Chapter - 2

Modern Living and Physical Health
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Modern living is characterized by sedentary lifestyle i.e. lack of time feeling of insecurity in life, poor dietary habits, lack of physical activity and pollution all around. In ideal living conditions and in pre modernization era people used to have freshly cooked food, fruits, grains, cereals constituted bulk of their diet. There was no adulteration of food, there was no pollution of the atmosphere and people were physically more active as compared to people of modern day. It is not that disease did not prevail those days but style of living in itself was not a detrimental factor as far as physical health is concerned. In modern living however, the vary style of living is a major cause of disease, and disability.

Style of modern living has given rise to host of physical health problems including obesity, diabetes, cardiovascular diseases (CVD), cancer and respiratory diseases to name a few. Approximately 2 million deaths every year are attributable to physical inactivity; and preliminary findings from a WHO study on risk factors suggest that sedentary lifestyle is one of the ten leading causes of death and disability in the world.¹ This reflects a significant change in diet habits and physical activity levels worldwide as a result of industrialization, urbanization, economic development and increasing food market globalization.

The three important aspects of modern living affecting physical health are:

1. Food habits
2. Lack of physical exercise
3. Pollution
Studies and surveys carried out in the past have established the relationships between a particular lifestyle & health status. The first two aspects i.e. food habit and physical exercise are directly related to the nature of an individual and can be monitored/controlled by him. The third factor pollution is a global phenomena and needs to be addressed at societal/government levels. This will be possible by bringing awareness at the individual level. Each of the aspect above, its affect on health and the extent/seriousness of the problem are detailed below:

**a. Food Habit**

Common aspects of the present day food habits affecting physical health can be grouped under three headings (i) quality of the food itself, (ii) the time factor with respect to biological clock, and (iii) style/pace of eating. Let us analyze the above one by one -

**Quality of food in modern living:**

We are what we eat. A good diet is central to overall good health. But which are the best foods to include in our meals, and which ones to avoid? This section looks at the facts, to help us make realistic, informed choices. Use of fast/junk foods, smoking, and consumption of alcohol, pan masala, gutka etc. are typical of modern living. In ideal living conditions people are away from this type of food. Even today most of the rural population do not have these food habits and thus are spared of the negative effects of such food habits. This is just because the rural populations do not have access to such kind of food on day-to-day basis or their economic conditions don’t allow them to opt for such kind of food habits. However, these foods are more common in urban areas and most people in urban areas are addicted to one or other of these foods. The typical modern diet is high in fat, salt, and sugar
and is apt to be low in fiber and vital nutrients. This can cause significant health problems. Even though most of us have healthy food options available, we tend to make poor food choices.

There has been an increasing trend in consumption of fast/junk foods, smoking and consumption of alcohol, pan masala, gutka etc. over the years. This is revealed from the rapidly growing business of industries involved in the food & drinks manufacturing or marketing. The market is flooded with fast and junk foods for all age groups. If we look at the food habits of children and teenagers, we will see that wafers, chips, kurkureys, artificial soft drinks make a major part of their daily intake. Similarly smoking and consumption of alcohol among adults and specially college going students are on the increase. The trend has been increasing from years as can be judged from the increasing profits of the companies providing it.

Use of junk foods in urban areas is more common because people here often work till late hours and in shifts and due to time constraints have to depend on fast/ junk foods. However, some people take it by choice. Aggressive marketing strategy and advertisements targeted at tempting basic human instincts which have resulted in deep penetration of the various junk food products into different segments of the society. So for many it is fun and a symbol of status rather than need to quest hunger.

**Junk food:** Junk food has become a way of life. Food manufacturers tantalize us with a new snack food each day. These foods are fun, tasty and intriguing but they are also addictive. Junk food can be defined as any food that contributes little or no nutrient value to the diet but instead provides excess calories and fat. Some examples of junk food are candy, breakfast pastries,
high fat chips, and high fat foods from fast food restaurants. When consumed in small amounts, junk food can also be worked into a healthy lifestyle. The key is not to over consume or replace healthy foods with junk food but to maintain an active lifestyle that burns off the extra calories these foods contribute.

If we avoid junk food a variety of benefits like better sleeping patterns, less indigestion, regular bowel movements, less irritability, increased stamina and even weight loss for some will occur over time. Most people who avoid junk food for long periods have no interest in returning to that eating style because the benefits of healthy eating are quite strong. Banning junk food from Schools should be done at once to save children from getting addicted to it.

A large section of the world population has nutrient deficiency in their diet. Many people rely heavily on convenience or manufactured foods that do not support good health. They do not eat nearly enough vegetables and fruits and consume an extremely high amount of fat, animal products and refined carbohydrates such as flour and sugar.

Due to growing imbalance in food production, an insidious form of malnutrition plagues the world today. More than 2 billion people-about 40 percent of the world’s population-now face debilitating diseases because their diets are dangerously low in precious micronutrients. Children's growth is stunted. Adults are weak and sickly, unable to resist disease and infection. This hidden hunger decreases worker productivity and increases morbidity rates, condemning people and their developing nations to vicious circles of ill health and low productivity, making it impossible to sustain economic growth.
These dietary habits cause the body to become both depleted of essential nutrients for proper function and overloaded with unwanted toxic substances. Smoking, excessive alcohol and recreational drug use devastates health and can have lingering effects for many years even after these habits are stopped. In some cases the damage is irreversible.

To have an idea of how the food habit of modern living is affecting physical health and how it differs from that of ideal living conditions we should have an idea of actual food requirement of the body and role of some of the food elements in maintaining sound physical health.

**Food requirement of the body:**

Dietary Guidelines have been established in many countries to help people choose support active lives, and reduce the risk of chronic disease. To maintain a healthy lifestyle a good diet should include variety of foods including plenty of fruits, vegetables, and grain products low in fat, saturated fat, and cholesterol. The diet should be with moderate sugar, salt and sodium. Alcohol and tobacco should be avoided.

A plant-based diet is an appropriate foundation for any meal pattern. Eating a variety of grains, especially whole grains is important as they are a rich source of vitamins, minerals and fiber. Whole grain foods have a generous amount of fiber that provide a sense of fullness for fewer calories and can stimulate proper bowel function. Many grains are now enriched with folic acid, which reduces the risk of serious birth defects when consumed before and during early pregnancy. It is also important to aim to include a variety of fruits and vegetables each day. Different fruits and
vegetables are rich in different essential nutrients. This is especially true for dark-green leafy vegetables, orange fruits and vegetables and cooked dry beans and peas.

For healthy eating, it is important to assure that food is safe from harmful bacteria, viruses, parasites, and chemical contaminants. No matter the inherent nutrients in food, if it is not handled safely, it will yield the desired health effect. Hands and food preparation surfaces should be clean. Raw and cooked foods should be kept separate from each other. In addition, food should be cooked and kept at the proper temperature to assure healthful quality.

It is always better to choose a diet with plenty of grain products, vegetables and fruits that provide needed vitamins, minerals, fiber and complex carbohydrates and can help lower intake of fat. The diet should be moderate in sugars. A diet with lots of sugars has too many calories and too few nutrients for most people and can contribute to tooth decay. The diet should be moderate in salt and sodium to help reduce risk of high blood pressure. Alcoholic beverages should be avoided as far as possible. Alcoholic beverages supply calories but little or no nutrients. Drinking alcohol is also the cause of many health problems and accidents and can lead to addiction.

**Food Guide Pyramid:**

What food is required for our body and in how much quantity for a healthy living can be best understood from the Food Guide Pyramid shown below. The Food-guide-pyramid is a helpful tool in selecting foods that will provide all the nutrients needed by each one each day.
The above shown pyramid is an outline of what to eat each day. It's not a rigid prescription, but a general guide that lets you choose a healthful diet that's right for you. The Pyramid calls for eating a variety of foods to get the nutrients you need and at the same time the right amount of calories to maintain or improve your weight.

The Food Guide Pyramid emphasizes foods from the five major food groups shown in the three lower sections of the Pyramid. Each of these food groups provides some, but not all, of the nutrients you need. Foods in one group can't replace those in another. No one-food group is more important than another - for good health, we need them all.

The small tip of the Pyramid shows fats, oils, and sweets. These are foods such as salad dressings and oils, cream, butter,
margarine, sugars, soft drinks, candies and sweet desserts. These foods provide calories and little else nutrition. Most people should use them sparingly.

The next levels of the Food Guide Pyramid are two groups of foods that come mostly from animals: milk, yogurt, cheese; and meat, poultry, fish, dry beans, eggs and nuts. These foods are for protein, calcium, iron and zinc etc.

The next level includes foods that come from plants - vegetables and fruits. Most people need to eat more of these foods for the vitamins, minerals and fiber they supply.

At the base of the Food Guide Pyramid there are breads, cereals, rice and pasta - all foods from grains. We need the servings of these foods each day.

**Nutrition and Diet:**

To be healthy, a person should eat a balanced diet with a variety of nutrients. Nutrients are substances in food needed for normal growth, maintenance and repair of tissues. There are six categories of essential nutrients. They are: Water, Fats, Carbohydrates, Proteins, Vitamins and Minerals.

**i) Water:** The human body has two-thirds of water. Water is an essential nutrient that is involved in every function of the body and is vital for survival.

- Water helps transport nutrients and waste products in and out of cells
- Water is necessary for all digestive, absorption, circulatory and excretory functions
Water is needed for the utilization of the water-soluble vitamins.

It is needed for the maintenance of proper body temperature.

The importance of water in the diet cannot be overestimated. Healthy lifestyles that include exercise and a high fiber diet require plenty of water intakes. Experts suggest that one should take a minimum of 7.5 liters of drinking water per day.  

**ii) Carbohydrates:** Carbohydrates supply the body with the energy it needs to function. It helps regulate how the body uses fat for energy and spares protein. It is the main source of blood glucose, which is a major fuel for all of the body’s cells, and the only source of energy for the brain and red blood cells. Fruits, vegetables, whole grains, peas and beans are natural sources of carbohydrates. Carbohydrates include fiber and starches.

Dietary fiber is the part of a plant that is resistant to the body’s digestive enzymes. Only a relatively small amount of fiber is digested or metabolized in the stomach or intestines. Most of it moves through the gastrointestinal tract and ends up in the stool.

Although most of the fiber is not digested, it delivers several important health benefits. First, fiber retains water, resulting in softer and bulkier stools that prevent constipation and hemorrhoids. A high-fiber diet also reduces the risk of colon cancer, perhaps by speeding the rate at which stool passes through the intestine and by keeping the digestive tract clean. In addition, fiber binds with certain substances that would normally result in the production of cholesterol and eliminates these substances from the body. In this way a high-fiber diet helps lower blood cholesterol levels reducing the risk of heart disease.
iii) **Proteins:** Protein is essential for growth, development and good health. Protein is important in building, maintaining, and repairing body tissues. It provides the body with energy and it is needed for the manufacture of hormones, antibodies, enzymes, and tissues. It also helps maintain the proper acid-alkali balance in the body. When protein is consumed, the body breaks it down into amino acids the building blocks of all proteins. Amino acids are considered *essential* meaning that the body cannot synthesize them and therefore must obtain them from the diet.

