complex vitamins?

These are a group of water-soluble B vitamins such as B1: thiamine, B2: riboflavin, B3: niacin, B5: pantothenic acid, B6: pyridoxine, B7: biotin, B9: folate, B12: cobalamin. Together they are responsible for carrying out various vital functions such as energy metabolism and cell signaling in the body to maintain good health.

## Why are B complex vitamins important?

This group of vitamins play a major role in utilization of energy as a fuel in the body, maintaining the brain function, cellular integrity and generation of red blood cells along with other major functions as follows:

1. Vitamin B1 (Thiamine): Vital for functioning of brain and other major organs.
2. Vitamin B2 (Riboflavin): Necessary for maintaining the health of nerves especially those of eyes.
3. Vitamin B3 (Niacin): Required to help maintain cholesterol levels within limits
4. Vitamin B5 (Pantothenic acid): Necessary for formation of red blood cells
5. Vitamin B6 (Pyridoxine): Major role in production of red blood cells and neurotransmitters
6. Vitamin B7 (Biotin): Necessary for maintenance of good nervous system
7. Vitamin B9 (Folate): It aids in production of DNA and RNA and growth of cells and tissues
8. Vitamin B12 (Cobalamin): Essential of RBC production and regulation of DNA.

## What is B complex vitamin deficiency?

There are recommended amounts of various B complex vitamins which are required by the human body for normal functioning. There is also a required amount of these vitamins in the blood to maintain equilibrium and aid in various energy generation mechanisms. However, when there is an imbalance and a decrease in the levels of these vitamins due to poor intake, increased demands or any chronic underlying medical condition resulting in poor absorption of B complex vitamins causes a state of B complex deficiency in the body.

## What are the common symptoms of B complex deficiency?

These include one or more of the following symptoms such as, gastrointestinal disturbances, pale skin, muscular pain, extreme fatigue, mood changes, loss of appetite, difficulty breathing, tingling numbness, sore tongue and oral ulcers.

## What are the "Ten points priority check list for dietary and lifestyle changes" to prevent or regulate Vitamin B complex deficiencies?

These include one or more of the following symptoms such as, gastrointestinal disturbances, pale skin, muscular pain, extreme fatigue, mood changes, loss of appetite, difficulty breathing, tingling numbness, sore tongue and oral ulcers.

1. Achieve and maintain healthy body weight: Any fluctuations in the weight too low or too high than the ideal body weight may result into changes in the absorption and metabolism of B complex vitamins resulting into a state of deficiency.
2. Include rich sources of whole grains in daily meals; this can be achieved through use of whole wheat instead of refined wheat flour, bran, millets such as jowar and bajra.
3. Include good amounts of nuts and oilseeds in preparations like chutney which can be consumed in daily meals. These may include sunflower seeds, pumpkin seeds, almonds, pistachios and soy bean.
4. Inclusion of non- vegetarian foods such as organ meats, fish and poultry. Eggs can be consumed with yolk. These foods yield good quality B complex vitamins especially vitamin B 12.
5. Milk and dairy products should be included in daily diets. A glass of milk should be consumed at least once in a day. Inclusion of buttermilk and curd can also be beneficial for the gut health and aid in better absorption of B complex vitamin.
6. Dark green leafy vegetables are a rich source of these vitamins and hence should be incorporated in meals. It can be in form of a vegetable, parathas or raita.
7. Legumes such as chickpeas, kidney beans and lentil can be incorporated as raw salads or in form of cooked vegetables in daily meals.
8. Spirulina blue green algae a dietary supplement and yeast available in markets can be used after doctor's advice to improve the B complex status in the human body.
9. Alcohol has a direct effect on absorption of B complex vitamins and hence should not be consumed in excess. It should be avoided in a known case of B complex deficiency.
10. Exercising daily helps in maintaining good health. It assists in weight maintenance and thereby helps maintaining equilibrium of nutrients in the body.

## MYTHS AND FACTS

**MYTH:** Consuming B complex vitamin supplements is an easy way out than consuming dietary sources of B complex vitamins.

**FACT:** Dietary sources are the most natural sources and more acceptable by the human body rather than consuming synthetic forms of vitamins. Supplements provide adequate amounts required for replenishing the exhausted stores however they cannot and should not be considered as a replacement for the natural dietary sources of b complex vitamins.

**MYTH:** Vegetarians are at an increased risk of developing B complex deficiencies.

**FACT:** Non vegetarian foods are the richest sources especially for B12 vitamins. However, it is imperative to understand that if well balanced vegetarian diet is consumed with appropriate inclusion of B complex vegetarian food sources the risk can be reduced up to two folds.

## Functional foods:

1. Safflower seeds: 1 tsp daily
2. Psyllium husk: 1 tsp if indicated only
3. Dried Brewer's yeast powder: Addition to dough, rice, salads

## Foods to include and exclude:

| Foods to include | Foods to exclude |
|---|---|
| Whole grain cereals & millets like sorghum (jowar), pearl millet (bajra), finger millet (ragi/nachni), maize. | Bakery products– biscuits, cookies, bread, cakes, doughnuts, waffles, khari, toast. |
| Dal & pulses like kidney beans, chickpea, green gram, black gram, bengal gram. | Fruit juices, aerated drinks, ketchup, ice cream and chocolates. |
| Nuts like almond, cashew nuts, pistachios and walnuts. | Fried foods such as wafers, vadas, samosa, pakodas, chivda, farsan |
| Milk and milk products like cheese, paneer, curd and buttermilk. | Smoked, processed or cured meats. |
| Egg with yolk, fish, organ meats and chicken. | Salty foods- pickle, papad, canned foods, sauces ketchup and packaged foods. |
| Dark green leafy vegetables and other vegetables like cabbage, ladies finger, carrots. All fruits. | Avoid use of margarine, vanaspati, butter. Avoid reheating and recycling of oil. |

**B complex vitamins and their rich sources**

| List of B complex vitamins | Rich Sources |
|---|---|
| Vitamin B1 (Thiamine) | Safflower seeds, pistachio nuts, gingelly seeds, soybean, dry peas. |
| Vitamin B2 (Riboflavin) | Milk, paneer, khoa, cheese, curd. |
| Vitamin B3 (Niacin) | Barley, green gram whole, bengal gram whole, lentil, dry peas, rajmah. |
| Vitamin B5 (Pantothenic acid) | Black gram whole, black gram dhal, green gram dhal, avocado, cashewnut, groundnut. |
| Vitamin B6 (Pyridoxine) | Organ meats, yam, french beans, field beans, broad beans, banana, jackfruit. |
| Vitamin B7 (Biotin) | Green leafy vegetables, moth beans, garden cress seeds, gingelly seeds, walnut. |
| Vitamin B9 (Folate) | Organ meats, field beans, cowpea, ladies finger |
| Vitamin B12 (Cobalamin) | Organ meats, baker's yeast |

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# VITAMIN D DEFICIENCY

## What is Vitamin D?

Vitamin D is well known for its essential role in maintaining healthy bones. Deficiency causes bones to become soft and weak: a condition known as rickets in children and osteomalacia in adults. Over the years a lot has changed, and other physiological roles of vitamin D in maintaining health are now recognised. Vitamin D, the only vitamin that our body can make on its own, has gone way beyond from being just a nutrient for which nutritionist and clinicians didn't worry too much, to one of the most talked about. Vitamin D deficiency is now a global public health problem affecting an estimated 1 billion people worldwide.

Although the general awareness about vitamin D through various sources is on the rise, there are many questions that come to one's mind like- how is vitamin D linked to sunshine, how much sunlight do we need, why is it important to get adequate vitamin D for good health and what foods are recommended? One may also be curious about just how common is vitamin D deficiency, what are the early warning symptoms, and how our doctors may diagnose and treat it? The text discussed below tries to answer few of these.

## What is vitamin D?

Vitamin D is a group of fat-soluble vitamin, which was identified after the discovery of the anti-rachitic effect of cod liver oil in the early part of the 20th century. There are two forms of vitamin D: D2 and D3. Vitamin D2, also known as **ergocalciferol**, comes from fortified foods, plant foods, and over-the-counter supplements. Vitamin D3, also known as **cholecalciferol**, comes from fortified foods, animal foods (fatty fish, cod liver oil, eggs, and liver), supplements, and can be made internally when your skin is exposed to ultraviolet (UV) radiation from the sun.

It is also produced endogenously when ultraviolet rays from sunlight strike the skin and trigger vitamin D synthesis. Vitamin D obtained from sun exposure, food, and supplements is biologically inert and must undergo two hydroxylations in the body for activation. The first occurs in the liver and converts vitamin D to 25-hydroxyvitamin D [25(OH)D]. The second occurs primarily in the kidney and forms the physiologically active 1, 25-dihydroxyvitamin D [1,25$(OH)_2$D].

## What happens if you do not get enough vitamin D?

Vitamin D is required by our body for healthy bones and to prevent rickets in children and osteomalacia in adults. Rickets is a bone disease that is associated with low serum calcium and low serum phosphate, and is characterized by widening and delay of mineralization of growth plates in bones. Osteomalacia is the disease in which softening of the bones is caused by impaired bone metabolism primarily due to inadequate levels of available phosphate, calcium, and vitamin D, or because of resorption of calcium. Osteomalacia is also known as the adult form of rickets.

However, the consequences of vitamin D deficiency have found an alarming number of health issues outside skeletal health too. These include certain cancers, cardiovascular disease, autoimmune diseases, infections, inflammatory bowel diseases, psychological disorders, cognitive disorders, obesity, and or mortality. The risks of all the above mentioned diseases increase by many folds in the absence or inadequate presence of vitamin D in our body.

## What is vitamin D deficiency?

There's no straightforward answer on this, largely because there's disagreement on what vitamin D levels "should" be as it has a role to play both as a vitamin and as a prohormone i.e. in both skeletal and non-skeletal health. The Institute of Medicine (IOM), bases adequate Vitamin D levels as "generally adequate for bone and overall health in healthy individuals." The Endocrine Society (ES) has set threshold levels slightly higher.

However, while deficiency rates are debated, most do agree that a large portion of the population likely has vitamin D levels lower than what is ideal. If you're worried about being vitamin D deficient, you can have a simple blood test done at your doctor's clinic.

| Vitamin D Levels* | IOM | ES |
|---|---|---|
| Deficiency | < 12 ng/mL | < 20 ng/mL |
| Inadequate | 12-20 ng/mL | 21-29 ng/mL |
| Adequate | ≥ 20 ng/mL | ≥ 30 ng/mL |

*Using 25(OH)D blood values

## What are the main reasons that make you vitamin D deficient?

- Age: A 70-year-old person produces only 25% the capacity of vitamin D3 compared to a 20 year old
- Darkly pigmented skin: Natural skin melanin acts as a shield that absorbs the UVB photons. Therefore darker the skin lesser is its capacity to generate vitamin D.
- Institutionalized or homebound: As exposure to sunlight is low among them and physical activity is also restricted
- Geographical location: As the zenith angle increases with increasing latitude, the UVB photons have to travel a greater distance making it less capable of inducing vitamin D3 production in the skin.
- Cover-up clothing or sunscreen decreases the absorption of UVB radiation and hampers the endogenous synthesis of vitamin D.
- Air pollution affects the penetration of sunlight to reach earth's surface and our skin.
- Malabsorption: Impaired fat metabolism reduces the vitamin D absorption in the body
- Renal disease: Affects the vitamin D metabolism in the body
- Liver disease: Affects the vitamin D activation and utilization in the body
- Obesity reduces the availability of vitamin D to the cells for the physiological functions

In India, inadequate exposure to sunlight results from indoor lifestyle in urban areas and wearing head coverings. Besides, our darker skin contains more melanin pigment, which reduces the skin's ability to make vitamin D. In addition, air pollution contributes by reducing the amount of solar UV-B rays that reach the earth's surface, apart from deterring people from being outdoors.

## What are the early warning symptoms of vitamin D deficiency?

Vitamin D deficiency may often go unrecognized, and many who see their doctor for aches, pains and fatigue end up being misdiagnosed as suffering from fibromyalgia. Actually, vitamin D deficiency retards calcium incorporation into the skeletal collagen matrix, resulting in aching bones. Chronic pain and muscle weakness may actually be very subtle, especially in the beginning. Remarkably, symptoms are being relieved.

## How would your doctor know if you have vitamin D deficiency?

Doctors would make the diagnosis through a blood test values below 20 ng/ml being considered deficient, 21-29 ng/ml insufficient and 30-70 ng/ml optimal. In individuals who are diagnosed with vitamin D deficiency, doctors would aim at optimising the values, which can be most reliably achieved by low-cost supplements, given in doses titrated by blood levels, plus adequate exposure to the sun.

## What are the dietary recommendations for prevention and treatment of rickets and osteomalacia?

The dietary recommendations for its prevention and treatment include

- Dietary calcium intake to prevent rickets for infants 0–6 and 6–12 months of age is 200 and 260 mg/d, respectively.
- Vitamin D supplementation for the prevention of rickets and osteomalacia is 400 IU/day (10 µg). It is recommended for all infants from birth to 12 months of age, independent of their mode of feeding.
- Beyond 12 months of age, all children and adults need to meet their nutritional requirement for vitamin D through diet and/or supplementation, which is at least 600 IU/day (15 µg), as recommended by the Institute of Medicine (IOM).

'The two main ways to get vitamin D are by exposing your bare skin to sunlight and by taking vitamin D supplements' as quoted by the Vitamin D Council. Exposing your skin for a short time will make all the vitamin D your body can produce in one day. In fact, our body can produce 10,000 to 25,000 IU of vitamin D in just a little under the time it takes for our skin to begin to burn. You make the most vitamin D when you expose a large area of your skin, such as your back, rather than a small area such as your face or arms. Researchers say that the best time to expose oneself to sun is between 11 am to 2 pm for maximum synthesis of vitamin D.

A physically active body helps to keep the vitamin D levels in sufficient range. Hence it is recommended to engage in a physical activity at least 4 times a week for 30-60 minutes.

## Foods to include and exclude:

| Foods to include | Reason |
|---|---|
| Dairy products like low-fat non-fat milk, yogurt, cheese. | Provide Calcium and some products are fortified with vitamin D |
| Fatty variety of fish like sardines, salmon, mackerel, tuna. | Provide Calcium and vitamin D |
| Fruits and vegetables like dark GLV, okra, broccoli. Red-orange varieties like tomato, orange, papaya, bell-peppers, etc. | Provide calcium, magnesium, potassium, vitamin C and vitamin K |
| Fortified foods like juices, breakfast foods, soy products, cereals, milk and breads. | Fortified with calcium and vitamin D |

| Foods to exclude | Reason |
|---|---|
| High intake of beans and foods spinach, wheat bran | Contain phytates and oxalates which interfere with calcium absorption. Phytates can be reduced by soaking beans in water and cooking in fresh water. |
| High salt foods | High salt causes calcium loss from bones |
| Alcohol | Leads to bone loss. Limit intake to 2-3 drinks per day. |
| Caffeinated (tea, coffee) and carbonated (soft drinks, soda) drinks | Interfere with calcium absorptions and cause bone loss. |

## Sources of vitamin $D_2$ and vitamin $D_3$

| Natural sources | |
|---|---|
| Cod liver oil | ~400–1000 IU/tsp vitamin D3 |
| Egg yolk | ~20 IU/yolk vitamin D3 or D2 |
| Mackerel, canned | ~250 IU/3.5 oz vitamin D3 |
| Salmon, canned | ~300–600 IU/3.5 oz vitamin D3 |
| Salmon, fresh farmed | ~100–250 IU/3.5 oz vitamin D3, vitamin D2 |
| Sardines, canned | ~300 IU/3.5 oz vitamin D3 |
| Shiitake mushrooms, fresh | ~100 IU/3.5 oz vitamin D2 |
| Shiitake mushrooms, sun dried | ~1600 IU/3.5 oz vitamin D2 |
| Sunlight/UVB radiation | ~20,000 IU equivalent to exposure to 1 minimal erythemal dose (MED) in a bathing suit. Thus, exposure of arms and legs to 0.5 MED is equivalent to ingesting ~3000 IU vitamin D3 |
| Tuna, canned | 236 IU/3.5 oz vitamin D3 |
| **Supplemental Sources** | |
| Multivitamin | 400, 500, and 1000 IU vitamin D3 or vitamin D2 |
| Egg yolk | 400, 800, 1000, 2000, 5000, 10,000, 14,000, and 50,000 IU |

Source: Holick MF, 2007

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# IRON DEFICIENCY ANEMIA

## What is Anemia?

Anemia is a condition in which blood does not have enough red blood cells or has dysfunctional red blood cells or the red blood cells do not have enough hemoglobin.

Hemoglobin (Hb) is an iron rich protein or in simpler words red blood pigment responsible for supplying oxygen rich blood to all parts of body. Just as iron is an important component in building structures, it is an important structural component in our body.

There are many types of anemia. However, the common cause of anemia is iron deficiency anemia.

## What is Iron deficiency anemia?

Iron-deficiency anemia is a type of anemia caused by a lack of iron. Iron deficiency anemia is a widespread nutritional deficiency disorder across the world. However particularly affects developing countries and very commonly observed in large number of children and women of reproductive age in India.

## What is the cause of iron deficiency anemia?

When the balance of iron intake, iron stores in body and body's loss of iron to support red blood cell production is inadequate iron deficiency anemia sets in.

## How is iron deficiency anemia diagnosed?

World Health Organization (WHO) has classified anemia as mild, moderate and severe based on the Hb values as follows.

**WHO classification of anemia based on hemoglobin values.**

| Gender/ Age group | Hb threshold (g/dL) | Hb threshold (mmol/L) | Anemia (g/dL) | Mild Anemia (g/dL) | Moderate Anemia (g/dL) | Severe Anemia (g/dL) |
|---|---|---|---|---|---|---|
| Children (0.5-5years) | 11.0 | 6.8 | <11.0 | >10.0-10.9 | 7-9.9 | <7 |
| Children (5-11years) | 11.5 | 7.1 | <11.5 | >11.0-11.4 | 8-10.9 | <8 |
| Children (12-14years) | 12.0 | 7.4 | <12.0 | >11.0-11.9 | 8-10.9 | <8 |
| Women (non- pregnant > 15 years) | 12.0 | 7.4 | <12.0 | >11.0-11.9 | 8-10.9 | <8 |
| Women, pregnant | 11.0 | 6.8 | <11.0 | >10.0-10.9 | 7-9.9 | <7 |
| Men (>15 years) | 13.0 | 8.1 | <13.0 | >11.0-12.9 | 8.0-10.9 | <8 |

## What are the symptoms of iron deficiency anemia?

The commonest symptoms of anemia are tiredness, lethargy, and fatigue, shortness of breath, pale complexion, and heart palpitations, headache, dry damaged hair, vertigo. IDA is associated with decreased neurological functioning and decreased learning ability in children. Some lesser known symptoms are headache, spoon shaped nails, ringing in ears, desire to eat nonfood items such as paper, clay-mud etc. (Pica)

## Why body needs iron?

Iron is an important trace element which has to be absorbed from food. Iron is the central atom in hemoglobin which transports oxygen to all parts of body. Also, it plays an important role in building immunity against infections, DNA synthesis and provides energy supply to cells of the body.

## What is the daily requirement of iron?

Iron is lost through feces, urine and sweat. Iron requirement is determined by individual requirements and storage status of iron.15% of the total dietary iron consumed is available to body and therefore the dietary guidelines for Indians recommend an intake of 17 mg per day for a man and 21 mg per day for a woman. The requirement increases to 35 mg per day during pregnancy. For infants 0-6 months the requirement is 46µg/per kg/day and for 6-12 months the requirement increases to 5 mg/day. For children between 1-3 years, 4-6 years and 7-9 years the requirement is 9mg/day,13mg/day and 16mg/day respectively. For adolescent boys and girls 10-12 years the requirement is 21 and 27 mg/day respectively. For boys and girls between 13-15 years the requirement is 32mg/day and 27mg/day respectively. For boys and girls in late adolescence the requirement is 28mg/day and 26 mg/day respectively.

## Which are the rich sources of iron in foods?

Meat and poultry are the best sources of iron among non-vegetarian foods as the iron from such foods is better absorbed than plant food sources and is readily available to body. Goat spleen is the richest followed chicken, poultry, liver, goat lungs, eggs respectively. Vegetarian sources rich in iron include nuts and oils seeds such as garden cress seeds and gingelly seeds, green leafy vegetables such as amaranth leaves, gogu leaves, onion stalks, Raisins, dates and jaggery. Bajra and amaranth seeds (black) also contain moderate amounts of iron.

## Which foods hinder iron absorption?

Phytates, lignin, oxalates and phosphates present in foods inhibit the absorption of iron from foods such as cereals, pulses and leafy vegetables. Tannins present in tea and coffee, wine, calcium salts present in foods such as milk and milk products interfere with the absorption of iron. Hence, it is advisable to avoid tea and coffee in combination with iron rich foods. To reduce phytate content of cereals and legumes it is advisable to soak and ferment foods to increase iron absorption.

## Which foods promote iron absorption?

Consumption of Vitamin C rich foods such as citrus fruits and vegetables in the same meal containing iron rich foods boost the iron absorption. An example is combination of greens dhal with tomato has shown to improve the bio availability of iron from the diet.. Salads prepared with tomatoes, lime juice, cabbage and peppers, legume sprouts with lentils or meat is also a good combination for boosting iron absorption.

## Are there any iron fortified foods available?

In order to address micronutrient deficiencies, in October 2016, FSSAI operationalized the Food Safety and Standards (Fortification of Foods) Regulations, 2016 for fortifying staples namely Wheat Flour and Rice (with Iron, Vitamin B12 and Folic Acid), Milk and Edible Oil (with Vitamins A and D) and Double Fortified Salt (with Iodine and Iron) to reduce the high burden of micronutrient malnutrition in India. The '+F' logo has been notified to identify fortified foods. Food Safety and Standards (Fortification of Foods).

## Are vegetarians more prone to iron deficiency anemia than non-vegetarians?

Not necessarily, vegetarians can achieve the recommended iron intake through the consumption of balanced diet along with careful selection of foods rich in iron in meals and foods which boost iron intake. However pregnant and breastfeeding women may be advised iron supplements under medical supervision along with balanced diet.

## Who is at risk of developing iron deficiency anemia (IDA)?

Women of reproductive age having heavy menstrual bleeding, pregnant women, adolescents girls and boys and growing infants are at risk for developing iron deficiency as their requirements are increased or and the intake of iron is lower than recommended levels. Individuals with hookworm infestation, gastrointestinal disturbances such as ulcers, gastrointestinal bleeding may suffer from IDA.

## Is Iron deficiency anemia fatal?

Generally Iron deficiency anemia shows mild symptoms or sometimes no symptoms. However, due to diminished red blood cells heart works harder to pump oxygenated blood which can lead to thickening of heart muscle wall (called as left ventricular hypertrophy). However, if untreated can be life threatening and may require hospitalization.

## When iron supplement is advised?

When the iron stores in the body are drastically low iron supplements in the form of tablets, chewable, or capsules or syrup is advised under medical supervision. Care should be taken to consume the supplement at least one hour before the meals, avoid tea or coffee with supplements and preferably consume vitamin c rich foods so as to boost the iron absorption.

## Prevention of Anemia through dietary improvement:

Proper balanced diet which incorporates all food groups can definitely prevent anemia. However, apart from dietary improvement in consumption of iron rich foods, foods rich in folates and riboflavin which increases the iron absorption are advised. Table 1.1 suggests the list of food to be included in diet along with foods to be consumed in moderation or should be avoided.

**Table 1.1. List of foods to be consumes and list of foods to be avoided.**

| Foods to include | Foods to be consumed in moderation or Foods to be excluded |
|---|---|
| **Cereals**- Bajra, amaranth seeds (black and brown) | Foods rich in phytates such as bran, cereals, pulses and legumes interfere with the iron absorption. |
| **Pulses**<br>Horse gram, moth beans, soybean, lentil(whole), Bengal gram whole | However it is not advised to avoid eating cereals, legumes and pulses.<br>On the other hand, various cooking methods such as soaking, sprouting and fermenting the cereals, pulses and legumes are recommended to reduce the phytate content. |
| **Meat, fish poultry**<br>Meat poultry, organ meat such liver, spleen, lungs, eggs . | Large portion sizes of foods rich in calcium should not be combined with an iron rich meal as it interferes with the iron absorption.<br>Therefore foods such as milk and milk products such as cheese, tofu, rhubarb in large portions should be avoided in the same meal containing iron rich foods. |
| **Green leafy vegetables**<br>Amaranth, Gogu leaves, beet greens, mustard leaves, parsley, Cauliflower leaves | Green leafy vegetables, nuts, chocolates, tea also contain a high amount of oxalates and tannins. Therefore to improve the bioavailability of iron and reduce the oxalate content methods such as cooking in iron vessels, germination and sprouting etc are recommended.<br>Vitamin C rich foods such as citrus fruits, tomatoes, green leafy vegetables etc enhance iron absorption from plant food sources.<br>Foods rich in riboflavin and folates such as cauliflower greens, beet greens etc also enhance the iron absorption. |
| **Other Vegetables**<br>Cluster beans, bitter guard, beans, | |
| **Fruits**<br>Dates, raisins, and other citrus fruits, fruits like orange, guava, | |
| **Nuts and Oilseeds**<br>Dry dates, Garden cress seeds, Gingelly seeds, Raisins black | |
| **Roots and Tubers**<br>**Lotus root** | Tea, coffee, chocolates, wines and alcohols and carbonated beverages which contain tannins and other polyphenol compounds should be avoided with meals. |
| **Condiments and Spices –Fresh**<br>Coriander leaves, Mint leaves, Curry leaves | |
| **Sugars –**<br>Jaggery | |

## Region wise rich sources

Food consumption in India is influenced by variety of factors such as ethnicity, agricultural production, socioeconomic factors, cultural preference etc. Table 1.2 shows the rich sources of iron region wise produced and consumed.

**Region wise rich sources of Iron**

| Region/ Part of India | Rich sources of iron |
|---|---|
| Western part of India | Bajra, Lentils, Moth beans Dates, Raisins, Garden cress seeds, Meat, poultry and organ meats. |
| Eastern part of India | Meats such as pork, beef, chicken, fish, poultry , eggs, Soybean, Gooseberries, Horsegram, Gingelly seeds, Mustard leaves, bamboo shoots are a modest source of vitamin C which aids in iron absorption. |
| Central part of India | Whole wheat, Amaranth, Pulses such as soyabean, Bengal gram. |
| Northern part of India | Amaranth seeds, Mustard leaves, Lotus roots, Meat and poultry, eggs. |
| Southern part of India | Horse gram, Goose berry, organ meats, lentils whole, blackgram dal, tamarind pulp. |

## DID YOU KNOW HOW MUCH IRON IS PRESENT IN VARIOUS FOODS?

The IFCT tables given by ICMR suggests of iron content in mg /100 gram of foods.

**Iron rich sources of foods to be included in the diet**

| Food Groups | Rich Sources of Iron | Iron mg/100g | Household measure |
|---|---|---|---|
| Cereals | Amaranth seed black | 9.33 | 1 katori |
| | Bajra | 6.42 | 1katori |
| Pulses | Whole horse gram | 8.7 | ¾ katori |
| | Soyabean brown | 8.2 | ¾ katori |
| | Lentil whole, yellowish & Moth beans | 7.9 | 1katori |
| Meat fish poultry | Egg, poultry, yolk, boiled | 4.9 | 2 in number |
| | Poultry , chicken, liver | 9.9 | 1 |
| | Goat spleen | 51.4 | 1 |
| | Goat lungs | 7.1 | 2 |
| Green leafy vegetable | Amaranth leaves, red | 7.25 | 1 small bundle with |
| | Amaranth leaves, green | 6.3 | stalks |
| | Gogu leaves, red | 9.5 | 1 katori |
| Other vegetables | Cluster beans | 3 | ½ Pieces cut approx. |
| | Bitter guard | 4.9 | 1 cup. |
| Fruits | Dates, dark brown | 4.7 | 10-12 |
| | Raisins, black | 6.8 | 2/3 katori |
| | Tamarind pulp | 9.11 | Approx.1/3 cup |
| Nuts and | Gardencress seeds | 7.2 | 3/4th katori |
| Oilseeds | Gingelly seeds, white | 15 | 3/4th katori |
| Sugars | Jaggery | 4.6 | ½ katori |

**The volume of katori = 150 ml*

## Guidelines to prevent Iron deficiency Anaemia

1. **Ensure consumption of diverse and balanced diet** containing adequate sources of iron rich foods from vegetarian / non-vegetarian sources.
2. **Add foods which enhance iron absorption such as vitamin C rich foods** such as sprouts, lemons, tomatoes etc should be encouraged with meals.
3. **Avoid foods that hinder iron absorption.** Beverages such as tea/coffee/aerated drinks and chocolates interfere with iron absorption. Hence is it advisable to avoid such foods with meals.
4. **Include healthy cooking and processing methods** such as fermentation, germination, sprouting, steaming and boiling to increase the bioavailability of iron.
5. **Ensure consumption of local, seasonal foods.** Home kitchen gardens for cultivating fruits and vegetables which are feasible should be promoted.
6. **For infants, ensure breastfeeding** till 6 months of age for getting adequate iron supply followed by complimentary feeding containing rich sources of iron.

7 **Use and promote consumption of fortified foods** such as cereal flours, breads, double fortified salt containing both iodine and iron in order to increase iron intake.

8 **Practice proper sanitation and hygiene** to prevent worm infestations. Regular deworming should be practiced to prevent worm infestations.16

9 **Avoid drinking** as alcohol abuse can lead to deficiency of other nutrients which affect the red blood cell production.

10 **Avoid tobacco and cigarette smoking** as cigarette smoking is a major risk factor to acquire anemia.

## NUTRITION MYTHS ASSOCIATED WITH IRON DEFICIENCY ANEMIA

**Myth:** **If I am taking a multivitamin tablet or tonic I don't need to take iron rich food sources.**

**Fact:** False, high doses of iron may not be present in all multivitamin tablets or tonics. It is advised to replenish iron stores by consumption of dietary iron and use iron supplements only under medical supervision.