Proteins are found in foods of animal origin, vegetables and gelatin. Daily intake should be adequate, but not excessive. Too much protein is not useable and is stored as fat. Beans and brown rice are both quite rich in protein. All soybean products are complete proteins. They contain the essential amino acids plus several other nutrients.

iv) **Fats:** Although most of us don't like our bodies to have "added fat," we need fat in our diets and in our bodies for health. Fats provide energy linoleic acid, an essential nutrient and help carry the fat-soluble vitamins of A, D, E, & K. During infancy and childhood, fat is necessary for normal brain development. We need some fat in the food, but we will have to choose sensibly. We should avoid foods like cheese, whole milk, cream, butter, ice cream, fatty meats, palm oil and coconut oil since these contain saturated fats, which increase the risk for coronary heart disease by raising the blood cholesterol. In contrast, unsaturated fats (found mainly in vegetable oils) do not increase blood cholesterol.

Excessive fat intake is a major causative factor in obesity, high blood pressure, coronary heart disease, and colon cancer, and has been linked to a number of other disorders as well.
v) Vitamins: Vitamins have no calories and are needed only in small amounts. They regulate body processes that promote growth and maintain health and life. There are fat-soluble (vitamins A, D, E, and K) and water-soluble (B-complex and vitamin C) vitamins. Consuming too much of a fat-soluble vitamin can result in toxicity. Water-soluble vitamins do not accumulate in the body. Well-balanced diet will comprise of the essential vitamins.

vi) Minerals: Minerals contain no calories and are needed in small amounts. Their major functions are to influence water distribution in the body, help the body use carbohydrates, proteins and fats, stimulate nerve and muscle cells (e.g., regulate heart beat) and build bones, teeth, blood and cartilage.

The major minerals found in the body are: calcium, phosphorus, sodium, potassium, chloride, magnesium, and sulfur. The trace minerals are: iron, iodine, zinc, copper, manganese, fluoride, chromium, selenium, and molybdenum. As with vitamins, it is better to get minerals from foods rather than supplements.

Vitamins and minerals are essential to life. They are considered nutrients and are often referred to as micronutrients simply because they are needed in relatively small amounts compared with the four basic nutrients.

People who are active and exercise; those who are under great stress, on restricted diets, or mentally or physically ill; women who take oral contraceptives; those on medication; those who are recovering from surgery; and smokers and those who consume alcoholic beverages all need higher than normal amounts of nutrients.
In addition to a proper diet, exercise and a positive attitude are two important elements that are needed to prevent sickness and disease. If one's lifestyle includes each of these, one will feel good and have more energy, something we all deserve. We need to target a healthier diet by thinking positive and acting positive! Think about the foods that we can have, rather than focusing on the foods that we can't have. A "pinch of the right" attitude thus puts one on the way to healthy living.

**Basic Nutrition Guide:** A diet high in nutrients is the key to good health. The following table (Source: Prescriptions for Nutritional Healing, James Balch, MD) can be used as a guide for deciding which type of food to include in one's diet and which type of food to avoid for maintaining good health.
## Basic Nutrition Guide

<table>
<thead>
<tr>
<th>Types of Food</th>
<th>Foods to Avoid</th>
<th>Acceptable Foods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beans</td>
<td>Canned beans, canned beans with salt or preservatives, frozen beans.</td>
<td>All beans cooked without animal fat or salt,</td>
</tr>
<tr>
<td>Beverages</td>
<td>Alcoholic drinks, coffee, cocoa, pasteurized and/or sweetened juices and fruit drinks, sodas, tea (except herbal tea).</td>
<td>Herbal teas, fresh vegetable and fruit juices, cereal grain beverages (often sold as coffee substitutes), mineral or distilled water.</td>
</tr>
<tr>
<td>Dairy products</td>
<td>All soft cheeses, all pasteurized or artificially colored cheese products, ice cream.</td>
<td>Raw goat cheese, nonfat cottage cheese, kefir, unsweetened yogurt, goat’s milk, raw or skim milk, buttermilk, rice milk, all soy products.</td>
</tr>
<tr>
<td>Eggs</td>
<td>Fried or pickled.</td>
<td>Boiled or poached (limit of four weekly).</td>
</tr>
<tr>
<td>Fish</td>
<td>All fried fish, all shellfish, salted fish, anchovies, herring, fish canned in oil.</td>
<td>All freshwater white fish, salmon, broiled or baked fish, water-packed tuna.</td>
</tr>
<tr>
<td>Fruits</td>
<td>Canned, bottled, or frozen fruits with sweeteners added; oranges.</td>
<td>All fresh, frozen, stewed, or dried fruits without sweeteners (except oranges, which are acidic and highly allergenic), untreated fruits, home-canned fruits.</td>
</tr>
<tr>
<td>Grains</td>
<td>All white flour products, white rice, pasta, crackers, cold cereals, instant types of oatmeal and other hot cereals</td>
<td>All whole grains and products containing whole grains: cereals, breads, muffins, whole-grain crackers, cream of wheat or rye, cereal, buckwheat, millet, oats, brown rice, wild rice. (Limit yeast breads to three servings per week.)</td>
</tr>
<tr>
<td>Meats</td>
<td>Beef; all forms of pork; hot dogs; luncheon meats; smoked, pickled, and processed meats; corned beef; duck; goose; spare ribs; gravies; organ meats.</td>
<td>Skinless turkey and chicken, lamb. (Limit meat to three 3-oz servings per week.)</td>
</tr>
<tr>
<td>Types of Food</td>
<td>Foods to Avoid</td>
<td>Acceptable Foods</td>
</tr>
<tr>
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</tr>
<tr>
<td>Nuts</td>
<td>Peanuts; all salted or roasted nuts.</td>
<td>All fresh raw nuts (except peanuts).</td>
</tr>
<tr>
<td>Oils (fats)</td>
<td>All saturated fats, hydrogenated margarine, refined processed oils, shortenings, hardened oils.</td>
<td>All cold-pressed oils: corn, safflower, sesame, olive, flaxseed, soybean, sunflower, and canola oils; margarine made from these oils; mayonnaise without eggs.</td>
</tr>
<tr>
<td>Seasonings</td>
<td>Black or white pepper, salt, hot red peppers, all types of vinegar except pure natural apple cider.</td>
<td>Garlic, onions, cayenne, Spike, all herbs, dried vegetables, apple cider vinegar, tamari, miso, vinegar, seaweed, pulse.</td>
</tr>
<tr>
<td>Soups</td>
<td>Canned soups made with salt, preservatives, MSG, or fat stock; all creamed soups.</td>
<td>Homemade (salt- and fat-free) bean, lentil, pea, vegetable, barley, brown rice, onion.</td>
</tr>
<tr>
<td>Sprouts and seeds</td>
<td>All seeds cooked in oil or salt.</td>
<td>All slightly cooked sprouts (except alfalfa, which should be raw and washed thoroughly), wheat-grass, all raw seeds.</td>
</tr>
<tr>
<td>Sweets</td>
<td>White, brown, or raw cane sugar, corn syrups, chocolate, sugar candy, fructose (except that in fresh whole fruit), all syrups (except pure maple syrup), all sugar substitutes, jams and jellies made with sugar.</td>
<td>Barley malt or rice syrup, small amounts of raw honey, pure maple syrup, untreated blackstrap molasses.</td>
</tr>
<tr>
<td>Vegetables</td>
<td>All canned or frozen with salt or additives.</td>
<td>All raw, fresh, frozen (no additives), or home-canned without salt (undercook vegetables slightly).</td>
</tr>
</tbody>
</table>

Source: Prescriptions for Nutritional Healing, James Balch, MD
http://1stholistic.com/Nutrition/hol_nutrition-Guide.htm

Harmful effects of taking excess supplement: There's increasing evidence that too much of some nutrients may be harmful. While most nutrients are safe, some can be dangerous and too much of anything can be toxic. The fat-soluble vitamins
that can accumulate in the body, such as vitamins A and D, are particularly suspect.

**Nutritional Deficiencies:** Nutritional deficiencies are common and this is especially a problem for the elderly and hospitalized patients. Even many supposedly "normal" people have been found to be nutritionally deficient.