**Myth:** **Less iron in my body means Anemia.**

**Fact:** False. Anemia is not just the deficiency of iron; it could be the deficiency of B12 or Folate too.

**Myth:** **Medications do not lead to anemia.**

**Fact:** False. Certain medications and antibiotics lead to iron deficiency anemia.

**Myth:** **Spinach and beetroot are good sources of Iron.**

**Fact:** False. Spinach and beetroot are good sources of folic acid but not iron.

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# ZINC DEFICIENCY

Zinc is the multipurpose trace element essential as a cofactor required by greater than 100 enzymes. It is present in entire body, with majority of zinc found in muscle and bone (85%), following skin and the liver (11%) and remaining in other tissues.

## Why body requires zinc?

Zinc supports the process of several proteins in the body such as mettalloenzymes, involved essentially for metabolic processes along with the gene expression. Additionally, it stabilizes cell membrane, strengthens against the free radical attacks. Zinc also plays indirect role in synthesis, storage and releasing of the insulin hormone. Interaction of zinc is observed with platelets for clotting of blood, thyroid hormone function and behavior performances. It is also essential for retinol –binding protein and retinal active form for visual pigments. Thus, inadequate amount of zinc in the body also known as zinc deficiency, impairs all the body functions.

## What are the causes of zinc deficiency?

Zinc deficiency occurs due to poor zinc in the diet, poor bioavailability or in people suffering from chronic conditions such as celiac disease, chronic diarrhoea, Crohn's disease, diabetes, ulcerative colitis. Vegetarian diet has lower zinc content and limited bioavailability due to the presence of phytates.

**Common symptoms** of zinc deficiency are altered/loss of taste and smell, anorexia (lack or loss of appetite), apathy, ataxic gait (uncoordinated movements), decreased immunity, depression, diarrhoea, excessive hair loss, fine tremor (unintentional muscle movement), impaired cognitive function, impaired memory, poor night vision, poor wound healing, prostatism, slurred speech, some forms of dermatitis and white spotting of nails.

**Complications** of zinc deficiency are diarrhoea, delayed sexual maturity, hair loss, poor wound healing, eye and skin lesions.

## What is the daily requirement of zinc?

According to the Recommended Dietary Allowance for Indians 2010, following are the adequate stores of zinc required for normal functioning of our body.

| Groups | Category/Age | Zinc (mg/d) |
|---|---|---|
| Men | Sedentary/Moderate/Heavy | 17 |
| Women | Sedentary/Moderate/Heavy | 10 |
| | Pregnant/Lactating | 12 |
| Children (Boys + Girls) | 1 – 3 years | 5 |
| | 4 – 6 years | 7 |
| | 7 – 9 years | 8 |
| Boys + Girls | 10 – 12 years | 9 |
| Boys + Girls | 13 – 15 years | 11 |
| Boys + Girls | 16 – 17 years | 12 |

## Dietary guidelines:

1. Animal products are good source of zinc
2. Fruits and vegetables are poor source of zinc
3. Phytates, lignins and fibre hamper the absorption of zinc from vegetarian sources of zinc.
4. Consuming calcium with milk and milk products reduce bioavailability

## Foods to include and exclude:

| Food Group | Food to Include | Foods to Exclude |
|---|---|---|
| Cereals, millets and their products | Wheat, oats, barley, maize, quinoa, rice | Whole grains products, unleavened whole-grain breads |
| Pulses and Legumes | Baked beans, chickpeas, kidney beans, lentils, soy | Phytate rich pulses and legumes |
| Milk, Sea foods, and Meat products | Oysters, Beef, Crab, Lobster, fish, eggs, Pork, yogurt, cheese, milk | |
| Vegetables and Fruits | Fruits, potatoes, green beans, kale vegetables | |
| Miscellaneous | Cashews, almonds, ORS, Pumpkin seeds, sesame seeds | |

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CHAPTER 13

# CANCER

# CANCER

## What is Cancer?

Cancer is a collection of related diseases, caused by changes in genes that control the way our cells function. In all types of cancer, some of the body cells begin to divide without stopping and spread into surrounding tissues. Energy inefficiency and malnutrition leading to cachexia is the most common comorbidity found in cancer patients. Nearly 50% of all cancer patients develop a complex metabolic syndrome of cachexia that is characterized by systemic inflammation, a negative protein and energy balance, and an involuntary loss of lean body mass.

## What are the Differences between Cancer Cells and Normal Cells?

Cancer cells differ from normal cells in many ways that allow them to grow out of control and become invasive. One important difference is normal cells mature into very distinct cell types with specific functions, cancer cells do not. This is one reason why cancer cells continue to divide without stopping unlike normal cells.

## What are the early warning signs of Cancer that I should address?

**The early warning signs are described using the acronym-CAUTION**

**C**hange in bowel or bladder habits

**A** sore that does not heal

**U**nusual bleeding or discharge

**T**hickening or lump in the breast or elsewhere

**I**ndigestion or difficulty in swallowing or chewing

**O**bvious change in a wart or mole

**N**agging cough or hoarseness

## What happens when cancer spreads?

The process by which cancer cells spread to other parts of the body is called metastasis. Cancer that has spread from the place where it first started to another place in the body is called metastatic cancer.

## Why does Cancer develop?

There are more than 100 types of cancers.

It is usually not possible to know exactly why one person develops cancer and another doesn't. But research has shown that certain risk factors may increase a person's chances of developing cancer. As Cancer is not a single disease but a group of related diseases. Many things in our genes, our lifestyle, and the environment around us may increase or decrease our risk of getting cancer.

## Can Cancer be prevented?

Scientists are studying many different ways to help prevent cancer, including the following:

- Changes in diet and lifestyle.
- Ways to avoid or control things known to cause cancer.
- Finding pre-cancerous conditions early. Pre-cancerous conditions are conditions that may become cancer-like the warning signs mentioned above.
- Chemoprevention (medicines to treat a precancerous condition or to keep cancer from starting).

If we can lower the risk factors that cause cancer, to a certain extent, certain cancers can be prevented.

## What are the important risk factors that I must know?

- **Tobacco** -Tobacco use causes many types of cancer, including cancer of the lung, larynx (voice box), mouth, esophagus, throat, bladder, kidney, liver, stomach, pancreas, colon and rectum, and cervix, as well as acute myeloid leukemia. People who use smokeless tobacco (snuff or chewing tobacco) have increased risks of cancers of the mouth, esophagus, and pancreas. There is no safe level of tobacco use. People who use any type of tobacco product are strongly urged to quit immediately.

- **Alcohol** - Drinking alcohol can increase your risk of cancer of the mouth, throat, esophagus, larynx (voice box), liver, and breast. The more you drink, the higher your risk. The risk of cancer is much higher for those who drink alcohol and also use tobacco.

- **Other cancer**-causing substances-Substances known to cause cancer are called carcinogens. Coming into contact with a carcinogen does not mean you will get cancer. It depends on what you were exposed to, how often you were exposed, and how much you were exposed to, among other things. Examples of Known human carcinogens are Asbestos, Arsenic, Benzene, Beryllium; Vinyl chloride.

- **Chronic Inflammation** - Chronic inflammation may be caused by infections that don't go away, abnormal immune reactions to normal tissues, or conditions such as obesity. Over time, chronic inflammation can cause DNA damage and lead to cancer. eg Ulcerative colitis

- **Obesity** People who are obese may have an increased risk of several types of cancer, including cancers of the breast (in women who have been through menopause), colon, rectum, endometrium (lining of the uterus), esophagus, kidney, pancreas, and gallbladder.

- **Diet**- Scientists have studied many foods and dietary components for possible associations with increasing or reducing cancer risk. Foods such as whole grains, legumes, dark green yellow fruits and vegetables, polyphenols in tea and green tea, soya protein, low fat foods, low sugar containing foods, calcium and vitamin D containing foods etc. have been identified to help in reducing cancer risk

## What are the common signs and symptoms of Cancer?

Malnutrition and a loss of muscle mass are frequent in cancer patients, and have a negative clinical outcome. Therefore, good nutrition is important for cancer patients before, during and post treatment. Fatigue, anorexia, weight loss, anemia, fevers, sweating etc., is usually seen in cancer patients. If you modify the diet as per the signs and symptoms, some side effects of cancer treatment can also be prevented and managed.

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## How can I improve my nutritional status while I am on Chemotherapy?

The diet of a cancer patient needs proper care and must be tailored according to the type of therapy being given. There are several side effects which may be avoided by some diet modifications. The most important to be remembered is the maintenance of body weight.

The Nutrition Care Process (NCP) consists of four interrelated steps: Nutritional assessment, Nutritional diagnosis, Nutritional Intervention and nutrition monitoring and evaluation of cancer patients. With the help of a Clinical Nutritionist you can have a good lifestyle with lesser side effects of the therapy.

## What are the advantages of nutrition and diet therapy?

- It prevents weight loss.
- It can improve and maintain the nutritional status.
- It reduces the risk of infection and decreases morbidity and mortality.
- It minimizes the side effects of drugs and increases its effectiveness.

## WHAT IS 'THE TWELVE POINT PRIORITY CHEKLIST' TO FOLLOW – TO HAVE A GOOD LIFESTYLE EVEN WHEN YOU ARE ON CANCER THERAPY?

1. Achieve and maintain a healthy body weight
2. Consume a diet that is high in calories, high protein with optimum vitamins and minerals, and antioxidants which help to support cancer therapy.
3. Energy-Energy needs may be increased when nutritional status is deteriorating. Therefore, Consume at least 25-30 Kcal/kg day
4. Protein –To meet the increased demand for protein synthesis during treatment, consume good quality high biological value proteins around 1.2 gms/kg/day
5. Consume moderate amount of Fats usually unto 30%of total energy, especially Omega 3 fats
6. Consume good amount of fluids -30-35 ml/kg/day to face increased fluid losses due to vomiting, diarrhoea etc.
7. Use of daily multivitamin and minerals supplementation or from natural sources is recommended –especially Vit D, B12, Vit C and Retinol and minerals such as Calcium, Magnesium, Zinc, Copper and Iron, due to deficiency or inadequacy of food intake.
8. Include Vegetables and Fruits at every meal –around 2.5 cups of vegetables and fruits daily.
9. Minimize consumption of processed meats, and meat subjected to smoking, tenderized with salt, with artificial food colors which are carcinogenic and cancer causing.
10. Avoid raw foods, cold beverages, raw eggs, raw nuts, soft cheeses, yoghurt products with active cultures, ice, salad bars and fruit bars etc when Neutrophil concentration is low. Follow a Neutropenic diet during this phase of therapy.

11 Take small frequent meals rather than 3 large meals to prevent any gastrointestinal symptoms such as heart burn, vomiting, bloating, indigestion etc.

12 Eat easy to swallow foods, which help in changes in saliva production

## Foods to include and exclude:

| Foods to include | Foods to exclude |
|---|---|
| Cancer Protector foods such as Phytochemicals containing Onion, Garlic, Cabbage, Cauliflower | Limit refined sugar intake<br>Sweetened canned beverages<br>High saturated fats such as cream, buffalo milk etc. |
| Colorful fruits and vegetables –Orange, Papaya, Peach, Mango, berries, Grapes, Tomatoes | Caffeine, Alcohol, tobacco |
| Soluble fiber containing foods –Oats, whole grains, Barley, legumes | Processed meat such as Bacon, sausages etc. |
| Fish, Poultry, Eggs | Red meat such as Beef, Pork, lamb |

## Some side effects of Cancer therapy and suggested dietary modifications

| Foods to include | Foods to exclude |
|---|---|
| Nausea and vomiting | High carbohydrate foods such as juices, toasts, jellies, fruit salads are helpful.<br>Sandwiches, Porridges with cereal, milk and sugar taken slightly may help and will not aggravate nausea.<br>Cold clear beverages or carbonated drinks may help too<br>Eat at room temperature as cold or hot foods may add to nausea.<br>Small frequent meals, low fat diet, avoidance of fried foods and staying away from nauseating odors may also help. |
| Loss of appetite | Take a walk before mealtime, a mild exercise can stimulate appetite.<br>Avoid drinking liquids just before a meal.<br>Small and frequent meals may be better than three heavy meals.<br>Improve your food with seasonings including lemon juice, mint, vinegar etc.<br>Keep snacks such as toasts, glucose biscuits, etc handy to nibble. |
| Sore mouth and Throat | Try soft foods, cold nourishing drinks that are easy to chew and swallow, such as shakes, ice-creams, mashed, custard, puddings, cottage cheese(paneer)<br>Avoid spicy and highly acid foods such as citrus fruits juices, tomatoes and raw onions etc.<br>Blended and liquid foods at room temperature, using straw for liquids may be included.<br>Highly seasoned foods and spicy preparations may be avoided. |
| Dry Mouth | Sucking an ice cube and ice cream sticks will numb the mouth and feel less painful.<br>Drink plenty of water and other fluids throughout the day.<br>Moisten the foods with lots of gravy or vegetable soups or sauces (bland). |

## BUSTING NUTRITION MYTHS:

**Myth:** Sugar feeds cancer!

**Fact:** American Institute of Cancer Research (AICR) recommends limiting consumption of sugar, sweetened drinks, fast foods and other processed foods high in fat, starches or sugars.

**Myth:** Juice is a cure for cancer!

**Fact:** People who practice juice diets need to be aware that it significantly reduces the amount of fiber which is a potential risk factor for cancer, therefore having fruit as a whole is far beneficial instead of having fruit juices.

**Myth:** Alkaline diet cures cancer!

**Fact:** There is no scientific evidence available that supports the effectiveness or safety of alkaline diets. As recommended by Alkaline and Acid foods Association, Consume 80%alkaline foods such as vegetables, fruits, legumes and 20%acid foods such as poultry, dairy foods, coffee, etc.

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CHAPTER 14

# MENTAL HEALTH

# MENTAL HEALTH DISORDERS

A healthy mind in a healthy body goes the saying! So, mind plays a very important role in the Physical health of an individual. What you eat may affect not only your physical health, but also your mental health and wellbeing. Eating well (i.e. a well-balanced diet) may be associated with feelings of wellbeing.

## What are the various mental health disorders with nutritional implications?

- Autism spectrum disorders
- Attention –deficit /hyperactivity disorder
- Bipolar disorder
- Borderline Personality disorder
- Eating disorders like Bullemia, Anorexia
- Major depression
- Obsessive –compulsive disorder
- Panic disorder
- PTSD (Post Traumatic Stress Disorder)
- Dual Diagnosis: mental illness and substance abuse
- Schizo affective disorder
- Schizophrenia
- Seasonal affective disorder
- Suicide
- Tourette syndrome

## What is the role of a nutritionist in mental health disorder?

- A nutritionist's job is to recognize unusual eating behaviours so that appropriate recommendations for treatment can be made. For example, person with OCD may struggle making choices in grocery stores and restaurants, where a multitude of choices exist. He can seek help from a Registered Dietitian for specific direction (eg.''Just tell me what to eat'')
- A person with bipolar disorder may alternate between periods of mania and depression. During the manic phase, consumption of sugar, caffeine and large quantities of food can be extreme and during the depression phase food intake may cease completely
- These mood fluctuations often manifest as weight fluctuations, so initial nutritional consultation really helps in treatment.
- One of the most important contributions of nutrition to mental health is the maintenance of the structure and functions of the neurons and brain centers, which play a crucial role in good mental health.