**Nutritional Deficiency and Its Symptoms:**

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Incidence of Deficiency</th>
<th>Typical Symptoms and Diseases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biotin</td>
<td>Uncommon</td>
<td>Dermatitis, eye inflammation, hair loss, loss of muscle control, insomnia, muscle weakness</td>
</tr>
<tr>
<td>Calcium</td>
<td>Average diet contains 40 to 50% of RDA*</td>
<td>Brittle nails, cramps, delusions, depression, insomnia, irritability, osteoporosis, palpitations, periodontal disease, rickets, tooth decay</td>
</tr>
<tr>
<td>Chromium</td>
<td>90% of diets deficient</td>
<td>Anxiety, fatigue, glucose intolerance, adult-onset diabetes</td>
</tr>
<tr>
<td>Copper</td>
<td>75% of diets deficient; average diet contains 50% of RDA*</td>
<td>Anemia, arterial damage, depression, diarrhea, fatigue, fragile bones, hair loss, hyperthyroidism, weakness</td>
</tr>
<tr>
<td>Essential fatty acids</td>
<td>Very common</td>
<td>Diarrhea, dry skin and hair, hair loss, immune impairment, infertility, poor wound healing, premenstrual syndrome, acne, eczema, gall stones, liver degeneration</td>
</tr>
<tr>
<td>Folic acid</td>
<td>Average diet contains 60% of RDA*; deficient in 100% of elderly in one study; deficient in 48% of adolescent girls; requirement doubles in pregnancy</td>
<td>Anemia, apathy, diarrhea, fatigue, headaches, insomnia, loss of appetite, neural tube defects in fetus, paranoia, shortness of breath, weakness</td>
</tr>
<tr>
<td>Nutrient</td>
<td>Incidence of Deficiency</td>
<td>Typical Symptoms and Diseases</td>
</tr>
<tr>
<td>-------------</td>
<td>----------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Iodine</td>
<td>Uncommon since the supplementation of salt with iodine</td>
<td>Cretinism, fatigue, hypothyroidism, weight gain</td>
</tr>
<tr>
<td>Iron</td>
<td>Most common mineral deficiency</td>
<td>Anemia, brittle nails, confusion, constipation, depression, dizziness, fatigue, headaches, inflamed tongue, mouth lesions</td>
</tr>
<tr>
<td>Magnesium</td>
<td>75 to 85% of diets deficient: average diet contains 50 to 60% of RDA*</td>
<td>Anxiety, confusion, heart attack, hyperactivity, insomnia, nervousness, muscular irritability, restlessness, weakness</td>
</tr>
<tr>
<td>Manganese</td>
<td>Unknown, may be common in women</td>
<td>Atherosclerosis, dizziness, elevated cholesterol, glucose intolerance, hearing loss, loss of muscle control, ringing in ears</td>
</tr>
<tr>
<td>Niacin</td>
<td>Commonly deficient in elderly</td>
<td>Bad breath, canker sores, confusion, depression, dermatitis, diarrhea, emotional instability, fatigue, irritability, loss of appetite, memory impairment, muscle weakness, nausea, skin eruptions and inflammation</td>
</tr>
<tr>
<td>Pantothenic acid (B5)</td>
<td>Average elderly diet contains 60% of RDA*</td>
<td>Abdominal pains, burning feet, depression, eczema, fatigue, hair loss, immune impairment, insomnia, irritability, low blood pressure, muscle spasms, nausea, poor coordination</td>
</tr>
<tr>
<td>Potassium</td>
<td>Commonly deficient in elderly</td>
<td>Acne, constipation, depression, edema, excessive water consumption, fatigue, glucose intolerance, high cholesterol levels, insomnia, mental impairment, muscle weakness, nervousness, poor reflexes</td>
</tr>
<tr>
<td>Pyridoxine (B6)</td>
<td>71% of male and 90% of female diets deficient</td>
<td>Acne, anemia, arthritis, eye inflammation, depression, dizziness, facial oiliness, fatigue, impaired wound healing, irritability, loss of appetite, loss of hair, mouth lesions, nausea</td>
</tr>
<tr>
<td>Nutrient</td>
<td>Incidence of Deficiency</td>
<td>Typical Symptoms and Diseases</td>
</tr>
<tr>
<td>-----------</td>
<td>---------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Riboflavin</td>
<td>Deficient in 30% of elderly Britons</td>
<td>Blurred vision, cataracts, depression, dermatitis, dizziness, hair loss, inflamed eyes, mouth lesions, nervousness, neurological symptoms (numbness, loss of sensation, &quot;electric shock&quot; sensations), seizures. Sensitivity to light, sleepiness, weakness</td>
</tr>
<tr>
<td>Selenium</td>
<td>Average diet contains 50% of RDA</td>
<td>Growth impairment, high cholesterol levels, increased incidence of cancer, pancreatic insufficiency (inability to secrete adequate amounts of digestive enzymes), immune impairment, liver impairment, male sterility</td>
</tr>
<tr>
<td>Thiamin</td>
<td>Commonly deficient in elderly</td>
<td>Confusion, constipation, digestive problems, irritability, loss of appetite, memory loss, nervousness, numbness of hands and feet, pain sensitivity, poor coordination, weakness</td>
</tr>
<tr>
<td>Vitamin A</td>
<td>20% of diets deficient</td>
<td>Acne, dry hair, fatigue, growth impairment, insomnia, hyperkeratosis (thickening and roughness of skin), immune impairment, night blindness, weight loss</td>
</tr>
<tr>
<td>Vitamin B-12</td>
<td>Serum levels low in 25% of hospital patients</td>
<td>Anemia, constipation, depression, dizziness, fatigue, intestinal disturbances, headaches, irritability, loss of vibration sensation, low stomach acid, mental disturbances, moodiness, mouth lesions, numbness, spinal cord degeneration</td>
</tr>
<tr>
<td>Vitamin C</td>
<td>20 to 50% of diets deficient</td>
<td>Bleeding gums, depression, easy bruising, impaired wound healing, irritability, joint pains, loose teeth, malaise, tiredness.</td>
</tr>
<tr>
<td>Vitamin D</td>
<td>62% of elderly women's diets deficient</td>
<td>Burning sensation in mouth, diarrhea, insomnia, myopia, nervousness, osteomalacia, osteoporosis, rickets, scalp sweating</td>
</tr>
<tr>
<td>Vitamin E</td>
<td>23% of male and 15% of female diets deficient</td>
<td>Gait disturbances, poor reflexes, loss of position sense, loss of vibration sense, shortened red blood cell life</td>
</tr>
</tbody>
</table>
Problems of Modern Living and Need of Yoga

<table>
<thead>
<tr>
<th>Vitamin K</th>
<th>Deficiency in pregnant women and newborns common</th>
<th>Bleeding disorders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zinc</td>
<td>68% of diets deficient</td>
<td>Acne, amnesia, apathy, brittle nails, delayed sexual maturity, depression, diarrhea, eczema, fatigue, growth impairment, hair loss, high cholesterol levels, immune impairment,</td>
</tr>
</tbody>
</table>

**source:** http://www.1stholistic.com/Nutrition/hol_nutr-def-symptoms.htm

**Other aspects of food habit affecting physical health:**

**Time factor with respect to the biological clock:** Irregular timings of eating is a common feature of modern living, which leads to physical health problems like indigestion, acidity, constipation etc. In ideal living conditions and in early days people used to have fixed timings for breakfast, lunch or dinner. But in modern living people often do not maintain time for eating. Remaining awake and taking dinner at late in the night is a common feature of modern living. People of modern day seems to have forgotten the old popular saying "Early to bed and early to rise makes a man healthy wealthy and wise".

For some people in the urban areas and industrial belts it is a compulsion because of their nature of job, however, for some late night parties and dinner are by choice or culture. Irregular timings of taking food daily, taking heavy meals just before going to bed and eating even if there is no hunger affects the biological clock of the body and lead to many health problems. One should try to maintain the breakfast/lunch/ dinner timings as far as possible.

Apart from maintaining time for taking breakfast/lunch/ dinner, one should also have periods of food restrictions at regular intervals. Fasting at regular intervals has been a tradition in Indian
culture and this is scientific requirement of good health. Many religious events in India are associated with fasting. Fasting stabilises the metabolic functions of the body. Father of the nation, Mahatma Gandhi was a great proponent of fasting. For him fasting was a spiritual act, going deeper into one’s inner being and it was synonymous with prayer. 

**Eating style (slow eating pays):** Eating slower lessens our chances of getting fatter. Chewing food slowly and eating slowly helps proper digestion of the food. This simple habit can delay the development of diabetes in our bodies.

**Effect of food habit on Govt. expenditure & society as a whole:** Unhealthy eating habits not only lead to various health problems for an individual but also increase the cost of the government in maintaining health of their employees as a whole. According to a new study from the WHO for Health Economics, the cost for unhealthy eating habits of society as a whole is increasing every year. The cost analysis is based on cost for health care related to overweight. Overweight leads to further complications such as diabetes, high blood pressure, stroke, vascular spasm and heart attacks and increase govt. expenditure on providing/maintaining health care facilities. Healthy food and healthy eating is a key to a healthier population. The price of obesity becomes even higher when indirect costs such as reduced productivity are taken into account.

**Role of dietary factors in development of obesity & diabetes:** Typical modern day diet is high in fat content. Excess fat in diet increases fat storage in body and thus lead to overweight/obesity and subsequently to diabetes.
Food habit and Cardio vascular diseases: Typical modern day diet and junk foods have tendency to increase cholesterol levels in body which leads to heart diseases.

Food habit & Cancer: Dietary factors also play a significant role in cancer risk. Dietary factors also play a significant role in cancer risk. At least one-third of annual cancer deaths in the world are due to dietary factors. A recent review on diet and cancer estimates that up to 80 percent of cancers of the large bowel, breast, and prostate are due to dietary factors.  

Cancers of the mouth, throat and stomach are due to dietary factors. Cancers are caused mainly by tobacco. Lung cancer is the most obvious example, but by no means the only one. Cancers of the mouth, throat, kidney, and bladder are also caused by tobacco. Chewing of pan masala & gutka also leads to mouth cancer.

The link between diet and cancer is not new. Numerous research studies have shown that cancer is much more common in populations consuming diets rich in fatty foods, particularly meat, and much less common in countries eating diets rich in grains, vegetables, and fruits. One reason is that foods affect the action of hormones in the body. They also affect the strength of the immune system and other factors. While fruits and vegetables contain a variety of vitamins, minerals, antioxidants, and phytochemicals to protect the body, by contrast, recent research shows that animal products contain potentially carcinogenic compounds which may contribute to increased cancer risk.

Foods and Immunity: Boosting intake of vitamin-rich vegetables and fruits strengthens immune system and helps knock out cancer cells. White blood cells in our blood destroy cancer cells and
bacteria. The function of white blood cells is improved by intake of beta-carotene found in carrots, vegetables and fruits. Vitamins C and E improve immune function in addition to their antioxidant effects hence more of these should be included in our diet. Fats impair immunity, and cutting fat out of the diet helps strengthen the immune defenses against cells that turn cancerous. It has been observed that vegetarians have stronger immune systems than meat-eaters. The immune-boosting power of vegetarian diets is partly due to their vitamin content, their low fat content, and perhaps other contributors, such as reduced exposure to toxic chemicals and animal proteins. The amount of secretion of hormones in our bodies and their actions are determined, to a large extent, by the foods we eat.
b. Lack of Physical Exercise

Lack of physical exercise is also a common feature of modern living. Modernization and advancement in the field of science & technology has given rise to (i) home products like television, grinders, washing machine, vacuum cleaners etc. (ii) commuting systems like motor vehicles & trains and (iii) Lifts in office buildings. These things in turn have made men physically less active. In pre modernization era and in most of the rural areas even today, people are physically more active because of absence of such facilities. Earlier people were compelled to do a lot of physical work daily not only to earn their livelihood but also to manage their day-to-day homely jobs & societal activities. Advent of machines has made life of men more comfortable but simultaneously one has to pay the price if he becomes slave to the facilities of modern living. Lack of physical exercise is a common phenomenon in urban area, as the typical office jobs do not involve much physical activity.

Levels of inactivity are high in virtually all developed and developing countries. In the rapidly growing urban areas of the developing world, physical inactivity is a great problem. Crowding, poverty, crime, traffic, low air quality, and a lack of parks, sports and recreation facilities, and sidewalks make physical activity a difficult choice. Even in rural areas of developing countries sedentary pastimes, such as watching television, are increasingly becoming popular.

The human body is meant to be active most of the time. Instead, average man and women today spend a considerable amount of time watching television. Man has sedentary job and does not find time to exercise on a regular basis. People are becoming more
overweight now a day than at any time in the history. Even children are becoming increasingly obese and out of shape due to lack of physical activity.

Despite the well known benefits, most adults and children lead relatively sedentary lifestyles. They are not active enough. A sedentary lifestyle is defined as engaging in no leisure-time physical activity (exercises, sports, physically active hobbies) in a two-week period. Typically alot of older people lead sedentary lifestyles. More than one-third of young people in grades 9-12 do not exercise regularly. They tend to watch too much television.\textsuperscript{10}

**Harmful effects of lack of physical activity:** Lack of physical activity is a major underlying cause of death, disease and disability today. The results of lack of physical activity are increased levels of obesity, diabetes, cardiovascular disease, colon cancer, high blood pressure, osteoporosis, depression and anxiety.

**Lack of Physical Activity – Facts:** Preliminary data from a WHO study on risk factors suggest that physical inactivity or sedentary lifestyle is one of the ten leading causes of death and disability. WHO has assessed the global burden of disease from 22 health risk factors, including physical in-activity. It is clear that physical inactivity is a major public health problem that affects huge number of people in all regions of the world. As per the results published in the World Health Report-2002\textsuperscript{11} and reports published in the web site of eduar para a saude\textsuperscript{12} certain facts of about lack of Physical exercise are listed below.

- In countries around the world between 60% and 80% of adults are simply not active enough to benefit their health.
- At least 60% of the global population fails to achieve the minimum recommendation of 30 minutes moderate/intense
physical activity daily. The risk of getting a cardiovascular disease increases by 1.5 times in people who do not follow minimum physical activity recommendations.

➢ Physical inactivity is estimated to cause 2 million deaths worldwide annually. Globally, it is estimated to cause about 10-16% of cases each of breast cancer, colon cancers, and diabetes, and about 22% of ischaemic heart disease.