**Nutrition is very crucial for the rehabilitation of every mental health issue, not just eating disorders. Consult a Qualified Nutritionist to recognize the eating behaviours if any of the above disorders are specified.**

## What are 'the twelve-point priority check list' to follow, even when you are on psychiatric therapy?

1. A recent study found that a Mediterranean-style diet (a diet high in vegetables, fruits, legumes, nuts, beans, cereals, grains, fish, and unsaturated fats such as olive oil.) supplemented with fish oil led to a reduction in depression.

2. A poor diet (with high levels of saturated fat, refined carbohydrates and processed food products) is linked to poorer mental health in children and adolescents. Cut down on the above said foods to have a good mental status.

3. Eating disorders are actually serious and often fatal illnesses that are associated with severe disturbances in people's eating behaviors and related thoughts and emotions. Preoccupation with food, body weight, and shape may also signal an eating disorder. Common eating disorders include anorexia nervosa, bulimia nervosa, pica and binge-eating disorder.

4. Energy –Increase or decrease in appetite is very common in Psychiatric illness. Take a balanced diet with complex carbohydrates, to achieve desirable body weight.

5. Protein –Consume good quality proteins consisting of milk, lean meat, poultry, nuts, beans, low fat dairy, legumes and pulses, to ensure the lean body mass is maintained.

6. Fat-Limit the use of saturated fats, cholesterol rich foods, full cream milk, deep-fried and processed foods. Consume more of Monounsaturated fats such as Olive oil, Omega -3 rich foods like fish, flax seeds, walnuts, chia seeds, almonds etc.

7. Consume a good antioxidant rich diet containing colorful fruits, vegetables rich in B complex vitamins, micronutrients and phytochemicals, such as Berries, citrus fruits, Green Tea, onion, ginger, turmeric, garlic etc. Take 2 fruits a day and at least 2-3 cups of vegetable daily.

8. Nutrients for the nervous system are B12, B6, and Folic acid etc. Consume low fat dairy, lean meat like eggs, fish and poultry, nuts and pulses to get these nutrients. B12 is found in animal sources only such as organ meat, liver, sea foods etc. B6 is found in Oatmeal, bananas, Avocados, chicken, potatoes, Sunflower seeds, brownrice etc. Best sources of Folic acid are mushrooms, spinach (Palak), broccoli, green leafy vegetables,legumes,orange juice etc.

9. Flax seeds, chia seeds, sunflower seeds and nuts such as walnuts contain Omega -3 (ALA) and contribute to overall brain and nervous function.

10. Fatty fish and sea food contain Omega -3 (EPA and DHA), particularly in conditions such as depression, suicide ideation and homicide. Consume 1 g (1000g) of EPA and DHA per day. If you suffer from mood disorders or psychotic disorders.

11. DASH diet needs to be prescribed if there is underlying hypertension also seen

12. Vit D deficiency has been associated with the presence of an active mood disorder and also a risk of major and minor depression in adults. Get your Vit D from sunlight, egg yolks, oily fish, fortified foods, fortified milk and cereals etc

## Quick Take Home Message:

1. Make right food choices with the help of a qualified dietitian and also Food medication interaction needs to be considered.
2. Choose a Brain healthy diet to reduce cravings which helps to tackle behaviour issue.
3. Maintain good physical activity- Helps a lot in stress management.
4. Exercise helps to release depression, secrete feel good hormones and prevent obesity.
5. Weight management is a crucial part of therapy.

## BUSTING MYTHS

**Myth:** Mental illness is caused by a personal weakness.

**Fact:** A mental illness is not a character flaw. It is an illness that has nothing to do with being weak or lacking willpower. Although people with mental illnesses can play a big part in their own recovery, they did not choose to become ill, and they are not lazy because they cannot just snap out of it."

**Myth:** If I seek help for a mental health issue, others might think I'm a wimp or even crazy.

**Fact:** Seeking appropriate help is a sign of strength, not weakness. No one should delay getting treatment for a mental health problem that is not getting better, just as one would not wait to take care of a medical condition that needed treatment. The wisest, most courageous way to cope is to seek help, especially since early treatment can produce more positive results.

**Myth:** Mental illness is a single, rare disorder.

**Fact:** Mental illness is not a single disease but a broad classification that contains many disorders. Anxiety, depression, schizophrenia, personality disorders, eating disorders and attention deficit disorders are a spectrum of disorders.

**Myth:** People with mental illness never get better.

**Fact:** With the right kind of help, people with mental illnesses often recover and go on to lead healthy, productive lives. While the illness may not go away, the symptoms associated with it can be controlled.

## TABLE -1 FOODS TO INCLUDE AND FOODS TO EXCLUDE

| Foods to Include | Foods to Exclude |
|---|---|
| Dark green leafy vegetables, yellow and orange cultured fruits | Limit refined sugar intake<br>Sweetened canned beverages |
| Antioxidant containing Orange, Papaya, Peach, Mango, berries, Grapes, Tomatoes | Caffeine, Alcohol, tobacco |
| Whole grains, nuts like walnuts and Almonds, legumes, pulses | Processed meat such as Bacon, sausages etc. |
| Fish-2 -4 times a week, Poultry, Eggs<br>Omega -3 containing foods such as Fish oil, cod liver oil -1g (1000mg) a day | Red meat such as Beef, Pork, lamb<br>High saturated fats such as cream, buffalo milk etc. |

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CHAPTER 15

# NEUROLOGICAL DISORDERS

# PARKINSON'S DISEASE

## What is Parkinson's Disease?

Parkinson's Disease is a neuromuscular disorder due to functional deterioration and/or death of a type of brain cells. These cells produce Dopamine, required to coordinate and generate muscular movements. The disease risk increases with ageing, about 1% of people with Parkinson's disease over the age of 65 years. Razdan et al, reported the prevalence of 14.1 per 100,000 from rural Kashmir and 27 per 100,000 from Bangalore.

**Symptoms of Parkinson's disease are** slowness of movement, postural instability and coordination, muscular rigidity of limbs and trunk, resting tremors of hands, arms, legs, jaw and face, problems to chew, speak, swallow(Dysphagia), constipation, nausea due to Dopamine-carbidopa drug therapy, weight loss, anorexia due to ageing/early satiety(feeling of fullness), Gastro Esophageal Reflux Disease (GERD) and bloating of stomach.

**Patients with Parkinson disease are** at increased risk of undernutriton and weight loss and nutritional status should be monitored routinely throughout the natural history of the disease (2). Several predictors of malnutrition have been found: Older age at diagnosis, higher levodopa equivalent dose/body weight, anxiety and depression and living alone.

**Complications** include bradykinesia (abnormal involuntary movements) akinesia (loss of power of voluntary movements) resting tremor, muscle rigidity, postural instability. Also, dementia, loss of olfactory sense, dysphagia, slowed gastric mobility (resulting in early satiety and constipation) and orthostatic hypotension occur due to disease progression. Decreased voluntary physical activity and preference for sweet or salty foods may predispose to weight gain.

## Dietary guidelines:

- Detect nutritional inadequacies at an early stage through thorough diet history.
- Take measures to correct deficiencies or nutrition related problems.
- Minimise the practical difficulties associated with eating, feeding, swallowing.
- Maintain desirable body weight and preserve lean muscle mass.
- Promote absorption of anti-Parkinson drugs. Levodopa is the most effective drug in the treatment of PD. In some patients, proteins (mainly found in meat, fish, eggs, chicken, cheese, yogurt, milk, pulses, nuts etc) seem to interfere with effectiveness of their Levodopa medication, as it will compete with amino acid produced from dietary protein. Therefore, people benefit from taking Levodopa 45 minutes before meals or 1 and half hour after meals with few arrowroot biscuits.
- Patients taking Levodopa experiencing motor fluctuations (on and off phase) are recommended to comply with controlled protein regimen. In such cases, a special diet of daytime protein restriction (dal, legumes, meat, fish and milk and products) to about 10 gm provided a helpful adjunct therapy. The remaining day's requirement for protein is advised to be consumed after 5:00 pm. or at dinner time. The grain based products, for example, bread, pasta, rice, fruits, vegetables are permitted at breakfast and lunch time.
- Reduce the impact of side effects of drug treatment on dietary intake.
- Prevent constipation by encouraging diet high in fibre and fluids.

- Regularly monitor nutritional status as the disease condition progresses
- Patients should undergo regular monitoring of nutritional and vitamin status with focus on changes in body weight and need of supplementing vitamin D, Folic Acid and vitamin B12.
- Eat healthy and balanced diet- Regularise the meal timings- 3 main meals with 2 snacks in between.
- Weight maintenance- Overweight patients with co-morbidities such as hypertriglyceridemia, diabetes, CVD etc.
    - Carbohydrates Intake- Choose whole grains over refined cereals and flour. Eat whole wheat breads, oats etc. Try to limit sugars and use salt moderately.
    - Protein Requirement- Advised to keep intake within RDA (recommended allowances) to 0.8 g/kg body wt as higher amounts interfere with medication.
    - Fats Requirements- Choose foods low in saturated fats and cholesterol.
    - Vitamin-D and Calcium- Parkinson Disease Patients are at risk of falls. Therefore altered bone metabolism can lead to osteoporosis. Supplementation should be considered in patients with high risk.
    - Vit B12 and Folate levels- Levodopa treated patients have lower circulating levels of both. Administration of these vitamins is effective in reducing homocysteine levels and should be considered to prevent neuropathy.
    - Pyridoxin (Vitamin B6)- Avoid bran since recent research shows that bran is high in vitamin B 6,which interferes with the effectiveness of levodopa .Consume in moderation. Extra supplementation is not required.
    - **Hyperhomocysteinemia–** Levodopa treated PD patients show elevation of homocysteine. A reduction in levels can contribute to improvement in BMD (Bone mineral density).
    - **Fibre-** Recommended 25-35 gms per day.
    - **Water-** Take 8-10 glasses of fluids per day.

## Remedies for Feeding Problems

- **Resting Tremors-** Hand tremors make it difficult to obtain, prepare and eat food from bowl to mouth. Therefore, soups should be avoided, semi-solid or more textured foods are preferred. Special feeding cups, spoons, large handled cutlery is useful and straws ,sippers may be used.
- **Dysphagia-** Consumption of small frequent meals, chewing thoroughly, eating slowly is useful. Small food items like peas, nuts should be avoided to prevent aspiration. Consuming following foods minimizes problem and facilitate swallowing:
    - Upma/ chopped or pureed foods.
    - Porridge or gruel, Khichri/ Idli
    - Buttermilk/Lassi, milkshakes, juices
    - Custards/ Puddings/ Kheer/ Rice preparations with Raita.
- **GERD- Heart burn is due to fluctuations in body mechanisms. Tips to prevent include:**
    - Taking small meals will help.
    - Avoid chilly, ginger, garam masala.

- Avoid frying of foods.
- Use cumin seeds, coriander, lemon juice, asafoetida.
- Avoid tobacco, alcohol, carbonated beverages, smoking and peppermint. Avoid nuts and dry fruits.
- Drink lots of water, avoid excess tea and coffee.
- Do not sleep immediately after meals.
- Relaxation techniques eg. yoga, meditation helps to reduce stress.

- **Postural Hypotension / Orthostatic Hypotension-** There is sudden fall in B.P. that occurs when person assumes a standing position and experience post-prandial hypotension, blurred vision, dizziness after meals. Dietary management includes: Avoiding large meals, reduce carbohydrate intake, simple sugars, increase intake of salt, fluid intake.

- **Constipation-** Common problem in patients with Parkinson disease due to anti Parkinson medication, reduced physical activity, inadequate fluids and fibre intake and consequence of neurodegenerative process.
  - Recommended 25-30 gm fibre in diet,
  - Fluids of 8-10 glasses a day,
  - Avoid tea, coffee in excess.
  - Good amount of raw and cooked fruits and vegetables( Green leafy veg, cabbage, cauliflower, salad leaves) is advised.
  - Whole grains, cereals instead of refined ones.
  - Use of prebiotics and probiotics fibre also helps improve stool consistency.( 18 ).
- **Nausea-Eat slowly.**
  - Avoid fried foods, fats and very sweet foods.
  - Eat small amounts more frequently over the day.
  - If you feel nauseated early in morning, eat salted or plain wheat cracker or biscuit.

## Servings and portions:

1. Cereals-6 or more servings preferably whole grain cereals, wheat, brown rice, oats, etc. (1 serving-1 slice bread or 1 and half cup cooked rice/cereal/1 roti)
2. Pulses, Legumes- 2 servings per day (legumes, beans, soya beans etc. (1 serving- ½ cup dal/ beans cooked)
3. Milk Products- 2-3 servings.(low fat milk, cottage cheese, curd, lassi. (1 serving- 1cup milk or 50 gm cottage cheese)
4. Meat, fish, poultry- 2 or more servings- choose lean meats like eggs, chicken, fish rather than red meats or organ meat. (1 serving- 50-80 gm cooked lean meat, chicken/fish/2 eggs)
5. Fruits and Vegetables- 4-5 servings (1 serving approx. 100 gm) or ½ cup chopped raw or cooked veg.

6 Fats and oils and nuts- 2 servings per day- (I serving 5ml oil/10-14 gm nuts (handful approx.).

7 Milk- 200 ml (plain/ custard/pudding/dessert etc)

8 **Approximate Nutritive Value: Total Calories (Kcal): 2200;/day Total Protein (g)- 60 g/day**

## BURSTING NUTRITION MYTH:

**Myth:** Only medical intervention helps in Parkinson disease.

**Fact:** Lifestyle modifications, including regular exercise, muscle strengthening therapies, healthy diet can help reduce severity of symptoms and quality of life.

**Myth:** Parkinson only affects you physically.

**Fact:** Other warning signs of symptoms include change in speech, urinary frequency, swallowing problems etc.

**Myth:** Only older people can be diagnosed with Parkinson disease.

**Fact:** In most of the cases Parkinson occurs after age 50 years, but possible to be diagnosed in early life i.e. young onset Parkinson.

## Foods to be included and excluded

| Food Group | Foods to Include | Foods to Exclude |
|---|---|---|
| Cereal, millets and their products | Whole grain cereals – wheat, jowar, bajra, rice and their products | Refined flour, bakery and processed foods- biscuits, doughnuts, cakes, pastries, khari biscuits and ready to eat food items |
| Pulses and Legumes | Dals, Legumes, Pulses | Fried dals |
| Milk and Meat products | Skimmed milk, paneer, curd, buttermilk, yoghurt. Dairy alternatives – almond milk, soymilk, rice milk, tofu etc. Egg whites, lean poultry and lean meat, fish. | Full fat milk, cream, cheese, khoa Red meat, organ meat, egg yolk |
| Vegetables and Fruits | All fresh fruits and vegetables cooked in less oil. | Fried potato chips, canned vegetables and fruits |
| Miscellaneous | Coconut oil | Oily and fried foods, sweets, vegetable fat-vanaspati, ghee. |

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# ALZHEIMER'S DISEASE

**Alzheimer's disease is a progressive disorder that causes brain cells to waste away (degenerate) and dies.** Alzheimer's disease is the most common cause of dementia- a continuous decline in thinking, behavioral and social skills that disrupts a person's ability to function independently.

## Symptoms:

- Memory loss is the key symptom of Alzheimer's disease.
- An early sign of the disease is usually difficulty remembering recent events or conversations.
- As the disease progresses, memory impairments worsen and other symptoms develop.
- At first, a person with Alzheimer's disease may be aware of having difficulty with remembering things and organizing thoughts.
- A family member or friend may be more likely to notice how the symptoms worsen.

## People with Alzheimer's may:

- Repeat statements and questions over and over
- Forget conversations, appointments or events, and not remember them later
- Routinely misplace possessions, often putting them in illogical locations
- Get lost in familiar places
- Eventually forget the names of family members and everyday objects
- Have trouble finding the right words to identify objects, express thoughts or take part in conversations.
- Forget the steps involved in cooking
- Lose their appetite due to the medications they are taking, change in medication dosage, or due to depression
- Forget how to hold and use utensils
- Have difficulty communicating their desire for foods they would like to eat or recognize that they are hungry or thirsty
- Develop difficulty chewing and swallowing

## Dietary tips for loss of appetite:

- Offer a variety of different colored foods with pleasant aromas.
- Offer smaller portions, but more frequent foods, drinks, and snacks.
- Try a wide selection of different foods (remember, tastes and likes may change with age).
- Use herbs and spices, sauces, gravies, or broths to add flavor to foods.

## For difficulty chewing or swallowing:

- Offer soft, moist foods, such as scrambled eggs, oatmeal, yogurt, cottage cheese, mashed potatoes, applesauce, soups, baked fish, juices, milkshakes and smoothies.
- For other food types, grind the food or cut into small, bite-sized pieces.

## For the person who is agitated, angry or irritable:

- A person with dementia may experience behaviour changes that can include agitation and anger. These behaviours can manifest in such ways as refusing to eat or spitting out food.
- If the person has difficulty speaking, look at his or her body language and eyes for clues as to what he or she might want or need. Never put pressure on the person to eat or drink. If the person is showing signs of anger or irritation, wait for them to calm down and then offer some food and beverage.
- Involve the person with meal preparation (if the person is able). Perhaps he or she could help cook a portion of the meal or set the table.
- Allow the person to be as independent as possible by selecting the meal items to eat and drink (as much as reasonable), when to eat each type of meal (for example, he or she may prefer a larger lunch and a smaller dinner), and where to sit to eat. Remember, food preferences may change and the person may like foods previously never liked or dislike previously loved foods.
- Make mealtime a fun, friendly social event. Eat together. Talk about wonderful life events from the person's past.
- Remove clutter/distractions from the eating area.
- Turn on soft music that the person enjoys.
- Make sure the eating area is well lit.
- Make eating as easy as possible for the person by using whatever bowls or plates are easiest for the person to manage. Same with utensils. If a large spoon is the easiest to manage, cut the food so that it can be scooped up with a spoon.
- Use solid colors (instead of patterns) and different colors for tablecloths, placemats, bowls and plates. This can help make the food easier to see.
- Check the temperature of foods and drinks before serving. Make sure food is warm but not too hot. Some people with dementia cannot judge if food or drink is too hot to consume.
- Don't put pressure on the person to eat or make them feel rushed to finish eating. Also, don't assume the person has finished eating if they have stopped eating.

## Dietary guidelines:

- **Cut down on sugar.** Sugary foods and refined carbs such as white flour, white rice, and pasta can lead to dramatic spikes in blood sugar which inflame your brain.
- **Get plenty of omega-3** -Food sources include cold-water fish such as salmon, tuna, trout, mackerel, seaweed, and sardines. You can also supplement with fish oil.
- **Stock up on fruit and vegetables.** - Eat up across the color spectrum to maximize protective antioxidants and vitamins, including green leafy vegetables, berries, and cruciferous vegetables such as broccoli.

## Foods to include and exclude:

| Foods to include | Foods to avoid |
|---|---|
| Fish, Nuts, Turmeric, Pumpkin seeds, Avocado, Fresh fruits, Spinach, Whole grains, Dals, Pulses, Olive Oil, Dark chocolate. | Red Meat, Butter, Margarine, Cheese, Fast and unhealthy foods, Sweets, High sodium foods. |

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# STROKE

Stroke is the second leading cause of death worldwide. In India, the incidence of stroke population varies from 116 to 163 per 100,000 population.

## What is stroke/Brain Attack/Paralysis?

**Stroke occurs when the blood supply to the brain is suddenly cut-off, due to rupture of blood vessel supplying blood** to the brain **(Haemorrhagic Stroke)** or when the blood stops flowing through the artery, that supplies oxygen and nutrients to the brain due to a blood clot **(Ischemic Stroke)**. The symptoms persist for more than 24 hrs.

## What is transient ischemic attack (TIA)/Mini stroke?

Transient ischemic attack occurs when there is a temporary interruption of blood supply to the brain but the symptoms go away within 24 hrs. The risk factors and symptoms are same as that of stroke. One who has had a TIA has a much greater chance of having a stroke or recurrent TIA, so it should not be ignored.

## Symptoms/ Features Of Stroke: How Do I Recognize the Signs of Stroke?

- If there is sudden numbness or weakness in face, arm or leg, especially on one side of the body or clumsy hands.
- There is sudden confusion, trouble in speaking or difficulty in understanding speech, there is facial muscle weakness.
- One has trouble seeing in one or both eyes/ vision loss.
- There is sudden trouble in walking, dizziness, loss of balance or coordination.
- There can be impairment or loss of consciousness.

## Ask these simple questions to help recognize signs of Stroke: (FAST)

**FACE** : Ask the person to smile, does one side of face drop?

**ARM** : Ask the person to raise both arms, does one arm drift downwards.

**SPEECH** : Ask the person to repeat a simple sentence; Is the speech slurred or strange?

**TIME** : Act fast and take the patient to nearby hospital immediately at any of these signs persist.

## Need for Swallow Screening:

All patients should be screened for swallow test within 4 hrs of admission and before taking any food or fluids orally. If Dysphagia (swallowing difficulty) is present then follow dysphagia diet i.e. texture modified foods or thickened liquids.

**Malnutrition** may occur as a result of inability to eat and drink due to unconsciousness, disoriented, swallowing problem, postural instability, decreased mobility, depression.

## What are the major risk factors of stroke?

**A. Modifiable Risk Factors: (Well Documented)**

1. Hypertension (Increased Blood Pressure)
2. Diabetes Mellitus (Increased Blood Glucose)
3. Dyslipidaemia (High Fat content in the blood )
4. Being overweight or Obesity
5. Physical inactivity.
6. Tobacco use / Smoking(All forms)
7. Carotid artery stenosis (Narrowing)
8. Atrial Fibrillation (Irregular heart beat or pulse.
9. Excessive Alcohol consumption.
10. Unhealthy Diet.
11. Stress / Anxiety.
12. HRT (Hormone Replacement Therapy or taking Birth control Pills.

**Other Modifiable risk Factors (Less Well Documented)**

1. Migraine
2. Metabolic Syndrome
3. Drug Abuse
4. OSA (Obstructive Sleep Apnoea)
5. Hyperhomocysteinemia
6. Elevated Lipoprotein A (Lpa)

**B. Non Modifiable Risk Factors:**

1. Male gender are at higher risk than women.
2. Genetic Factors/ Family History.
3. Increased Age (Risk doubles as the age advances).
4. Low Birth Weight.
5. Low Socio-Economic status people.

## How is Stroke Diagnosed?

As soon as the warning signs appear, the patient is brought to the hospital:

1. A Brain C T Scan (computerised Tomography) or an MRI ( Magnetic Resonance Imaging) is done.
2. Blood Pressure is Checked.
3. Blood tests need to be done: Blood sugar levels, Cholesterol level, haemoglobin levels.
4. ECG (Electrocardiogram, Carotid Ultrasound and Heart check-ups are done to know the cause.

## The Treatment For Stroke Includes:

The time is very critical, as early recognition of symptoms can avoid excess damage to the brain.

1. **TPA Therapy** (Clot Busting Drug)- If you are at hospital within 4 and a Half Hours of stoke, you may be treated with a drug known as (Tissue Plasminogen Activator)therapy, to breakdown the blood clot and reopen the blocked arteries.
2. **Blood Pressure Lowering Drugs** are given to all patients who have high B.P.
3. **Cholesterol lowering Drugs / Statins** should be taken by all patients who have high levels of blood lipids or fats in body.
4. Anticoagulants ( Blood Thinning Medications)- Are advised (Acitrom, Warfarin etc), if they have Atrial Fibrillation, to prevent strokes in future.
5. To check PT / INR) regularly. (Prothrombin Time/ International Normalised Ratio).
6. Antiplatelet Drugs like Aspirin, Heparin can be advised.

## Lifestyle Modification for stroke prevention:

1. As a part of lifestyle management: prevention, screening, control and management of symptoms should be done. Healthy Dietary habits, regular exercise, yoga and avoidance of weight gain are recommended schedule.
2. **Avoid smoking (All forms)-** It increases stroke risk up to two times. It causes injury to blood vessel walls, hardening of arteries, increases blood pressure, reduces oxygen and increases clotting factor in the blood.
3. **Regular Routine check-ups** with the doctor in hospital.
4. **Increase Regular Physical Activity-** At least 30-45 mins a day or 150 mins of moderate intensity exercise in a week starting from low intensity first.
5. **Watch your Weight regularly.** Check your BMI (Body Mass Index) and Waist circumference-. If one is Overweight then take dietary advice from dietician to loose weight.
6. **Maintain a desirable blood Pressure.**
7. **Keep a check on Your blood Sugar levels** and get HbA1C checked every 3 months. Keep it >6.5%.
8. **Limit Alcohol Consumption-** As it contains empty calories and raises triglycerides and B.P. Not more than 1 drink per Day for women and 2 drinks per day for Men.
9. **Avoid Excess Salt/ Sodium in diet –** < 2400 mg of sodium or 5gm of salt per day.
10. **Avoid Birth control pills or HRT, hormone replacement therapy-** Women taking these have increased risk of clot formation. Replace pills with condoms or other contraceptive devices
11. **Keep a check on your Vitamin- D levels.**
12. **Avoid eating unhealthy Diet, Junk foods.** Limit intake of **foods with high saturated fats and cholesterol.** LImit high content of **simple sugars** in your diet
13. **Drug Abuse-** Like cocaine and opioids should be avoided.
14. **Avoid High stress levels** and Anxiety.
15. **Maintain a desirable blood cholesterol** and lipid levels
16. **Increase dietary potassium in diet.** Eg: fruits, vegetables, banana, coconut water.
17. **Increase dietary fiber** in your diet eg: whole grains, fruits, vegetables, oats, and nuts. Total dietary fiber of 25-30 gm is recommended.

## Curcumin, vitamin K and diet

Curcumin based diet and other inhibitors of vit-K are useful in prevention of blood clot in some strokes. If you are on blood thinners, keep your vitamin K steady in your diet. Otherwise you would require adjustment of medicine dose. The common food sources of vitamin K rich foods-Restrict Green leafy vegetables such as spinach, mustard leaves, coriander leaves, pudina, cauliflower, cabbage, Bathua leaves, Broccoli, Brussel sprouts, Lettuce( salad Leaves) Ladyfinger (Bhindi) Tomato and Egg yolk. Avoid mustard oil and Soyabean oil.

## BURSTING NUTRITION MYTH:

**Myth:** If one feels normal, then one can stop taking medicines.

**Fact:** It is because of medicine that you are feeling better, Take a good diet and continue with medicines and regular exercises.

**Myth:** If we are taking medicine for other illnesses, we can stop medicine for stroke prevention.

**Fact:** We should not stop medicine unless your doctor advices. Otherwise it may increase chance of stroke reoccurrence.

**Myth:** Once stroke occurs, it is not preventable

**Fact:** Stroke is preventable with medications and lifestyle modification.

**Myth:** I may get addicted to medication.

**Fact:** You will not get addicted, but the medicines have to be consumed regularly, on time for best results.

## Foods to include and exclude:

| Foods to include | Foods to exclude |
|---|---|
| Incorporate whole grains, legumes, millets, whole pulses(6 or more servings per day) | Avoid refined cereals, fast foods made from them, processed foods like chips, bread, cakes, pizzas. |
| Include good fats rich in MUFA- Flaxseeds, almonds, walnuts, olive oil, mustard oil, Mustard oil and PUFA rich oils- sunflower, Soyabean and corn oil | Avoid excess intake of saturated fats- Butter,ghee,dalda,vanaspati,margarine etc and Trans Fatty acids present in fried, reheated foods, bakery products. |
| Dark coloured jaggery is better, rich in iron, a better replacement of market confectionary, | Avoid simple sugars, in your meals, desserts like gulab jamun, ice-cream, pastries. |
| Include diet rich in fresh fruits and vegetables, rich in dietary fiber, vitamin C and antioxidants,(atleast 5-6 servings)from variety of citrus, yellow, orange coloured fruits and vegetables | Avoid fruit juices, Aerated beverages, sweetened drinks. Alcohol as they contain empty calories and no nutrition. |
| Include lean meats like fish, chicken, egg whites in your diet.<br>Atleast 2 portions of oily fish per week | Avoid processed meat, red meat, pork, beef, organ meats as they are high in saturated fats and cholesterol. |
| Include low fat dairy products milk, cottage cheese, butter milk, lassi, instead. | Avoid full fat milk, cream, cheese and dairy products. |

| | |
|---|---|
| Include non-fried and unsalted nuts- peanuts, walnuts, pistachio, almond, sesame seeds, sunflower seeds rich in good fats and fiber.<br>1 serving of fats can be replaces with nuts (14gm or handful). | Avoid table salt, pickles etc. |
| Prefer cooking methods like steaming, Baking, grill, roast, shallow fry. | Avoid deep frying of foods. |

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CHAPTER 16

# FEVERS

# TUBERCULOSIS

Tuberculosis remains the leading cause of death due to infectious disease among adults worldwide, with more than 10 million people becoming newly diagnosed from tuberculosis each year. India bears the maximum burden of Tuberculosis in the World with approximately 800 lives being lost yearly due to this lethal disease. It is roughly estimated that 80% of our country's population is exposed to the Tuberculosis virus by the time they turn 20.

## What is Tuberculosis?

Tuberculosis (TB) is an infectious disease caused by bacteria (Mycobacterium tuberculosis) that most often affect the lungs and later it might spread to different parts of the body. TB is spread from person to person through air. When people with lung TB cough, sneeze or spit, they propel the TB germs into the air. A person needs to inhale only a few of these germs to become infected. There are two different types of TB: Pulmonary Tuberculosis and Extra pulmonary Tuberculosis.

TB symptoms include a bad cough that lasts 3 weeks or longer, coughing up blood (mucus from deep inside the lungs), weakness or fatigue, sweating at night, shortness of breath, pain in the chest, weight loss, poor appetite, fever and chills. TB causes wasting classically due to underlying mechanisms like decreased food intake due to anorexia, the increase in basal metabolic rate due to fever.

The tests to diagnose TB are body fluids test – blood and sputum, skin test and chest X-rays. Blood samples are collected and are tested in the laboratories for the presence or absence of TB germs in the blood cells. The skin test a small sample of Tuberculin – a purified protein is injected under the patient's skin. If the skin around the site of the injection gets swollen more than five millimetres then it is a clear indication of TB infection.