➢ Estimated attributable fractions are similar in men and women.

➢ The global estimate for the prevalence of physical inactivity among adults is 17%.

➢ Estimates for prevalence of some, but insufficient, activity (<2.5 hours per week of moderate activity) ranged from 31% to 51%, with a global average of 41% across the sub-regions.

➢ Inactivity greatly contributes to medical costs

➢ Increasing physical inactivity is a societal, not just an individual problem and demands a population-based, multi-sectoral, multi-disciplinary and culturally relevant approach.

The WHR 2002 data only estimates the prevalence of physical inactivity among people aged 15 years and over, which suggests the total figures could be higher. Physical activity declines with age, falling off from adolescence, and physical activity and physical education is declining in schools worldwide. Inactivity is generally higher amongst girls and women.

Opportunities for people to be physically active exist in the four major domains of their day.

These are:

➢ At work (whether or not the work involves manual labour)
➢ For transport (walking or cycling to work, to shop etc)
➢ During domestic duties (all types of housework)
➢ In leisure time (sports and recreational activities)
Confounding Factors of Sedentary Lifestyles

a) At individual or community level
   - Insufficient knowledge
   - Lack of education
   - Stressful living conditions
   - Fast life
   - Wrong attitudes
   - False practices

b) At the National/Global level
   - Overcrowding
   - Poverty
   - Crime
   - Traffic
   - Poor quality of air
   - Lack of parks and gardens
   - Dug up sidewalks
   - Lack of sports and recreation facilities
   - Lack of safe areas and playground
   - Budget restraints

Importance of Physical Activity for Health: Available experience and scientific evidence show that regular physical activity provides people with a wide range of physical, social and mental health benefits. Appropriate regular daily physical activity is a major component in preventing and controlling certain chronic diseases such as, cardiovascular diseases, obesity, diabetes and osteoporosis. Physical activity interacts positively with strategies to improve diet, discourage the use of tobacco, alcohol and drugs, helps reduce violence, enhances functional capacity and promotes social interaction and integration.
Regular moderate physical activity is one of the easiest ways to improve and maintain our health. Being physically active increases energy levels, helps to reduce stress and lowers unhealthy levels of cholesterol and blood pressure. It also lowers risk of cancers, especially colon cancer. Regular active play promotes healthy growth and development in children and young people. It increases confidence, self-esteem and feeling of achievement. Older adults benefit from both, life long habits or newly learned routines of physical activity. It is important for healthy aging, improving and maintaining quality of life and independence. Daily physical activity helps with disabilities by improving mobility and increasing energy levels. It can also prevent or reduce certain disabilities.

Regular activity, fitness and exercise, are critical for the health and well being of people of all ages. Everyone, young or old can get benefit from regular physical activity, either vigorous or moderate. Even very old persons can improve mobility and function through physical activity. It should be a priority for everyone. Millions of people suffering from chronic illnesses can also get significant benefit through activity. People who are active outlive those who are inactive.

Physical activity maintains muscle strength, joint structure, joint-functioning and bone health. Exercise has an effect on mental health as well especially among young people. It increases the capacity for learning, increases self-esteem and reduces anxiety and stress. It can introduce and develop skills such as teamwork, self-discipline, sportsmanship, leadership and socialization. Lack of recreational activity may contribute young people to intend towards gangs, drugs or violence.
Regular physical activity is the key to maintain a healthy weight. Public and private sectors need to encourage more physical activity. The most important change has to come from the individual and families. Every person must realize the benefits of physical activity for the mind and body. They should commit to a lifestyle that is more active and beneficial for the whole family. Getting physically active is an important step in moving for health. However physical inactivity is not merely the result of an individual’s lifestyle. Government policies and programmes can have a great impact on people’s ability to influence their own health. Introduction of yoga into school curriculum will be a positive step in this direction.

Any amount of physical activity i.e. "any body movement that results in an expenditure of energy (burning calories) simply put moving" will make one feel better. The minimum amount of physical activity required for the prevention of disease is about 30 minutes of moderate activity everyday\textsuperscript{14} At least half an hour of moderate physical activity each day is sufficient to keep one self physically healthy. Yoga can be of great help in order to promote physical health. A community should prioritize and develop practices such as karma yoga for a more vibrant public life. One should try to do jobs on his own like wash his own clothes, windows of home, paint walls, sweeping of house, cut the grass, gardening, walk the dog etc.

**How physical activity helps:** Physical activity improves glucose metabolism, reduces body fat and lowers blood pressure; these are the main ways in which it is thought to reduce the risk of CVD, obesity and diabetes. It can also help manage and mitigate the effects of these diseases. Physical activity may also reduce the risk
of colon cancer by its effects on prostaglandins, reduced intestinal transit time and higher antioxidant levels.\textsuperscript{15}

Physical activity is associated with a lower risk of breast cancer, which may be the result of effects on hormonal metabolism. Participation in physical activity can also improve musculo-skeletal health, control body weight and reduce symptoms of depression. The possible beneficial effects on musculo-skeletal conditions such as and lower back pain, osteoporosis and falls, as well as on obesity, depression, anxiety and stress, have been well reported in a number of studies.

Physical movement and exercise are necessary for the lymphatic system to operate properly. Cells live in a “sea” of lymph, a clear-to-white fluid through which nutrients are delivered to the cells and into which cells dump their metabolic waste. One of the functions of the lymphatic system is to be the body’s “sewer system”, drawing toxins from the cells and dumping them into the blood.

The blood distribution system is powered by the heart. The lymphatic system is powered by body movement. Therefore, metabolic waste products cannot be completely cleared unless one is physically active.

The second important aspect of lack of physical exercise is lack of perspiration. The skin is a major outlet for waste products; when one is physically active, he perspires and thus the waste products are disposed of through the skin.

The third benefit of an active lifestyle is that muscle mass is retained. The muscle cells are where fat is burned. The more
muscle cells one has the stronger he is and more fat he burns. That is why yogic practice is essential for weight control.

Physical exercise is also fundamental in maintaining a healthy body and an active lifestyle. Exercise can help one mentally as well as physically. Psychological benefits such as a greater sense of well being increased self-esteem and decreased anxiety or depression have all been linked to exercise. Benefits increase dramatically when exercise becomes a lifelong commitment. Experts continue to remind us that the many health benefits offered by exercise should cause us to make it a lifetime priority.

**Regular exercise helps to:**

- Prevent heart disease (aerobic) by improving heart and lungs
- Decreases bad cholesterol (total and LDL cholesterol)
- Increases good cholesterol (HDL cholesterol)
- Normalize blood pressure (aerobic)
- Regulate blood sugar & Controls or prevents diabetes
- Prevent bone mineral loss
- Support body structure & muscles
- Decreases body fat & promotes weight loss
- Promote flexibility & Decreases risk of bone injuries and joint problems
- Increases energy levels
- Reduces levels of stress and depression & it makes one look and feel good
- Economic benefits, especially in terms of reduced health care costs, increased productivity, and healthier physical and social environments.
There is clear consensus in recommending at least 30 minutes of moderate/rigorous physical activity daily. Increased benefits come from doing more, especially more vigorous activities and these are highly recommended for youth to support healthy bones and muscles. Physical activity does not necessarily mean running a strenuous marathon or playing competitive sports rather, for many people, it is about walking the children to school or taking a brisk stroll in the park. It means taking the stairs instead of the elevator or getting off the bus two stops early. The duration rather than the intensity of physical activity is important. Thus, a moderate amount of activity can be obtained in a 30 minute brisk walk.

Patterns of physical activity acquired during childhood and adolescence are more likely to be maintained throughout the life span providing the base for active and healthy life. Unhealthy lifestyles - including sedentary behaviour, poor diet and substance abuse adopted at a young age are likely to persist. Physical activity is not merely about individual behaviour. Multi-sectoral policies and initiatives are needed to create environments that help people to be physically active.16

These should be:

- Population-based collective actions, involving various stakeholders, including public and private sector groups and NGOs.
- These should involve multiple sectors - especially health, sport, education, transport and culture, and recreation ministries as well as urban planners and local governments/municipalities.
- They should be culturally relevant and partnership-based.
- They should promote physical activity in all life settings.
They should make use of major sport, health and cultural events.

Regular exercise reduces a person's risk of premature death as well as the risk of developing heart disease, cancer, obesity and other diseases. People can substantially improve their health and quality of life by including moderate amounts of physical activity in their daily routine. Awareness among people will add to a larger ongoing process to promote physical activity worldwide in the context of an integrated approach to the prevention of chronic diseases, health promotion and socio-economic development.

However, it may be noted that exercise alone is not sufficient. It is important for people to remember that balancing physical activity with food intake is the key to maintain good health. The benefits of combining physical activity with calorie control are greater.

Major Conclusions:

- Insufficient physical activity resulting in fewer calories used than consumed contribute to the high prevalence of obesity
- Physical activity may favorably affect body-fat ratio.
- People of all ages, both male and female get benefit from regular physical activity.
- Significant health benefits can be obtained by including a moderate amount of physical activity on most, if not all, days of the week.
- Additional health benefits can be gained through greater amounts of physical activity.
- Physical activity reduces the risk of premature mortality in general and of coronary heart disease, hypertension, colon cancer and diabetes mellitus in particular.
- Physical activity also improves mental health.
➤ Physical activity is important for muscles, bones and joints

**Additional benefits of exercise:** Regular exercise can improve glucose tolerance, decrease plasma insulin and improve the lipid profile in obese individuals. Some benefits of exercise may be related to a change in body fat mass (especially in visceral fat) although there also seems to be an independent effect. It seems prudent to recommend increased physical activity to all obese & obese diabetic patients, in combination with dietary manipulation as part of an overall lifestyle management programme.

**Increasing energy expenditure:** Simply walking 30 minutes a day can have a measurable impact on a person's health and in preventing diseases such as diabetes. Playing with our children for an hour each day in the backyard improves the entire family's health. One doesn't need to join a gym or be a great athlete to get active.

WHO's latest projections\(^{17}\) indicate that:

- globally in 2005 approximately 1.6 billion adults (age 15+) were overweight and at least 400 million adults were obese.
- by 2015, approximately 2.3 billion adults will be overweight and more than 700 million will be obese. At least 20 million children under the age of 5 years are overweight globally in 2005.

What is particularly alarming is increase in the percentage of young people who are overweight. For example, the percent of adolescents aged 12-19 who are overweight has almost tripled in the past 20 years. By maintaining a healthy weight, more young people would be able to avoid negative behaviors that can lead to depression and stress. In fact, studies show that participation in
physical activity and sports can increase self-esteem, reduce anxiety and stress and promote social well-being among youths.\textsuperscript{18}

**Keeping Up Motivation:** Many times, we begin an exercise program or yoga and then gradually abandon it as time goes on. One thing is certain - in order to reap the full benefits, one needs to be physically active for a lifetime. If physical activity is stopped much of the fitness gained is lost within 2 weeks.