## Dietary guidelines:

- Nutritional assessment and counselling –concept of healthy balanced diet within the dietary preferences of the patient should be primed. The patient should be advised on increasing energy intake of diet by using locally available nutrient-rich food.
- Micronutrient supplementation in patients with active TB is recommended.
- Management of severe undernutrition in patients requires hospitalization – initial stabilization phase and rehabilitation phase.
- Patients with TB have a poor appetite initially; hence you are advised to eat small and frequent nutritionally balanced meals to build immunity.
- Increase the energy and protein content of the meals and snacks without increasing its volume. Addition of oil, butter or ghee (if easily available) to the chapatti or rice can increase the energy content of the diet.
- Choose wholesome foods such as whole grains, fruit, vegetables, dairy products, fish, poultry, eggs, beans, nuts and seeds to maximise the overall nutrient quality of the meals.
- A high protein diet is advised. Include at least one protein source in each meal such as milk and milk products like curd, buttermilk, cottage cheese (paneer), egg, fish, chicken, all dals and pulses, soybean, soymilk and tofu (soy paneer). The patient should also be encouraged to eat pulses in other forms e.g. sprouts, roasted channa. Nuts such as groundnuts are good sources of energy and proteins and can be taken as snacks. Simple combinations of cereal and pulse like khichadi, idli etc can be included.
- Include colored fruits and vegetables like pumpkin, bell peppers, carrots, tomatoes, papaya which are rich in antioxidants and boost immunity.

- Include foods rich in Vitamin C like orange, sweet lime, lemon, gooseberry (amla), bell peppers, berries, tomato, dark leafy vegetables, cashew fruit, kiwi, strawberry, brussels sprouts, broccoli etc. which help boost immunity.
- Foods rich in zinc such as nuts, whole grains, legumes, yeast, dairy products also help boost immune function and must be incorporated in the diet.
- Include immune boosting foods like ginger, garlic, cinnamon, gooseberries.
- Sip on warm soups, herbal teas (add mint , basil or ginger)
- Garlic, pepper, ginger, asafoetida (hing), cumin seeds/powder, turmeric, lemongrass, basil and coriander should be used in cooking as they help enhance digestion and improve immunity.
- Alcohol in any form is dangerous for the patient as it increases the risk of drug toxicity, and the patient should be counselled to quit alcohol.
- Avoid the use of carbonated drinks, excess of tea and coffee.
- Avoid smoking, the use tobacco and tobacco products.
- Avoid excess of spices and salt.

## Busting common Myths:

**Myth:** I do not Smoke and since Tuberculosis virus affects only the lungs, I can never have TB

**Fact:** Multiple factors cause Tuberculosis. In addition to the lungs, TB can impact many different organs of the human body including the brain, spinal cord, intestines, eyes, covering of the heart, bones & joints, stomach etc.

**Myth:** Tuberculosis is incurable

**Fact:** Early diagnosis plays an important role in the treatment of TB. If a patient thoroughly follows the treatment module and goes for regular follow-ups with the doctor, this disease is completely curable.

**Myth:** Only those who are poor & underprivileged can contract this disease

**Fact:** Anyone, regardless of his/her socio-economic background and living condition is susceptible to the TB virus.

**Myth:** Tuberculosis is extremely contagious and anyone who comes in contact with the infected person can contract it

**Fact:** Pulmonary or lung tuberculosis alone is marked as extremely infectious. Although TB is spread through the air when people who have the disease cough or sneeze, it takes close and lengthy contact with an infectious person to catch the disease.

**Myth:** Tuberculosis is hereditary

**Fact:** TB is not caused by genetic factors but is contracted only after coming in close contact with an infected person.

**Myth:** TB infection & TB disease are the same

**Fact:** TB infection is a state whereby the TB germs are asleep in your body. This germ enters your body after coming in close contact with a TB infected person. TB infection progresses into TB disease when the germs become active and start affecting your organs. You can prevent this outcome by taking proper medications to get rid of the TB germs in your body.

**Myth:** BCG vaccination offers guaranteed protection from TB

**Fact:** The only assurance that a BCG vaccination can give is that it safeguards children from contracting an extremely severe kind of Tuberculosis. Whether or not it protects adults from TB, is very uncertain because there have been cases in the past whereby people who were vaccinated earlier in life went on to contract the infected at a later stage.

## Foods to be included and excluded

| Food group | Foods to include | Foods to exclude |
|---|---|---|
| Cereal, millets and their products | Whole grain cereals & millets such as sorghum (jowar), pearl millet (bajra), finger millet (ragi/nacahni). | Uncooked street foods |
| Pulses and Legumes | Protein rich foods like soya bean, tofu, dals, pulses. | |
| Milk and Meat products | Buttermilk, low fat paneer, milk and milk products. Whole Egg, fishes such as mackerel (bangada), hilsa, katla, rawas (Indian salmon), halwa (black pomfret), sardines; and chicken (without skin) | Avoid raw/ undercooked meats, fish and egg |
| Vegetables and Fruits | Seasonal fruits, vitamin C rich fruits such as amla, guava, orange, sweet lime, Dry fruits like dates, anjeer, Nuts and Seeds like almonds, walnuts, sunflower seeds, flaxseeds, chia seeds.<br>Green leafy vegetables and yellow and orange coloured vegetables, mushrooms. | Fruit juice from roadside vendors.<br>Raw vegetables if used should be washed well. Better to use sauté vegetables or as soups. |
| Miscellaneous | Coconut water, Lemon water | Carbonated drinks. Caffeine in excess |

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# TYPHOID

**Typhoid fever is a life-threatening infection caused by the bacterium *Salmonella typhi.***

It is usually spread through contaminated food or water. Once *Salmonella typhi bacteria* are eaten or drunk, they multiply and spread into the bloodstream.

## How is it caused?

It begins in the small intestine, where the bacteria attach to the epithelium of intestine of wall penetrate in layer, multiple in the mesenteric lymph nodes and eventually reach the blood stream. Here lyses of bacteria by action of antibodies and compliment results in the end toxin which causes symptoms such as fever.

## Symptoms of Typhoid Fever:

The incubation period is usually 1-2 weeks, and the duration of the illness is about 3-4 weeks. Symptoms include:

- Poor appetite
- Headaches
- Generalized aches and pains
- Fever as high as 104 degrees Fahrenheit
- Lethargy
- Diarrhoea

## Risk factors:

- Typhoid risk is higher in populations that lack access to safe water and adequate sanitation. Poor communities and vulnerable groups including children are at highest risk.
- Work in or travel to areas where typhoid fever is established (endemic)
- Work as a clinical microbiologist handling Salmonella typhi bacteria
- Have close contact with someone who is infected or has recently been infected with typhoid fever
- Drink water contaminated by sewage that contains Salmonella typhi

## Complications:

- Inflammation of the heart muscle (myocarditis)
- Inflammation of the lining of the heart and valves (endocarditis)
- Pneumonia
- Inflammation of the pancreas (pancreatitis)
- Kidney or bladder infections
- Infection and inflammation of the membranes and fluid surrounding your brain and spinal cord (meningitis)
- Psychiatric problems, such as delirium, hallucinations and paranoid psychosis

## Treatment:

- Take prescribed antibiotics for as long as the doctor has prescribed.
- Wash their hands with soap and water after using the bathroom, and do not prepare or serve food for other people. This will lower the chance of passing the infection on to someone else.
- Have their doctor test to ensure that no Salmonella Typhi bacteria remain in their body

## Vaccines:

Two vaccines are available.

- One is injected in a single dose at least one week before travel.
- One is given orally in four capsules, with one capsule to be taken every other day.

## Dietary guidelines:

- A soft, easily digestible diet should be provided.
- Drink boiled water and keep your body hydrated.
- Consume 3 – 4 litres of fluids in the form of water, fruit juices, tender coconut water and soup.
- Eat small frequent meals rather than large meals to ease digestion and for maximum nutrient utilization by the body.
- Try not to include spices as much as possible till the fever recovers.
- Slowly introduce protein in your diet in the form of eggs, yoghurt and boiled fish; depending on your tolerance level, increase the portion size.
- Avoid raw vegetables and fruits that cannot be peeled. Vegetables like lettuce are easily contaminated and are very hard to wash well.
- When you eat raw fruit or vegetables that can be peeled, peel them yourself. (Wash your hands with soap first.) Do not eat the peelings. Avoid foods and beverages from street vendors. It is difficult for food to be kept clean on the street, and many travellers get sick from food bought from street vendors.
- Treat all drinking water by bringing it to a rolling boil for 1 minute or using Aqua-tablet's or other household water treatment products before you drink it. Ask for drinks without ice unless the ice is made from boiled or chlorine treated water.
- Avoid flavoured ices and juice because they may have been made with contaminated water.

## Foods to include and exclude:

| Foods to include | Foods to exclude |
|---|---|
| Fruit juices with glucose, coconut water, barley water, cereals, bread, boiled potato, pulses, steamed vegetables, vegetable puree, milk, milk shakes, thin dal, curries, eggs, curd, cottage cheese, milk puddings. | Butter, ghee, vegetable oil, fibres foods, chilies other spices, pastries, fried foods, puddings and creamy soups, |

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# INFLUENZA AND H1N1 (SWINE FLU)

Influenza, or flu, is a respiratory illness caused by a virus. Flu is highly contagious and is normally spread by the coughs and sneezes of an infected person.

## How is it caused?

A person can also catch flu by touching an infected person, for instance, by shaking hands.

## Types:

There are three types of flu virus:

- Influenza A
- Influenza B
- Influenza C

Types A and B viruses cause seasonal epidemics in the U.S. and Europe virtually every winter.The type C influenza virus causes mild respiratory illness and is not responsible for outbreaks.

## Symptoms:

Flu and cold symptoms may both include:

- a runny or blocked nose
- a sore throat
- a cough
- high temperature
- cold sweats and shivers
- headache
- aching joints and limbs
- fatigue, feeling exhausted

## Who are at risk for Influenza?

- Very young children
- Older people
- Individuals with other longstanding illness that can undermine their immune system
- Adults over 65
- Babies or young children
- Pregnant women
- Individuals with heart or cardiovascular disease
- Those with chest problems, such as asthma or bronchitis
- Individuals with kidney disease
- People with diabetes
- People taking steroids
- Individuals undergoing treatment for cancer
- Those with longstanding diseases that reduce immune system function
- The complications of influenza may include:
- Bacterial pneumonia
- Dehydration

- Worsening of chronic medical conditions, such as congestive heart failure asthma, or diabetes
- Children may develop sinus problems and ear infections.

## Prevention:

There are two types of vaccinations:

- The flu shot
- The nasal-spray flu vaccine

## Dietary guidelines:

- Drink plenty of fluids. This includes water, soup, and low-sugar flavoured drinks.
- Treat symptoms such as headache and fever with over the counter medications.
- Wash your hands to prevent spreading the virus to other surfaces or to other people in your house.
- Cover your coughs and sneezes with tissues. Immediately dispose of those tissues.
- Consider pain relievers. Use an over-the-counter pain reliever, such as acetaminophen (Tylenol, others) or ibuprofen (Advil, Motrin IB, others), to combat the achiness associated with influenza. Children and teens recovering from flu-like symptoms should never take aspirin because of the risk of Reye's syndrome, a rare but potentially fatal condition.

## Foods to include and exclude or restrict:

| Foods to include | Foods exclude or restrict |
|---|---|
| Ice pops | Alcohol |
| Vegetable soup | Caffeinated drinks |
| Chicken soup | Processed foods |
| Ginger | Dairy products |
| Garlic | |
| Banana | |
| Toast | |
| Oatmeal | |

# H1N1 (SWINE FLU)

Swine flu, also known as 2009 H1N1 type influenza, is a human disease.

## How is it caused?

A virus that is a subtype (H1N1) of the orthomyxovirus (species Influenza A virus of the genus Influenza virus A) causing influenza A, that infects birds, pigs, and humans, and that includes strains which may occur in seasonal epidemics or sometimes pandemics.

Human infection with influenza virus can vary from asymptomatic infection to uncomplicated upper respiratory tract disease to serious complicated illness that may include exacerbation of other underlying conditions and severe viral pneumonia with multi organ failure.

## Uncomplicated influenza:

Influenza like illness (ILI) symptoms includes:

- Fever, cough, sore throat, nasal congestion or rhino rhea, headache, muscle pain, and malaise, but not shortness of breath and not dyspnoea.
- Gastrointestinal illness diarrhoea and/or vomiting, especially in children, but without evidence of dehydration.

## Complicated or severe influenza:

Clinical signs like shortness - breath/dyspnoea, tachypnoea, and hypoxia

## Radiological signs:

- Lower respiratory tract disease (e.g. pneumonia)
- Central nervous system (CNS) involvement (e.g. encephalopathy, encephalitis)
- Severe dehydration
- Presenting secondary complications, such as renal failure, multiorgan failure, and septic shock
- Other complications can include rhabdomyolysis and myocarditis.
- Exacerbation of underlying chronic disease, including asthma, chronic obstructive pulmonary disease (COPD), chronic hepatic or renal insufficiency, diabetes, or other cardiovascular conditions (e.g. congestive cardiac failure). Any other condition or clinical presentation requiring hospital admission for clinical management (including bacterial pneumonia with influenza).
- Signs and symptoms of progressive disease Patients who present initially with uncomplicated influenza may progress to more severe disease. Progression can be rapid (i.e. within 24 hours).

## Signs of progression of the disease:

- Shortness of breath (with activity or at rest),
- Difficulty in breathing, tachypnoea
- Presence of cyanosis, bloody or colored sputum, chest pain, and low blood pressure
- In children, fast or labored breathing and hypoxia, as indicated by pulse oximetry or arterial blood gases.

## Symptoms and signs suggesting CNS complications:

- Altered mental status, unconsciousness, drowsiness, or difficult to awaken and recurring or persistent convulsions (seizures), confusion, severe weakness, or paralysis.
- Severe dehydration, manifested as decreased activity, dizziness, decreased urine output, and lethargy.

## Dietary guidelines:

A high calorie, high protein, high carbohydrate, low fat, high fluid, low fiber diet is suggested. Nutrient rich foods should be included in the diet. The following nutrients are of benefit to the patient.

- **Vitamin A:** Carrots, eggs, pumpkin, whole milk, liver.
- **Beta-carotene:** Orange and yellow colored veggies & fruits - Carrots, papaya, all green leafy veggies broccoli, pumpkin & squashes and sweet potatoes.
- **B-Vitamins (folate and $B_{12}$):** spinach, legumes, peanuts, whole grains, leafy green vegetables, eggs, milk.
- **Vitamin C:** oranges, grapefruits, all berries, Vitamin C and zinc are particularly recommended for flu sufferers, for they help to reduce congestion, relieve watery eyes, and minimize the disease's duration.
- **Vitamin E:** Peanuts, sunflower seeds, eggs, spinach, whole grains, vegetable oils, poultry
- **Zinc:** Fish, poultry, beef, pork, eggs, crab, shellfish, cheese, milk, peanut butter, whole grains
- **Selenium:** can be found in fish, turkey, nuts, pork and whole grains.
- **Quartering:** Red onions raw or cooked as also apples, broccoli, spinach, & lettuce.
- **Plenty of fluids:** Preferably electrolyte rich such as fruit juices, tender coconut water and stimulants such as green and herbal teas which contain phytonutrients. That strengthens and boosts the immune system or even ordinary tea, soups, broths etc.
- All colorful vegetables & fruits, including leafy greens, whole grains, nuts, eggs, low fat milk, oatmeal and lean meat are foods to include liberally in your diet as they act as Cold and Flu Fighters.
- Since patients have poor appetite initially food must be appetizing, and patient's likes and dislikes must be considered.
- As the patient progresses, normal, attractive and palatable food should be given.

## Foods to include or exclude:

| Foods to include | Foods to exclude |
|---|---|
| Whole grains like wheat, rice, jowar, bajra | Junk foods, fast foods, sugar sweetened drinks, and white flour |
| Legumes and thin dals | - |
| Cow's milk, skim milk curd, buttermilk, milkshakes, lean meat, chicken, fish | - |
| Nuts, seeds and soy-based foods | - |
| Plenty of water, Cloves and raw garlic, Vitamin D3 supplements, Probiotics | - |

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# MALARIA

Malaria is common and life threatening disease in many tropical and subtropical areas. Human malaria is caused by the protozoan parasite Plasmodium, which has five different species. The malaria parasite is transmitted by female Anopheles mosquitoes, which bite mainly between dusk and dawn. Malaria is an acute febrile illness with an incubation of 7 days or longer. The most severe form is caused by *Plasmodium falciparum*.

Symptoms include variable features include fever, chills, headache, muscular aching and weakness, vomiting, cough, diarrhoea, abdominal pain.

## Dietary guidelines:

A diet for malaria should focus on boosting the immune system without causing harm to other organs like kidney.

- **Eat nutritious foods:** When the patient has a malarial fever, the body's calorie, and nutritional requirement increases.
- **Increase fluid intake:** Unfortunately, at the time of fever, one experiences appetite loss, less tolerance and therefore, eating food becomes a challenge. To compensate for such a situation, one must drink glucose water, fresh fruit juices, coconut water, sorbet made with lemon, salt, sugar and water and electoral water.
- **Increase protein intake:** There is an increase in the requirement of protein as one lose a lot of tissue. A diet of high carbohydrate and high protein is helpful as the body can utilize the protein for anabolic and tissue repair and building process. Eating curd, lassi, and buttermilk is highly beneficial.
- **Eat fat in moderation:** Fats are necessary for the body, but moderation is the key. Using dairy fats like cream, butter and fats from milk products aid in digestion. These foods contain MCT or medium change triglycerides. Using excessive fats or eating fried foods can increase the risk of nausea, indigestion, and loose bowels.
- **Vitamin and Minerals:** It is important to work on vitamin loss by drinking electrolytes. Eating soups, stews or drinking fruit juices or dal water, coconut water etc. are important. Vitamin C and a rich foods such as papaya, beetroots, and other citrus foods etc. With vitamin B complex are important for a malaria patient.

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# DENGUE

Dengue is a viral illness transmitted to humans by infected mosquitoes.

## What is Dengue fever?

Dengue is a vector-borne disease transmitted by the bite of an infected mosquito. There are 4 serotypes of the virus that causes dengue. These are known as DEN-1, DEN-2, DEN-3, DEN-4. Severe dengue is a potentially lethal complication which can develop from dengue infections. It is estimated that there are over 50-100 million cases of dengue worldwide each year and 3 billion people living in dengue endemic countries.

## How is Dengue transmitted?

Dengue is spread through the bite of the female mosquito (Aedes aegypti). The mosquito becomes infected when it takes the blood of a person infected with the virus. After about one week, the mosquito can then transmit the virus while biting a healthy person. The mosquito can fly up to 400 meters looking for water-filled containers to lay their eggs but usually remains close to the human habitation.

## Can Dengue spread directly from one person to the other?

Dengue cannot be spread directly from person to person. However, a person infected and suffering from dengue fever can infect other mosquitoes. Humans are known to carry the infection from one country to another or from one area to another during the stage when the virus circulates and reproduces in the blood system.

Symptoms include high fever, joint pain, muscle pain, headache, nausea, fatigue and rash.

## Care of the patient while they have fever:

1. Patient is advised bed rest. Adequate rest is advised during the illness for quick recovery.
2. Control the fever using prescribed medicines. Sponge patient's skin with cool water if fever stays high.
3. Prevent dehydration which occurs when a person loses too much fluid (from high fevers, vomiting, or poor oral intake). Give plenty of fluids and watch for signs of dehydration.
4. Take the patient to clinic or emergency room if any of the following signs develop:
    - Decrease in urination (check number of wet diapers or trips to the bathroom)
    - Few or no tears when child cries
    - Dry mouth, tongue or lips
    - Sunken eyes
    - Listlessness or overly agitated or confused
    - Fast heartbeat (more than 100/min)
    - Cold or clammy fingers and toes
    - Sunken fontanel in infant
5. Prevent spread of dengue within your house.Place patient under bed net or use insect repellent on the patient while they have a fever. Mosquitoes that bite the patient can go on to bite and infect others.Kill all mosquitoes in house and empty containers that carry water.Put screens on windows and doors to prevent mosquitoes from coming into house.

## Care for patient when the fever is going away:

1 Watch for warning signs as temperature declines 3 to 7 days after symptoms began.

2 Return immediately to doctor if any of the following warning signs appear:

- Shortness of breath (with activity or at rest),
- Severe abdominal pain or persistent vomiting
- Red spots or patches on the skin
- Bleeding from nose or gums
- Vomiting blood
- Black, tarry stools
- Drowsiness or irritability
- Pale, cold, or clammy skin
- Difficulty breathing

## Dietary guidelines:

1. Our body requires sufficient vitamins, minerals and protein for bone marrow health which produces platelets. Vegetables such as spinach, pumpkin, paprika, carrot, watercress, celery, broccoli and beet root will trigger your platelet levels.

- Have a soft balanced diet
- Include easy to digest foods like boiled vegetables, soft khichdi, buttermilk, probiotic curd and soups
- Eat small frequent meals as one may not be able to eat too much at one time due to decreased appetite and nausea.
- Drink adequate fluids like coconut water, lemon juice, fruit juices, Oral Rehydration Solution and soups to keep you hydrated and flush out toxins from the body.
- Consumptions of green leafy vegetables, cod liver oil, flax seed oils and fresh fruits and fruit juices help to improve platelet count and reduce inflammation in the body
- Papaya leaf juice and dragon fruit is known to increase white blood cells and platelets
- Include immune boosting foods like ginger, garlic, cinnamon, gooseberries,
- Include coloured fruits and vegetables like pumpkin, bell peppers, carrots, tomatoes, papaya which are rich in antioxidants and boost immunity.
- Include foods rich in Vitamin C like orange, sweet lime, lemon, gooseberry, bell pepper, berries, tomato, dark leafy vegetables, cashew fruit, kiwi, strawberry, Brussel sprouts, broccoli etc. which help boost immunity
- Foods rich in zinc such as nuts, whole grains, legumes, yeast, dairy products also help boost immune function and must be incorporated in the diet.
- Sip on warm soups, herbal teas; add mint , basil or ginger
- Garlic, pepper, ginger, asafoetida (hing), cumin seeds/powder, turmeric, lemongrass, basil and coriander should be used in cooking as they help enhance digestion and improve immunity.

## What are the specific foods which can be consumed to improve symptoms of Dengue?

- **Papaya leaves**

  The extract of the leaves of Carica papaya is being studied as a complementary treatment for disorders of platelet function. Just crush the papaya leaves and squeeze them to extract the juice. Its extract increases platelet count to a great extent. Alternatively, you can also boil the papaya leaves in water and drink the solution. It is possibly the best home remedy for the treatment of dengue fever.

- **Green Coconut water**

  This popular drink is highly effective to raise platelet level. Coconut water provides not only vitamins A, B and C, but also has minerals, calcium, potassium, magnesium, iron and phosphorus.

- **Aloe Vera**

  Aloe Vera is rich in nutrients such as calcium, magnesium, phosphorus, potassium, zinc, sodium, copper, and vitamins C, E, and B. Therefore, aloe vera juice has multiple medicinal applications. It can be an excellent ally in taking care of cardiovascular health and promoting platelet production.

- **Yogurt**

  Probiotics, also known as active bacteria, are found largely in yogurt. These are very useful for keeping the intestines free of harmful germs and bacteria that are capable of causing diseases. Its regular consumption will help you keep the defences high. Ideally, you should consume about 150 g of yogurt a day to get its healing benefits.

- **Chicken soup**

  There is scientific evidence that supports that chicken soup is of great help to stop the symptoms of colds and flu, stimulating the defences so that healing is carried out quickly. It will also help you stay hydrated and raise the temperature of the airways, which is very effective in loosening the mucus.

## Which foods should be avoided for a person suffering from dengue?

- Oily and fried foods, caffeine, carbonated drinks, spicy food and foods high in fats.

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CHAPTER 17

# HIV/AIDS

# ACQUIRED IMMUNO DEFICIENCY SYNDROME (AIDS)

Primary infection with Human Immunodeficiency Virus, "HIV" is the underlying cause of AIDS. The virus can be transmitted via any of five body fluids: blood, semen, preseminal fluid, vaginal fluid and breast milk. Transmission can also occur by sharing contaminated needles, blood products as well as by across the placenta from an infected mother to her baby. The virus is not transmitted by casual contact, touching, hugging or kissing or through using the same plates or drinking glasses. All persons should use universal precautions to protect both themselves and other working with body fluids.

Symptoms of the infection include fatigue, aching muscles, sore throat, swollen lymph nodes, a red rash that doesn't itch, usually on your torso, fever and headache.

## Components of Medical Nutritional Therapy:

1. **Nutritional Screening :** All persons with HIV infection should be screened for nutritional problems and concerns at the time of their first contact with a health care professional. Routine monitoring should be performed and action should be taken accordingly.

2. **Nutrition referral :** Nutrition referral should consider the current diagnosis and medical history, referring to health care provider's nutrition prescription or desired outcome, clinical symptoms and feeding route, weight history and body composition, recent biochemical data, current medications, and lifestyle.

## Dietary guidelines:

### For adults with AIDS:

- **Energy :** Its requirement varies depending on the health status of the individual at the time of HIV infection, the progression of the disease and the development of complications that impair nutrient intake and utilization. Generally a patient may require 30-45 kcal/kg body weight at different stages of disease.
- **Protein :** High protein diets promote positive nitrogen balance and lean body mass repletion. Protein requirements may be estimated at 1 and 1.4 g/kg for maintenance and 1.5g and 2.0g /kg for repletion. Contain proteins for cell repair and growth. Are obtained from legumes (e.g. beans, lentils, cowpeas, pigeon peas, groundnuts and nuts), milk products (yogurt, cheese and for infants, breastmilk), animal foods (fish, eggs, chicken, pork and beef) and cereals (wheat, maize and rice).
- **Fat :** Use of Medium Chain Triglyceride would be beneficial.
- **Fluids and electrolytes :** Fluid needs in HIV- infected individuals are similar to those of normal individuals and are calculated to be 30-35 ml/kg.Additional amounts are required to compensate for losses from diarrhoea, nausea and vomiting, night sweats and prolonged fever. Replacement of electrolyte losses (sodium, potassium and chloride) in the presence of vomiting and diarrhoea is also recommended.
- **Vitamins and Minerals :** There is increased need of beta carotene, vitamin E, vitamin C, vitaminB12, vitamin B6, and folic acid. Micronutrient-rich foods: nutrients such as iron for blood; and calcium and phosphorus for strong bones, help to build bones and cells important for growth and development, B-vitamins to support the body absorb and utilize protein and carbohydrates; and to help fight infections and to digest and absorb other nutrients. Can be found in dark green, leafy vegetables (such as collard greens, cassava and potato leaves, spinach, pumpkin leaves and cabbage); and yellow and orange fruits and vegetables (such as mango, papaya, sweet potato, pumpkin, carrots, tomato, avocado, oranges, lemons and bananas).

- **Water :** Be sure water is clean! Boil water for at least 5 - 10 minutes to kill germs. Keep water stored in a container with a lid. Always wash your hands with soap before and after touching foods.
- **Non-vegetarian foods :** Cook all animal products (meat, chicken, pork, fish and eggs) at high temperatures until thoroughly cooked. Do not eat soft-boiled eggs or meat that still has red juice. Thoroughly wash utensils and surfaces where you placed uncooked foods, particularly meats, before you handle other foods. Cover meat, poultry or fish with a clear cover or cloth and keep separate from other foods to avoid contamination.
- **Fruits and Vegetables :** Use clean water to thoroughly wash all fruits and vegetables that are to be eaten raw to avoid contamination. If it is not possible to wash fruits and vegetables properly, remove the skin to avoid contamination. Remove the bruised parts of fruits and vegetables

## Nutritional guidelines for children with AIDS:

Complementary foods should increase over time providing an additional 280 kcal per day. Complementary food can be mixtures of cereals, fruits, vegetables and a protein source such as beans, eggs and meat when possible.

- Feed complementary food two to three times per day.
- Give a separate plate to the child with a portion of at least a handful of food.
- Feed mashed and semi-solid foods, such as porridge softened with breast milk if possible.
- Feed energy-dense and protein-rich foods, such as maize porridge with crushed groundnut.
- Introduce foods that children can eat alone at eight months, such as mango, banana, papaya
- Provide a variety of foods including fruits and vegetables; animal products such as eggs, chicken and fish and fortified foods if available.
- Provide extra amounts of food during and following illness.
- Feed patiently and persistently with lots of care and supervision.
- If available and affordable feed fortified staple foods. Infants 9-11 Months
- Continue to breastfeed several times per 24 hours.
- Provide an additional 450 kcal per day from complementary food (approximately two cups of mashed fruits or vegetables and ½cup of mashed beans).
- Feed solid food three to four times daily.
- Feed energy-dense combinations of soft foods, such as porridge with crushed groundnut.
- Give protein and iron rich foods such as eggs, meats (e.g. chicken and fish).
- Provide micronutrient rich snacks like mangos, melon, apples or bananas.
- Feed extra amounts of food during and following illness Children 12-23 Months
- Continue to breastfeed several times per 24 hours.
- At 12 months, children can eat the same foods as adults, except very spicy foods.
- Provide an additional 750 kcal per day from complementary food. This is approximately two to three cups of maize porridge, one cup of beans, a fruit snack such as mango or banana.
- Feed four to five times per day from separate plate.
- Feed protein-rich foods such as eggs, chicken, fish daily, or as often as possible.
- Feed extra amounts of food during and following illness.
- Children 24 Months-5 Years
- Feed a variety of fruits and vegetables, legumes, animal products and fortified foods.
- Give nutritious snacks (such as fruit, bread, nuts) between meals.
- Feed a variety of foods at least five to six times per day (three meals plus snacks such as mangos, bananas.

## For All Children :

- Ensure that the infant has received all vaccinations by one year (polio, BCG for tuberculosis and DPT for diphtheria, peruses, tetanus and measles).
- Encourage intake of Vitamin-A-rich foods and give the child a Vitamin A capsule every six months and iron drops daily or weekly starting at 6 months of age.
- Encourage the intake of iron and Vitamin C rich foods, and give liquid iron supplements daily (12.5mg/day to infants 6 months to 1 year). If anaemia prevalence is high, continue to 24 months of age or beyond.
- During diarrhoea continue breastfeeding and provide oral rehydration therapy. Make a sugar/salt solution to rehydration children or use ORS during diarrhoea episodes.
- Practice good hygiene and proper food handling.
- Use clean utensils, cups and bowls and avoid bottle-feeding children.
- Seek appropriate health care for fever, diarrhoea, chronic cough, malaria, hookworm and other parasitic infections.