Some familiar excuses for men/women who are physically inactive come under the following categories:

- Lack of time
- Social influence
- Lack of energy
- Lack of will power
- Fear of injury
- Lack of skill
- Lack of resources

However, anything too much is harmful, just like in doing exercise. Most of the time, we hear physical therapists and fitness experts that we must exercise regularly and in moderate form at the same time, following a strict pattern of movements and diet monitoring. This is true because some people tend to push themselves to the limits and exercise until they faint all because they want to have its result in the shortest period of time. The result is sprains and injuries that literally cause a big damage to the physical and emotional conditions of the person injured.

**Physical activity for reducing obesity & diabetes:** Physical activity is also a key element of many weight management programmes. It has favourable effects on a wide range of
physiological parameters and is useful for preventing the adaptive decrease in the basal metabolic rate which occurs in response to energy restriction. Physical activity is thus a very useful component of any weight management programme.

Regular exercise can improve glucose tolerance, decrease plasma insulin and improve the lipid profile in obese individual. Some benefits of exercise may be related to a change in body fat mass (specially increased fat) although there also seem to be an independent effect. Exercise improves insulin sensitivity. This may be of particular value to individuals with insulin resistance, such as those who are obese. The improvement in insulin sensitivity does not necessarily require a long interval of physical training.

**Particular Health Problems arising out of modern living:** Bad Food habits combined together with lack of physical activity in modern living lead to a host of physical health problems. The particular physical health problems arising out of modern living include Obesity, Diabetes, Cardiovascular Diseases (CVDs), Some form of cancers like that of lungs, mouth, colon, etc., Gastritis i.e. hyperacidity, indigestion etc., Cervical spondylitis, Back pain, Headache, etc. just to name a few. Some of the problems and its extent are as narrated below;

**Modern living & Obesity:** Most common physical health problem of modern living is obesity. It can be defined as an excess of body fat. Dependent on the degree, this pathological condition is classified as 'overweight' or 'obesity'. It is one of the biggest challenges faced today in many parts of the world. The rising epidemic reflects the profound changes in society and in behavioural patterns of communities over recent decades. While genes are important in determining a person's susceptibility to
weight gain, energy balance is determined by calorie intake and physical activity.

Economic growth, modernization, urbanization and globalization of food markets are just some of the forces thought to underlie the epidemic. As incomes rise and populations become more urban, diets high in complex carbohydrates give way to more varied diets with a higher proportion of fats, saturated fats and sugars. At the same time, large shifts towards less physically demanding work have been observed worldwide. Moves towards less physical activity are also found in the increasing use of automated transport, technology in the home, and more passive leisure pursuits.

The number of overweight/obese men & women across the globe is increasing rapidly. Over the past decade, obesity levels have risen drastically. Moreover, there is no sign of this trend slowing. Perhaps even more concerning is the growing rate of obesity in children. Obesity has reached epidemic proportions globally with more than 1 billion adults overweight - at least 300 million of them clinically obese.19

The Body Mass Index: One of the most widely accepted means of assessing obesity is the Body Mass Index or BMI (sometimes called the Quetelet Index after its original proponent). It is calculated as follows.

\[ \text{BMI, Kg/ (m}^2\) = \frac{\text{Body weight in kg}}{\text{height in m}}^2 \]
<table>
<thead>
<tr>
<th>Classification</th>
<th>BMI (Kg/m²)</th>
<th>Risks of co-morbidities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underweight</td>
<td>&lt;18.5</td>
<td>Low (but risk of other clinical problems increased)</td>
</tr>
<tr>
<td>Normal range</td>
<td>18.5-24.9</td>
<td>Average</td>
</tr>
<tr>
<td>Overweight</td>
<td>≥ 25.0</td>
<td>Increased</td>
</tr>
<tr>
<td>Pre-obese</td>
<td>25.0-29.9</td>
<td>Moderate</td>
</tr>
<tr>
<td>Obese class I</td>
<td>30.0-34.9</td>
<td>Severe</td>
</tr>
<tr>
<td>Obese Class II</td>
<td>35.0-39.9</td>
<td>Very Severe</td>
</tr>
<tr>
<td>Obese Class III</td>
<td>&gt;40.0</td>
<td></td>
</tr>
</tbody>
</table>

Classification of overweight in adults according to BMI (Modified according to WHO Report 1998)

**Modern living and Diabetes:** Diabetes is another common disease of modern living. Since the blood sugar of people varies constantly, it is often difficult to tell whether one has the disease or not. The disease is mostly discovered after a regular medical examination and often already in its advanced stage. The diabetes epidemic is underway. As per WHO’s estimate the number of people with diabetes, world-wide, in 2000 – is 177 million. This is likely to increase to at least 300 million by 2025. Much of the increase in diabetes will occur in developing countries, due to population growth, ageing, unhealthy diets, obesity and sedentary lifestyles.

Although scientists are not sure why diabetes occurs, many factors influence the chance of developing the condition. Diabetes can be of two types i.e. Type-1 and Type-2.

**Type-1 Diabetes:** It is an autoimmune disorder that affects the way the body processes and uses nutrients. When a person eats food, most of it is broken down into glucose the form of sugar that is used to fuel the body. The glucose is absorbed into the
bloodstream, where it is used by cells for energy. For the glucose to pass into the cells, insulin must be present. In type-1 diabetes, the immune system destroys the beta cells that produce the insulin. Without insulin, the glucose cannot reach into the cells and remains in the bloodstream. The cells in the body starve because they are not receiving the necessary fuel from glucose. Eventually, some of the glucose is excreted from the body in urine, a condition known as glucosuria.

Possible complications of type-1 diabetes, which are more common in patients with a long history of the disease, include: high BP, heart problems, chronic kidney failure, Eye diseases including glaucoma and cataracts, nerve diseases, low bone density and increased risk of fractures and osteoporosis, foot problems, skin conditions, sexual dysfunctions, Urinary tract infection etc.

Type-1 diabetes may also cause vascular and structural damage to the inner ear and impair hearing. In addition, people with type-1 diabetes who are using insulin are at increased risk of low blood glucose. Complications of low glucose can range from dizziness to seizures to diabetic coma.

**Type-2 Diabetes:** Type-2 diabetes is the most common type of diabetes. It is a disease of metabolism. It occurs when glucose builds up in the blood due to the body's inability to use insulin effectively. Insulin is a hormone that is essential to transport glucose, a sugar that is the body's primary fuel into the cells. Excess fat, inactivity and poor eating habits contribute to type 2 diabetes. Sometimes the disease can be prevented or controlled through diet and exercise, but some patients need insulin or other medications. The soaring incidence of type-2 diabetes in recent years is blamed largely on the soaring incidence of obesity, due to physical inactivity and overeating.
Modern living and Cardio-Vascular Diseases (CVD): Due to unhealthy food habits and lack of physical exercise in modern living CVD have increased. As per WHO's latest projections indicate that CVD made up 16.7 million, or 29.2% of total global deaths according to World Health Report 2003. Around 80% of CVD deaths took place in low and middle-income countries. By 2010, CVD will be the leading cause of death in developing countries.21

The major CVDs include:

- Coronary (or ischaemic) heart disease (heart attack)
- Cerebrovascular disease (stroke)
- Hypertension (high blood pressure)
- Heart failure
- Rheumatic heart disease

Lower socioeconomic groups generally have a greater prevalence of risk factors, diseases and mortality in developed countries, and a similar pattern is emerging as the CVD epidemic matures in developing countries. The rise in CVDs reflects a significant change in diet habits, physical activity levels, and tobacco consumption worldwide as a result of industrialization, urbanization, economic development and food market globalization. People are consuming a more energy-dense, nutrient-poor diet and are less physically active. Imbalanced nutrition, reduced physical activity and increased tobacco consumption are the key lifestyle factors. High blood pressure, high blood cholesterol, overweight and obesity - and the chronic disease of type 2 diabetes - are among the major biological risk factors. Unhealthy dietary practices include the high consumption of saturated fats, salt and refined carbohydrates, as well as low consumption of fruit and vegetables. These risk factors tend to cluster.
Modern living & Cancer: Some form of cancers like lungs cancer, oral/mouth cancers, cancer in colon etc. are the results of modern living due to smoking and use of tobacco & pan masala/gutka etc. Dietary imbalances: lack of sufficient amounts of dietary fruits and vegetables also help growth of cancer cells. Sedentary lifestyle, devoid of moderate physical activity seems to raise the risk of ovarian cancer in woman. The findings of various research suggest that a sedentary lifestyle could lead to hormonal changes that promote the development of cancerous cells. Pan masala containing tobacco was introduced in Indian market during the 1970s. Research and studies on pan masala/gutka reveal that it is likely to be carcinogenic. When combined with tobacco, it not only leads to cancer but damages other organs of the body as well. Chewing tobacco is a known cause of cancer of oral cavities, pharynx and oesophagus.

Other diseases associated with Modern living.

Gastritis: Anything that irritates the stomach may be a cause; over-eating, eating improper food, spicy food, improper combination, swallowing chemicals of any kind. Symptoms are: vomiting, pain, nausea, bloating of stomach, coated tongue, bad breath, feeling more thirsty and aversion to food.

Flatulence: Flatulence is a sign of gases stuck in the intestine due to disturbed digestion as a result of habitual eating of unwise food mixtures and combinations, besides sedentary habits and lack of exercises. However, cleansing the gastro-intestinal tract of stagnant putrefactive material through enema and fasting for 2-4 days followed by light diet comprising of fruits and vegetables, one can get rid of the trouble.
Hyper-Acidity: This is a condition which arises in the stomach purely as a result of habitual eating of excessive quantities of refined, fried, starchy, sour and sugary food. When excessive quantities of starchy and sugary food are eaten as they always are in conjunction with protein foods (meat, fish, eggs, cheese etc.), the proteins are digested first while the starchy food (grain, chapati, porridges, rice etc.), is left to ferment and acidify in the stomach before passing on to the intestine for digestion. It is obvious that to try to cure hyper acidity by taking medicines or powders is futile. Such treatment can only aggravate the condition in the long run.

Ulcer: Ulcer is a condition born out of wrong diet and indigestion. Besides, stress, worry and emotional problems, jealousy, frustration, guilt or loneliness also contribute to ulcers. Stress gives rise to production of excess acid in the stomach and it is this excess acid that causes ulcer. Symptoms of ulcer are heart burn, belching, acidity, gnawing, discomfort or pain in the stomach. Diet plays an important role in the treatment of ulcers.

Headaches: Recurrent headaches are a very frequent complaint among heavy computer users and in most office environments today. Typically these are caused by a multitude of issues regarding computer use. Poor screen position, too small font, screen too bright/too dark, poor sitting posture are all commonly reported causes of chronic headache. If they occur the same time every day or if they do not appear on non-work days, these are the clues that point to a computer cause. Poor eyesight sometimes may also be a cause of chronic headaches.

Back Pain: Back pain as well is a frequent complaint in most of the office environments today. In the general patient population, chronic back pain is often a sign of depression; however, in the
geek this is more frequently due to work conditions or to overuse. Poor posture, incorrectly sized chair, or poorly positioned monitors are common culprits.

The weekend warrior syndrome often causes the overuse back injury here. All week long the back becomes weak from sitting at the computer desk all day. On the weekend, yard work or lifting causes strain on these underdeveloped muscle units.

**Cervical spondylitis**: Cervical spondylitis is a degeneration in the bones and discs of the neck. This causes pain, stiffness or even numbness often running down the arms. Cervical spondylitis was normally seen in the elderly. But today it is becoming frequent in the youth also. This problem causes pain, stiffness and numbness in the neck - often running down the arms. Modern lifestyles, with little exercise and long working hours, have contributed to the prevalence of this ailment.
c. Pollution

Pollution may be defined as the introduction by man into the environment of substances or energy liable to cause hazards to human health, harm to living resources and ecological systems, damage to structure or amenity, or interference with legitimate use of the environment.²²

Modern living contrary to ideal living condition is characterized by pollution of the atmosphere all around. Number of industries & vehicles has increased many folds over the past few decades. This has led to pollution of the air and water vital for survival of life on earth. Use of pesticides to increase crop productivity has degraded the land and cereals, vegetables contain traces of pesticide. Thus the food available is contaminated. The air we breathe, water we drink, food we consume all are polluted beyond the prescribed norms of healthy living. These are directly and indirectly affecting our health and most of the time are acting as a silent killer.

Health Effects of Climate Change and Air Pollution:

Scientific projections indicate that climatic changes affect the health both directly and indirectly.²³

➢ There are two types of direct health effects of climatic changes. The first is those caused by projected higher temperatures. Examples include increases in illness and death from heat stroke and dehydration. The second is injury, illness and death caused by extreme weather conditions leading to floods, draughts etc.
➢ Climatic changes could also have significant indirect health effects, as changes in climate trigger other changes that
could affect health. An example would be the transmission of infectious diseases such as malaria, dengue and yellow fever.

➢ Another potential health effect of climate change is increased illness related to air pollution. Fossil fuel use produces two main greenhouse gases (GHGs): carbon dioxide and methane. Fossil fuel use also produces other by-products which do cause air pollution, such as smog. As well, increasing temperatures anticipated with climate change can serve to magnify the effects of pollutants already in the air.

➢ Children, the elderly, and people suffering with cardiorespiratory problems, are at highest risk of experiencing adverse health effects due to air pollution even at today's levels. Projections of more frequent and severe heat waves due to future climate change indicate that these air pollution problems may worsen.

➢ Increase in hot weather is expected to result in an increase in heat-related deaths in urban centres. Projections of more frequent and severe heat waves and humidity could lead to increases in smog and air pollution advisories. Increases in pollens and mold spores would compound the situation and affect those with cardiovascular disease, respiratory disorders such as asthma, emphysema and chronic bronchitis, and allergy problems.24

➢ Trees and other vegetation that give rise to allergenic pollens grow more profusely in a warmer climate. When combined with smog and other atmospheric pollutants, illness from allergic respiratory disease, particularly asthma, could increase.

➢ Projections of frequent and extreme weather events such as floods, & droughts, are of concern as these could increase deaths, injuries, infectious diseases (with contaminated run-
off affecting water supplies) and stress-related disorders associated with social disruption and environmentally forced migration.

➢ The quality and the quantity of drinking water could decrease as water sources in some areas become threatened by drought. Health disorders related to environmental and water contamination by bacteria, viruses, protozoa and parasites could also increase.

➢ Many Aboriginal communities that follow a traditional diet based on hunting, fishing and other resource-based activities, could be vulnerable to health problems due to predicted changes in the amount and distribution of wildlife, fish and vegetation.

➢ Improved health can be one of the benefits of taking action to mitigate climate change and there are tangible ways to help reduce GHG emissions. At times, it means changing our lifestyle. Driving less is one part of the solution. By walking or cycling more often instead of driving, we reduce greenhouse gas emissions, benefit from more physical activity and eliminate stress in a healthy way.

The most threatening form of pollution today is chemical pollution. The amount of chemical pollution in modern world is unprecedented in human history. We dump nearly 6,000,000,000 pounds of chemicals into our environment every year. It’s no wonder that 9 out of 10 mothers on the face of the planet are nourishing their infants with breast milk laced with DDT. Nearly all of us are carrying DDT and a host of other chemicals in our body.25
Negative effects of environmental toxicity include decreased immune function, nervous system problems, depression, irritability, fatigue, and memory loss.

Environmental pollution does not occur "somewhere else". It is in our immediate environment i.e. our home, our car, our office, our neighborhood and our city. We are exposed to chemicals from the air we breathe, the water we drink, and the food we eat. In other words, we are surrounded daily by chemicals that are either toxic or have unknown health consequences.

Our own home could be a major source of environmental pollution. New carpets, cabinets, and furniture are notorious for releasing toxic chemical gases. So are paints and solvents. Any plastic product or packaging may release undesirable chemicals. We spray our garden or lawn with pesticides or herbicides. Even personal care products such as deodorants, shampoo, and cosmetics may contain materials that are unhealthy. If we count the number of potentially unhealthy chemicals in or around our home, the high number would shock us. Chemical and other kinds of pollution are a serious threat to our health.

**Pollution within our body**: Pollution also occurs as a result of processes inside our body. One example is incompletely digested food particles due to modern living that leak through gut wall into our blood. Called food antigens, they excite the immune system, resulting in food allergies. Some contributors to this health problem are weakened digestive ability, unsuspected gut infection, or hormonal imbalances.

Another example of pollution within our body is pathogenic organisms such as candida albicans yeast. Candida proliferates in our GI tract anytime you take antibiotics. It produces a large
variety of toxins, including alcohol. This is one reason why some people with chronic yeast infections report that they feel intoxicated. Negative effects of candida overgrowth include fatigue, gas, bloating, depression, diarrhea, constipation, brain fog, vaginal yeast infections, chronic urinary tract infections, and chronic prostatitis.

All the pollution around us can be grouped into two sub headings viz. Direct pollution and Indirect pollution

Direct Pollution: By direct pollution we mean pollution of air, water, noise & light to which all human beings come directly in contact with. It directly affects our health. Let us see each of the direct pollution and how they affect our health one by one.

Air Pollution:

Since the onset of the industrial revolution, there has been a steady change in the composition of the atmosphere mainly due to the combustion of fossil fuels used for the generation of energy and transportation.

The major air pollution is caused by fuel combustion and emission of Carbon dioxide, carbon monoxide, un-burned hydrocarbons, oxides of nitrogen, sulphur dioxide and aldehydes. While there reaction caused forming secondary derivatives in form of Peroxy acetyl nitrates, oxides of nitrogen form ozone and sulphur dioxide brings acid rains, and particulate in gases form like: smoke, grit and dust, lead particles.

Sources: The air pollutants come from the following sectors:
Problems of Modern Living and Need of Yoga

- Industrial pollutant - SO\textsuperscript{2}, CO\textsuperscript{2}, CO, hydrogen sulphide, chlorine, nitrous oxide, arsenic, ozone, metal particles and gases
- Domestic pollutants - Fossil fuel burnt by man
- Automobile exhaust - carbon monoxide
- Radiation - nitrogen oxides
- Miscellaneous other sources of air pollution are: petrochemicals, fertilizers, synthetic fibers, metallurgy, sulphuric acid, nitric acid, pharmaceutical industries and ceramic industries

Air pollution is a major environmental health problem affecting the developing and the developed countries alike. The effects of air pollution on health are very complex as there are many different sources and their individual effects vary from one to the other. It is not only the ambient air quality in the cities but also the indoor air quality in the rural and the urban areas that are causing concern. In fact in the developing world the highest air pollution exposures occur in the indoor environment. Air pollutants that are inhaled have serious impact on human health affecting the lungs and the respiratory system; they are also taken up by the blood and pumped all round the body. These pollutants are also deposited on soil, plants, and in the water, further contributing to human exposure.

Sources of air pollution:

Air pollutants consist of gaseous pollutants, odours, and SPM, (suspended particulate matter) such as dust, fumes, mist, and smoke. The concentration of these in and near the urban areas causes severe pollution to the surroundings. The largest sources of human-created air pollution are energy generation, transportation, and industries that use a great deal of energy sources. Depending
on their source and interactions with other components of the air, they can have different chemical compositions and health impacts. Since these pollutants are generally concentrated in and around urban areas, the outdoor urban pollution levels are far higher than in the rural areas.

Fires are another major source of air pollution and can lead to severe problems if the smoke is inhaled for a period of time. These fires can either be forest fires, oil well fires, burning of leaves in the backyard or as in the case of rural areas, large-scale burning of agricultural waste. Other sources include industries and power plants located in these areas.

**Acid Rain:** Sulfur dioxide and nitrogen oxides are emitted through the burning of fossil fuels, whether coal, oil, or natural gas. When released into the atmosphere, these emissions come into contact with water where they are chemically converted to acidic compounds of sulfates and nitrates. These strong acids are deposited onto the earth's surface as rain, snow and fog and through dry deposition. While acidic deposition is the more accurate term, acid rain is used more commonly. Figure given below depicts the Acid Rain Cycle.

![Acid Rain Cycle](http://rewhc.org/wind/windhealth2.shtml)
**Impact of air pollution on health:**

Indoor air pollution can be particularly hazardous to health as it is released in close proximity to people. It is stated that a pollutant released indoors is many times more likely to reach the lung than that released outdoors. In the developing countries a fairly large portion of the population is dependent on biomass for their energy requirements. These include wood, charcoal, agricultural residue, and animal waste. Open fires used for cooking and heating are commonly found in the household both in the rural and the urban areas. The stove is often at floor level, adding to the risk of accident and the hygiene factor. In addition, they are often not fitted with a chimney to remove the pollutants. In such households the children and women are most likely to be affected, as they are the group that spends more time indoors. The main pollutant in this environment is the SPM. In fact, death due to indoor air pollution, mainly particulate matters, in the rural areas of India are one of the highest in the world. Many of the deaths are due to acute respiratory infections in children; others are due to cardiovascular diseases, lung cancer, and chronic respiratory diseases in adults. If emissions are high and ventilation is poor, household use of coal and biomass can severely affect the indoor air quality.

*Household use of fossil fuel is also fairly common in the developing countries, particularly coal—both bituminous and lignite. These are particularly damaging as they burn inefficiently and emit considerable quantities of air pollutants. If emissions are high and ventilation poor, then the exposure levels to the gases emitted are far higher. The most harmful of the gases and agents that are emitted are particulate matter, carbon dioxide, polycyclic organic matter, and formaldehyde. The indoor concentrations of these are*
far higher than the acceptable levels and is cause for concern in rural areas.

**Health impact of specific air pollutants:**

Some of these gases can seriously and adversely affect the health of the population and should be given due attention by the concerned authority. The gases mentioned below are mainly outdoor air pollutants but some of them can and do occur indoor depending on the source and the circumstances.²⁷

**Tobacco smoke.** Tobacco smoke generates a wide range of harmful chemicals and is a major cause of ill health, as it is known to cause cancer, not only to the smoker but affecting passive smokers too. It is well-known that smoking affects the passive smoker (the person who is in the vicinity of a smoker and is not himself/herself a smoker) ranging from burning sensation in the eyes or nose, and throat irritation, to cancer, bronchitis, severe asthma, and a decrease in lung function

**Biological pollutants.** These are mostly allergens that can cause asthma, hay fever, and other allergic diseases.

**Volatile organic compounds.** Volatile compounds can cause irritation of the eye, nose and throat. In severe cases there may be headaches, nausea, and loss of coordination. In the longer run, some of them are suspected to cause damage to the liver and other parts of the body.