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CHAPTER 18

# GERIATRIC CARE

# GERIATRIC CARE

Ageing is inevitable. But it is in your hands how you want to Age? Graceful ageing is a beautiful concept which all of us have to follow. If each of us stop and ask ourselves, how do I want to Age, and follow some good nutrition and lifestyle preventive health strategies in mid-life itself, a lot of us will not suffer from old age related degenerative diseases in future. So let's prepare ourselves for healthy graceful ageing now…

## Which age is qualified as old age?

Everyone knows people older than themselves, but those considered "old" depends a lot on one's own age. Youngsters consider their 20 or 30 something parents old. Today grey hair colour, wrinkles, retirement, or age 65 no longer defines old. Yet qualifying as an "older adult" is based on the minimum eligibility age of 65 in many federal programs.

## Age categories:

Young old : 65-74 years

Old : 75-84 years

Oldest old : >85 or older

New Old : 90 years

## Why is adequate nutrition important in old age?

- Aids in the maintenance of health
- Decreases the onset of chronic diseases
- Contributes to vitality in everyday activity,
- Enhances mood and good mental health
- Helps in maintaining functional independence

## What are the most common degenerative diseases seen in Elderly?

- Older persons are particularly vulnerable to malnutrition. Since both lean body mass and basal metabolic rate decline with age, an older person's energy requirement per kilogram of body weight is also reduced.
- Many of the diseases suffered by older persons are the result of dietary factors.
- Degenerative diseases such as cardiovascular and cerebrovascular disease, diabetes, osteoporosis and cancer, which are among the most common diseases affecting older persons, are all diet-affected.
- Micronutrient deficiencies are often common in elderly people due to a number of factors such as their reduced food intake and a lack of variety in the foods they eat.

## What are the natural physiological changes that can happen when you grow old?

- Body composition changes with aging. Fat mass and visceral fat mass increase, whereas lean muscle mass decreases.

- Sarcopenia –the loss of muscle mass, strength and function can be age related and can significantly affect an older adult's quality of life.
- Altered taste and decreased sense of smell at varying degrees at varying rates and varying ages are seen.
- Some degree of hearing loss is seen in old age as a common change,
- Vision changes are seen with age. Reading glasses often become necessary in the fourth decade of life.
- Immune competence declines with age, immune response is slower and less efficient.
- Tooth loss, use of dentures, dry mouth, difficulty in swallowing and chewing may also be seen.
- Insufficient production of acid in stomach is seen, causing poor absorption of B12.Some older adults also suffer from constipation due to delayed intestinal transit time, insufficient fluids, and medications.

## What should your goal be?

- To age gracefully managing the above said physiological changes related to Oldage.
- To enhance the immune function.
- To maximize the quality of life.

## Dietary and lifestyle guidelines for healthy ageing

1. You require dietary modifications as per the macro and micro nutrient requirements, with reduced amount of calories, as your physical activity decreases with ageing.
2. Include Nutrient dense foods to meet protein intake and to preserve the lean body mass and prevent excess fat accumulation
3. In case you have any swallowing difficulties, dentures etc. you need to modify the food consistency to promote better intake
4. Consume sufficient intake of fibre, fruits, vegetables, whole grains, fluids etc to prevent constipation
5. Consume Calcium rich sources such as dairy products, skimmed milk powder, dark green leafy vegetables and follow a regular exercise routine to prevent reduction in bone density and Osteoporosis
6. As there is increased prevalence of loss of elasticity of blood vessels and increase in risk of cardiovascular diseases and Hypertension, reduce the intake of salt and saturated fats.
7. Do take right supplementation with B12 and Omega -3 fatty acids, with the help of a medical nutritionist, this will help in improving the neurological functions, and prevent dementia, Alzheimer's and Parkinson's disease
8. Micronutrients such as Vit A, Vit D, Vit E, Vit B 12,Vit C, Calcium, Iron, Zinc and other anti oxidants are recommended to prevent age related degenerative disease and for healthy ageing. Identify the deficient nutrient under the guidance of the medical team.
9. Take small frequent meals in a day.
10. Avoid fried, salty, excessively sweet, and spicy foods
11. Avoid smoking, chewing of Tobacco products and consumption of alcohol.
12. Avoid self-medication and have regular health check ups.

## Must dos in oldage:

1. Regular health check is a must –at least once a year with your family physician.
2. Regular exercise routine is required for a healthy body and healthy mind. Walk for 30-40 min at least 5 days a week.
3. Drink adequate amount of water upto 8-10 glasses a day to prevent constipation. Consume fluids before 7 pm to reduce the frequency of urination at night.
4. Avoid consuming coffee, Tea and Cola beverages at night to prevent Insomnia.
5. Take small frequent meals instead of 3 heavy ones.

## STAY ACTIVE!

### Why Is A Healthy Lifestyle and Exercise So Important, Especially In Old Age?

**Exercise has many benefits:**

- Prevents memory loss (dementia)
- Feel good hormones called as Endorphins are secreted
- Helps reduce chronic pain
- Increases muscle mass from weight training and improves metabolism
- Improves the quality of sleep
- Improves flexibility balance and good posture
- Boosts our immune system
- Practicing yoga, for example, relieves discomfort caused by conditions such as arthritis and fibromyalgia.
- Do something that you enjoy in order to keep you motivated like cycling, golfing, walking a pet, gardening, or swimming.

## PROTECT YOUR MENTAL HEALTH!

### Exercise Your Brain

- Keep your brain active.
- While physical exercise helps keep your brain alert other activities like word games, crossword puzzles, learning a new language, learning a new skill keep your brain strong.

### Stay Positive And Stay Connected

- There are many difficult challenges that come with getting older, such as losing loved ones, your independence, and your health.
- Despite all these things, we must stay strong and try to navigate through these challenges.

## MYTHS AND FACTS:

**MYTH:** The stomach shrinks as people age

**FACT:** Although appetite may change, the stomach doesn't shrink as people get older. In fact, not eating well enough only accelerates the ageing process.

**MYTH:** Weight loss is healthy

**FACT:** Unfortunately, this is not the case for older people. Instead, dieting or unintentional weight loss should be avoided in the later years. In fact, extra padding in later age is beneficial and can support the body and brain of elderly patients in the years ahead.

**MYTH:** Elderly people need to eat less as they get older

**FACT:** While metabolism slows and energy output decreases, food and eating remain the key to ageing well. Elderly people may need to eat less of some things and more of others, particularly foods rich in protein, vitamins and minerals.

**MYTH:** Only drink water when thirsty

**FACT:** Dehydration can bring on confusion and delirium, hamper kidney function and worsen a multitude of other conditions that commonly effect older people. Seniors tend not to sense thirst as efficiently and are therefore at greater risk of dehydration, making fluid intake an essential element of overall nutrition.

**MYTH:** Malnutrition is a normal part of the ageing process

**FACT:** Malnutrition can affect anyone at any age, and it is not normal part of the ageing process. However, seniors are at greater risk of malnutrition and it's important that everyone doesn't dismiss the warning signs as being a part of 'old age'

## Foods to include and exclude in oldage

| Foods to Include | Foods to Exclude |
|---|---|
| Low Glycaemic index foods, complex carbohydrates like Oats, millets, whole grains, pulses, legumes, nuts | Limit refined sugar intake<br>High saturated fats such as cream, butter, buffalo milk etc. |
| Colourful fruits and vegetables – Orange, Papaya, Tomatoes, Green Leafy vegetables | Caffeine, Alcohol, tobacco |
| Olive oil, Omega -3 Fats, low fat dairy products, skimmed milk and foods rich in Calcium | Table salt in moderation, salty foods like salted snacks, salted nuts, pickles and chutneys |
| Fish, Poultry, Eggs<br>Water, fluids, fresh fruit juices | Red meat such as Beef, Pork, lamb |

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CHAPTER 19

# TOWARDS HEALTHIER LIVING

# TOWARDS HEALTHIER LIVING

In today's scenario, the availability of information is not an issue. There are umpteen sources and getting information online is only a click away. The abundance of information often makes people feel empowered but leaves them in quandary as to what is right and which is the most authentic source of information. Advice for medical conditions should be provided by those who are well informed. We hope this will serve as a resource book to a cross-section of stakeholders, especially, the medical practitioners (on whom the patients rely heavily), those engaged in providing dietary advise, care givers of patients and general public. An attempt has been made to make the content easily understandable.

As mentioned in the introduction, this book is only a quick guide to refer to the general dietary and physical activity guidelines for some common medical conditions. An effort to put together such information was indeed a herculean task and efforts of several upcoming and established dietitians, nutritionists, academics and researchers have materialized this book. There are several other disease conditions that are not covered in this book and there are a few which are covered but India specific guidelines/research may have been sparse. In such cases the experts have relied on well-researched and well-documented sources from elsewhere. This may be used only as a guidebook only. For providing personalized dietary advice to the patients, co-morbidities (if any), their age, gender, physiological status and a host of other factors also need to be considered.

Given the dynamic nature of science, there perhaps is a constant and regular need to revisit and update the information provided in this book and this will be our continued effort. FSSAI is of the opinion that eating right is as important as eating safe.

# ANNEXURE

| S.No. | Chapter | Written by | Vetted by |
|---|---|---|---|
| | | | |
| | Introduction | Dr. Subba Rao M Gavaravarapu | |
| | Assess Yourself | Dr. Jagmeet Madan | |
| 1. | High Blood Pressure | Ms. Sheryl Salis*.<br>Dr. Mansi Patil | Ms. Meenakshi Bajaj |
| | Metabolic Disorders | | |
| 2. | Overweight and Obesity | Dr. Maithili Paranjpe | Ms. Anita Jatana |
| 3. | Pre-diabetes | Dr. Tejas Limaye,<br>Aditya Birla Hospital | Ms. Anita Jatana |
| 4. | Diabetes Mellitus | Dr. Tejas Limaye and<br>Ms. Anita Jatana | Ms. Meenakshi Bajaj |
| 5. | PCOS | Mrs. Harshada Thakur | Ms. Anita Jatana |
| 6. | Gestational Diabetes | Ms. Meenakshi Bajaj | Ms. Anita Jatana |
| 7. | Dyslipidemia<br>(Abnormal Lipid Profile) | Ms. Sheryl Salis* and<br>Dr. Mansi Patil | Dr. Shilpa Shirole |
| 8. | Non-alcoholic Fatty Liver Diseases (NAFLD) | Ms. Sheryl Salis* | Dr. Jagmeet Madan and<br>Ms. Zamurrud Patel |
| 9. | Gut-Related Conditions | | |
| | Gastritis | Dr. Geeta Dharmatti | Ms. Shilpa Shirole |
| 10. | GERD- Gastroesophageal Reflux | Ms. Sheryl Salis* and<br>Dr. Geeta Dharmatti | Ms. Shilpa Shirole |
| 11. | Constipation | Ms. Sheryl Salis* and<br>Ms. Shilpa Shirole | Ms. Meenakshi Bajaj |
| 12. | Diarrhea | Ms. Sheryl Salis* and<br>Ms. Sneha Majumder | Ms. Shilpa Shirole |
| 13 | Inflammatory Bowel Disease (IBD) | Ms. Sneha Majumder | Ms. Meenakshi Bajaj |
| 14. | Food Intolerance (Gluten Intolerance) and Food Intolerance (Lactose Intolerance) | Ms. Sheryl Salis*<br>Mrs Shilpa Shirole<br>Mrs. Harshada Thakur | Ms. Meenakshi Bajaj |
| | Gastrointestinal Disorders | | |
| 15. | Cholecystitis | Mrs. Sukesha Satavalkar | Ms. Meenakshi Bajaj |
| 16. | Cirrhosis of Liver | Mrs. Sukesha Satavalkar | Ms. Shilpa Shirole |
| 17. | Pancreatitis (Chronic) | Ms. Shraddha Adsul | Ms. Shilpa Shirole |
| 18. | Food-borne Hepatitis | Mrs. Sukesha Satavalkar | Ms. Meenakshi Bajaj |
| | Kidney Disorders | | |
| 19. | Nephrotic Syndrome | Ms. Zamurrud Patel | Dr. Jagmeet Madan |
| 20. | Kidney Stones | Ms. Sheryl Salis* and<br>Ms. Zamurrud Patel | |
| 21. | Chronic Kidney Disease | Ms. Zamurrud Patel | |
| 22. | During Dialysis | | |
| 23. | Kidney Transplant | | |
| 24. | Gout | Ms. Sheryl Salis* and<br>Ms. Datta Patel | Dr. Geeta Trilok Kumar and Dr. Kavitha Menon |

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|---|---|---|---|
| | | | |
| | Bone Disorders | | |
| 25. | Osteoporosis | Dr. Veena Ekbote and Dr. Neha Kajale | Dr. Geeta Trilok Kumar and Dr. Kavitha Menon |
| 26. | Rheumatoid Arthritis | | |
| 27. | Osteoarthritis | | |
| | Allergies | | |
| 28. | Food Allergies | Ms. Vaishali Atul Madkaikar and Ms. Shilpa Shirole | Dr. Geeta Trilok Kumar and Dr. Kavitha Menon |
| 29. | Asthma | Ms. Shilpa Shirole | |
| | Nutritional Deficiencies | | |
| 30. | Vitamin A Deficiency | Mrs. Surabhi Singh Yadav and Dr. Kavitha Menon | Dr. Geeta Trilok Kumar |
| 31. | B-Complex Deficiencies | Ms. Devaki Gokhale | |
| 32. | Vitamin D Deficiency | Dr. Arti Muley | |
| 33. | Iron Deficiency | Mrs. Radhika Hedaoo | |
| 34. | Zinc Deficiency | Ms. Pooja Panchal and Dr. Kavitha Menon | |
| 35. | Cancer Prevention | Ms. Ambika Nair | Ms. Anita Jatana |
| 36. | Mental Health | Ms. Ambika Nair | Dr. Kavitha Menon |
| | Neurological Disorders | | |
| 37. | Parkinson Disease | Ms. Jasmin Kaur | Dr. Kavitha Menon |
| 38. | Alzheimer's Disease | Mrs. Malavika Karkare | |
| 39. | Stroke | Ms. Jasmin Kaur | |
| | Fevers | | |
| 40. | Tuberculosis | Ms. Sheryl Salis, Dr.Mansi Patil and Ms. Shilpa Varma | Dr. Kavitha Menon |
| 41. | Typhoid | Mrs. Malavika Karkare | |
| 42. | Influenza and H1N1 | | |
| 43. | H1N1(Swine Flu) | | |
| 44. | Malaria | | |
| 45. | Dengue | Ms. Sheryl Salis*, Dr. Mansi Patil and Ms. Shilpa Varma | |
| 46. | HIV/AIDS | Mrs. Malavika Karkare | Dr. Kavitha Menon |
| 47. | Geriatric Care | Ms. Ambika Nair | Dr. Jagmeet Madan |
| | Towards Healthier Living | Dr. Subba Rao M Gavaravarapu | |

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