**Formaldehyde.** Exposure causes irritation to the eyes, nose and may cause allergies in some people.

**Lead.** Prolonged exposure can cause damage to the nervous system, digestive problems, and in some cases cause cancer. It is especially hazardous to small children:
**Radon.** A radioactive gas that can accumulate inside the house, it originates from the rocks and soil under the house and its level is dominated by the outdoor air and also to some extent the other gases being emitted indoors. Exposure to this gas increases the risk of lung cancer.

**Ozone.** Exposure to this gas makes our eyes itch, burn, and water and it has also been associated with increase in respiratory disorders such as asthma. It lowers our resistance to colds and pneumonia.

**Oxides of nitrogen.** This gas can make children susceptible to respiratory diseases in the winters.

**Carbon monoxide.** Carbon monoxide is one of the gases that come out from car exhausts or from cigarette smokes. Many people confuse between carbon monoxide and carbon dioxide. CO (carbon monoxide) combines with haemoglobin to lessen the amount of oxygen that enters our blood through our lungs. The binding with other haeme proteins causes changes in the function of the affected organs such as the brain and the cardiovascular system, and also the developing foetus. It can impair our concentration, slow our reflexes, and make us confused and sleepy.

Symptoms of carbon monoxide poisoning include headache, dizziness, and nausea. Respiration becomes difficult and the victim yawns frequently. Recent studies show that even short-term exposure to the carbon monoxide can be harmful. And people already suffering from heart or lung diseases can experience different types of physical distress when exposed to carbon
monoxide and that is one of the dangers of chemical pollution of air.

The effects of carbon monoxide are quite different from those of carbon dioxide, when oxygen and carbon monoxide enter the blood stream they compete for hemoglobin of the blood the power of carbon monoxide to combine with hemoglobin is greater than that of oxygen. This combination forms a new product called carboxyhemoglobin, as this product increases the oxygen supply in the blood decreases, and so vital blood tissues are robbed of their need of oxygen. With time damage occurs to the heart, blood vessels, and other organs.28

**Sulphur dioxide.** SO₂ (sulphur dioxide) in the air is caused due to the rise in combustion of fossil fuels. It can oxidize and form sulphuric acid mist. SO₂ in the air leads to diseases of the lung and other lung disorders such as wheezing and shortness of breath. Long-term effects are more difficult to ascertain as SO₂ exposure is often combined with that of SPM.29

**SPM (suspended particulate matter).** Suspended matter consists of dust, fumes, mist and smoke. The main chemical component of SPM that is of major concern is lead, others being nickel, arsenic, and those present in diesel exhaust. These particles when breathed in, lodge in our lung tissues and cause lung damage and respiratory problems. The importance of SPM as a major pollutant needs special emphasis as a) it affects more people globally than any other pollutant on a continuing basis; b) there is more monitoring data available on this than any other pollutant; and c) more epidemiological evidence has been collected on the exposure to this than to any other pollutant.30
Water Pollution

Sources: The pollutants, which enter the water en-route, are:
- Sewerage
- Plant material
- Organic chemicals
- Exotic chemicals
- Infection agents or pathogens like: bacteria, fungus, virus and etc.
- Minerals chemicals
- Agro-chemicals like: insecticides, fungicides and herbicides
- Sediments: Minerals, Solid Wastes.

Kinds of Pollutants in Water:

The following are the pollutants usually found in water.\(^{31}\)

(i) Microbiological Pollutants:
- Green algae and Fungi, which come through natural sources & create intestinal disturbance and distress.
- Viruses, which come through human excrete and natural sources, cause viral hepatitis that is found in endemic form all around the year and probably is on increase. Viruses also cause pneumonia, typhoid fever and intestinal distress.
- Protozoa, which come through human excrete and natural sources.
- Parasites, which come through human excrete.

(ii) Bacterial of Various Types: It is categorized in various forms as listed below.
- Typhoid and paratyphoid bacterial: It causes typhoid and paratyphoid fevers resulting complications.
Gastro-enteritis diarrhea: It is caused usually by E.coli Bacteria.

Cholera: It is caused by Vibrio cholera usually in epidemic form. Although it is not common but it erupts any time usually in epidemic form.

Protozoal Infections: It causes different complication usually connected with digestive system.

(iii) Inorganic Pollutants: which come from fertilizers and manure.

(iv) Inorganic and organic pollutants, which come from plant protection. These include:

- Insecticides
- Fungicides
- Herbicides

(v) Non-agro chemicals: Chemical pollutants cause various symptoms and diseases in human beings, in various forms for example: present in the body. i.e. iron and copper cause nervous and gastric problems, pigmentation of the skin and weakness depression, affect lungs, liver, kidneys, digestive, circulatory and reproductory system, cause cancer dermal toxicity, skeletal damage, intestinal stress Wilson’s disease, central and peripheral nervous system damage, toxicity in pregnant women and children etc. Mercury, lead arsenic and some organic compounds affect the bone marrow and in turn affect the normal haemogenesis, causing anaemia and lack of production of white blood cells and macrophages which are very important for human defenses.

(vi) Agro-chemicals: Many agro-chemicals like insecticides, fungicides, herbicides and serious pollutants, but the worst are organo-chemicals and nitrates from chemical fertilizer or manure or even organic chemicals from industrial wastes
which causes residual effect in the body resulting in weakness, lethargy, wasting of muscles, cramps, mental retards and harmful effect on main organs of the body like liver, bone marrow and kidneys etc.

Some agro-chemicals are responsible for dreaded diseases like cancer, other cause stomach problems, defects at birth mortality among children, organo phosphates persist in body once get in to food chain or by inhalations and give rise to a number of complications.

Health impacts of water pollution:

It is a well-known fact that clean water is absolutely essential for healthy living. Adequate supply of fresh and clean drinking water is a basic need for all human beings on the earth, yet it has been observed that millions of people worldwide are deprived of this. Freshwater resources all over the world are threatened not only by over exploitation and poor management but also by ecological degradation. The main source of freshwater pollution can be attributed to discharge of untreated waste, dumping of industrial effluent, and run-off from agricultural fields. Industrial growth, urbanization and the increasing use of synthetic organic substances have serious and adverse impacts on freshwater bodies. It is a generally accepted fact that the developed countries suffer from problems of chemical discharge into the water sources mainly groundwater, while developing countries face problems of agricultural run-off in water sources. Polluted water like chemicals in drinking water causes problem to health and leads to waterborne diseases.
Groundwater and its contamination:

Many areas of groundwater and surface water are now contaminated with heavy metals, POPs (persistent organic pollutants), and nutrients that have an adverse affect on health. Water-borne diseases and water-caused health problems are mostly due to inadequate and incompetent management of water resources. Safe water for all can only be assured when access, sustainability, and equity can be guaranteed. Access can be defined as the number of people who are guaranteed safe drinking water and sufficient quantities of it. There has to be an effort to sustain it, and there has to be a fair and equal distribution of water to all segments of the society. Urban areas generally have a higher coverage of safe water than the rural areas. Even within an area there is variation: areas that can pay for the services have access to safe water whereas areas that cannot pay for the services have to make do with water from hand pumps and other sources.

In the urban areas water gets contaminated in many different ways, some of the most common reasons being leaky water pipe joints in areas where the water pipe and sewage line pass close together. Sometimes the water gets polluted at source due to various reasons and mainly due to inflow of sewage into the source.

Ground water can be contaminated through various sources and some of these are mentioned below.

**Pesticides.** Run-off from farms, backyards, and golf courses contain pesticides such as DDT that in turn contaminate the water. Leechate from landfill sites is another major contaminating source. Its effects on the ecosystems and health are endocrine and reproductive damage in wildlife. Groundwater is susceptible to
contamination, as pesticides are mobile in the soil. It is a matter of concern as these chemicals are persistent in the soil and water.

**Sewage.** Untreated or inadequately treated municipal sewage is a major source of groundwater and surface water pollution in the developing countries. The organic material that is discharged with municipal waste into the watercourses uses substantial oxygen for biological degradation thereby upsetting the ecological balance of rivers and lakes. Sewage also carries microbial pathogens that are the cause of the spread of disease.

**Nutrients.** Domestic waste water, agricultural run-off, and industrial effluents contain phosphorus and nitrogen, fertilizer run-off, manure from livestock operations, which increase the level of nutrients in water bodies and can cause eutrophication in the lakes and rivers and continue on to the coastal areas. The nitrates come mainly from the fertilizer that is added to the fields. Excessive use of fertilizers cause nitrate contamination of groundwater, with the result that nitrate levels in drinking water is far above the safety levels recommended. Good agricultural practices can help in reducing the amount of nitrates in the soil and thereby lower its content in the water.

**Synthetic organics.** Many of the 100 000 synthetic compounds in use today are found in the aquatic environment and accumulate in the food chain. POPs or Persistent organic pollutants represent the most harmful element for the ecosystem and for human health, for example, industrial chemicals and agricultural pesticides. These chemicals can accumulate in fish and cause serious damage to human health. Where pesticides are used on a large-scale, groundwater gets contaminated and this leads to the chemical contamination of drinking water.32
Acidification. Acidification of surface water, mainly lakes and reservoirs, is one of the major environmental impacts of transport over long distance of air pollutants such as sulphur dioxide from power plants, other heavy industry such as steel plants, and motor vehicles. This problem is more severe in the US and in parts of Europe.

Chemicals in drinking water:

Chemicals in water can be both naturally occurring and introduced by human interference and can have serious health effects.  

Fluoride. Fluoride in the water is essential for protection against dental caries and weakening of the bones, but higher levels can have an adverse effect on health.

Arsenic. Arsenic occurs naturally or is possibly aggravated by over powering aquifers and by phosphorus from fertilizers. High concentrations of arsenic in water can have an adverse effect on health. A few years back, high concentrations of this element was found in drinking water in six districts in West Bengal. A majority of people in the area was found suffering from arsenic skin lesions. It was felt that arsenic contamination in the groundwater was due to natural causes. The government is trying to provide an alternative drinking water source and a method through which the arsenic content from water can be removed.

Lead. Pipes, fittings, solder, and the service connections of some household plumbing systems contain lead that contaminates the drinking water source.

Petrochemicals. Petrochemicals contaminate the groundwater from underground petroleum storage tanks.
Other heavy metals. These contaminants come from mining waste and tailings, landfills, or hazardous waste dumps.

Chlorinated solvents. Metal and plastic effluents, fabric cleaning, electronic and aircraft manufacturing are often discharged and contaminate groundwater.

Diseases due to Water Pollution:

Water-borne diseases are infectious diseases spread primarily through contaminated water. Though these diseases are spread either directly or through flies or filth, water is the chief medium for spread of these diseases and hence they are termed as water-borne diseases.

<table>
<thead>
<tr>
<th>Cause</th>
<th>Water-borne diseases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bacterial infections</td>
<td>Typhoid, Cholera, Paratyphoid fever, Bacillary dysentery</td>
</tr>
<tr>
<td>Viral infections</td>
<td>Infectious Hepatitis (jaundice), Poliomyelitis</td>
</tr>
<tr>
<td>Protozoal infections</td>
<td>Amoebic dysentery</td>
</tr>
</tbody>
</table>

Most intestinal (enteric) diseases are infectious and are transmitted through faecal waste. Pathogens – which include virus, bacteria, protozoa, and parasitic worms – are disease-producing agents found in the faeces of infected persons. These diseases are more prevalent in areas with poor sanitary conditions. These pathogens travel through water sources and interfuses directly through persons handling food and water. Since these diseases are highly infectious, extreme care and hygiene should be maintained by people looking after an infected patient. Hepatitis, cholera, dysentery, and typhoid are the more common water-borne diseases that affect large populations in the tropical regions.
A large number of chemicals that either exist naturally in the land or are added due to human activity dissolve in the water, thereby contaminating it and leading to various diseases.

**Pesticides.** The organophosphates and the carbonates present in pesticides affect and damage the nervous system and can cause cancer. Some of the pesticides contain carcinogens that exceed recommended levels. They contain chlorides that cause reproductive and endocrinal damage.

**Lead.** Lead is hazardous to health as it accumulates in the body and affects the central nervous system. Children and pregnant women are most at risk.

**Fluoride.** Excess fluorides can cause yellowing of the teeth and damage to the spinal cord and other crippling diseases.

**Nitrates.** Drinking water that gets contaminated with nitrates can prove fatal especially to infants that drink formula milk as it restricts the amount of oxygen that reaches the brain causing the 'blue baby' syndrome. It is also linked to digestive tract cancers. It causes algae to bloom resulting in eutrophication in surface water.

**Petrochemicals.** Benzene and other petrochemicals can cause cancer even at low exposure levels.

**Chlorinated solvents.** These are linked to reproduction disorders and to some cancers.

**Arsenic.** Arsenic poisoning through water can cause liver and nervous system damage, vascular diseases and also skin cancer.

**Other heavy metals.** Heavy metals cause damage to the nervous system and the kidney, and other metabolic disruptions.
Salts. It makes the fresh water unusable for drinking and irrigation purposes.

Exposure to polluted water can cause diarrhoea, skin irritation, respiratory problems, and other diseases, depending on the pollutant that is in the water body. Stagnant water and other untreated water provide a habitat for the mosquito and a host of other parasites and insects that cause a large number of diseases especially in the tropical regions. Among these, malaria is undoubtedly the most widely distributed and causes most damage to human health.

Preventive measures:

Water-borne epidemics and health hazards in the aquatic environment are mainly due to improper management of water resources. Proper management of water resources has become the need of the hour as this would ultimately lead to a cleaner and healthier environment.

In order to prevent the spread of water-borne infectious diseases, people should take adequate precautions. The city water supply should be properly checked and necessary steps taken to disinfect it. Water pipes should be regularly checked for leaks and cracks. At home, the water should be boiled, filtered, or other methods and necessary steps taken to ensure that it is free from infection.

Noise Pollution:

Noise Pollution or Sound Pollution, exposure of people or animals to levels of sound that are annoying, stressful, or damaging to the ears. Although loud and frightening sounds are part of nature, only
in recent centuries has much of the world become urban, industrial, and chronically noisy.

Sound intensity is measured in units called decibels. The decibel scale is logarithmic and climbs steeply: An increase of about three decibels is a doubling of sound volume. In the wilderness, a typical sound level would be 35 decibels. Speech runs 65 to 70 decibels; heavy traffic generates 90 decibels. By 140 decibels, sound becomes painful to the human ear, but ill effects, including hearing loss, set in at much lower levels.34

Most noise pollution comes from machines, especially automobiles, trucks, and aircraft. Construction equipment, farm machines, and the din of machinery inside factories can be dangerously loud. Some home appliances, shop tools, lawnmowers, and leaf blowers can also be noisy, as are guns, firecrackers, and some toys. Even music, when played at very high volume, particularly through personal headphones, is as damaging to the ears as a roaring chain saw.

The engines of ships, especially large vessels and supertankers, produce a lot of sound, and traffic is increasing. Offshore oil exploration and drilling are also noisy. And more recently, very loud, low-frequency sonar signals are being sent through the seas to detect submarines and to gain information about water temperatures and global warming.

**Impact of Noise Pollution on Health:**

The most significant health problem caused by noise pollution is hearing loss. Impaired hearing ability is a common health problem of modern industrial world where people in factories are continuously exposed to high level of sounds. Any noise
appreciably louder than talking can damage the delicate hair cells in the cochlea, the structure in the inner ear that converts sound waves into auditory nerve signals. The initial damage to the cochlea may be temporary, but with repeated exposure, the damage becomes permanent. Loud noise deafens quickly—extremely loud sounds, such as gunshots at close range, can cause immediate hearing loss. But even sound levels of only 85 decibels will cause some hearing loss after prolonged exposure. In addition to deafness, many people with damaged ears are afflicted with tinnitus, or ringing in the ears.

Most hearing loss occurs in workplaces, where workers may be unable to avoid unhealthy noise, and where exposure may continue for years. Factory workers, construction workers, farmers, military personnel, police officers, firefighters, and musicians all have reason to be concerned about their occupational exposure to noise.

Even at levels below those that cause hearing loss, noise pollution produces problems. Noise makes conversation difficult, interferes with some kinds of work, and disturbs sleep. As a source of stress, it can promote high blood pressure and other cardiovascular problems, as well as nervous disorders.

**Light Pollution:**

Modern living is characterized by over exposure to light. In ideal living conditions and in rural areas exposure to light is mostly limited to sun light and deem light in early hours of night. People take dinner soon after sunset and go to bed early. However, in urban areas multiplexes, shops, market places, clubs, theatres and posh office complexes are flooded with dazzling lights throughout night and people often are exposed to intense light.
Overexposure to light can affect our physical health. Apart from affecting our eyes it leads to several other problems like insomnia. It disrupts the body’s production of melatonin, a brain hormone best known for its daily role in resetting the body’s biological clock. Secreted primarily in the brain, and at night, melatonin triggers a host of biochemical activities, including a nocturnal reduction in the body’s production of oestrogen. Some researchers have speculated that chronic decrease in nocturnal melatonin production might increase an individual’s risk of developing oestrogen-related malignancies, such as breast cancer. Women who work night shifts are more likely to get breast cancer because their bodies produce far less of a vital hormone that inhibits the disease.

**Psychological stress due to light pollution:** Living within the arctic circles can exhibit psychological stresses on inhabitants, due to the 24-hour daylight in summer, and 24-hour darkness in winter. Suicide rates in Finland are one of the highest in the world. Many would guess that the 24 hours of darkness would be the most stressful time, but apparently not. The thesis of Dr Helina Hakko states: "A significant excess of total suicides was found during spring/summer (May-July) and a significant trough during winter/spring (December-March) months.". The 24-hour daylight appears to cause more stress and suicides than at any other time of the year.

Artificial light illuminates our lives, allowing us to work or play through the night. But, as Hugh Wilson discovers, we toy with our body clocks at severe risk to our wellbeing.

**Medical Problems in Children:** Other health problems can occur in children. Scientists have warned that children who sleep with a light on during the night could be ruining their eyesight. Scientists
have found that children who sleep with a light on are significantly more likely to grow up short-sighted and having to wear glasses, when compared to children who sleep in the dark. Research suggests that exposure to constant artificial light may disrupt sleeping patterns, hyper-activity and may have a negative impact on a child's health.

**Other medical problems:** It is well documented that excessive light can lead to a chronic lack of sleep, diminishing the effectiveness of the body's immune system; indeed, shining light is a common method of torture. There are many hundreds of references dealing with biological clocks, circadian rhythms, melatonin, and the effects of light at night on animals and plants.37

**Indirect Pollution:**

Pollution with which we do not come directly under contact but has an indirect effect on our physical health can be said as indirect pollution. The indirect pollution responsible for physical health conditions are enumerated below.

**Soil contamination:** Soil contamination is the presence of man-made chemicals or other alteration to the natural soil environment. This type of contamination typically arises from rupture of underground storage tanks, application of pesticides and herbicides, spillage of contaminated surface water to nearby areas, leaching of wastes from landfills or direct discharge of industrial wastes to the soil. The most common chemicals involved are petroleum hydrocarbons, solvents, pesticides, herbicides, lead and other heavy metals. The occurrence of this phenomenon is correlated with the degree of industrialization and intensity of chemical usage
It takes million years for formation of soil and once contaminated the productivity and its characteristics to support bio-mass is lost for ever & it cannot sustain growth of vegetation. Therefore it is a matter of serious environmental concern since life on earth is dependent upon vegetation cover.

Concern over soil contamination is also due to health risks arising from secondary contamination of vegetables and crops. Traces of pesticides are reported in many food and beaverages which come from contaminated soil. Some contaminants may literally drain through soils such as sand and gravel and move to other soils or deeper aquifers and pollute the under ground water. Most soil contamination is the result of pollutants adhering to the soil particle surface, or lodging in interstices of a soil matrix.

**Principal sources of soil contamination:** There are legions of contaminant sources and pollutant types, but the following list is illustrative (pollutants indicated by parentheses):

- Petroleum hydrocarbons from rupture of underground storage tanks (benzene, toluene, xylene, alkanes, alkenes, MTBE)
- Spillage or leakage of solvents and dry cleaning agents (acetone, trichloroethylene, formaldehyde) and perchloroethylene
- Leaching of contaminants from solid waste disposal sites (lead, mercury, chromium, cadmium, bacteria, hydrocarbons)
- Water runoff which carries pollutants and may deposit them at a point of percolation
- Percolation into soils from pesticides and herbicides uses (wide variety of chemicals including DDT, lindane,
organochlorines, organophosphates, carbamates, cyclodienes\textsuperscript{[3]}

- Deposition of dust from smelting operations and coal burning power plants (zinc, cadmium, lead, mercury)
- Lead deposition from lead abatement or construction demolition (lead)
- Leakage of transformers (Polychlorinated Biphenyls (PCBs))

**Land Degradation:** Land degradation has affected some 1900 million hectares of land word-wide. The rate at which arable land is being lost is alarming. The loss of potential productivity due to land degradation worldwide is estimated to be equivalent to some 20 million tons of grain per year.\textsuperscript{38}

The understanding of the extent and causes of this phenomenon "desertification", however incomplete, is now far too clear for the global community to ignore. In some cases the cause could be solely natural or purely human, but often both human and natural causes combine to accelerate desertification. However the graphic talk of marching sand dunes and expanding deserts distracts attention from the real problem the continuing human impact of the degradation of the dry lands on the millions of desperate people facing hunger and despair.

There are close linkages between desertification & poverty. No long-term strategy of poverty eradication can succeed in the face of environmental forces that promote persistent erosion of the physical resources upon which poor people depend. No programme for protecting the environment can succeed without alleviating day-to-day pressures of poverty. These pressures leave people little choice but to discount the future so deeply that they fail to protect the resource base to ensure their own and their children's well being. The feminization of poverty in areas affected by
Desertification is an aspect that must not be ignored. Strategies to improve and safeguard the local environment should be built on the knowledge and resourcefulness of local women, and remove their special burdens and constraints.

**Health effects:** Traces of chromium and many of the pesticide and herbicide found in food i.e. fruits, vegetables, crops, and soft drinks are harmful to health. These are carcinogenic to all populations. Lead is especially hazardous to young children, in which group there is a high risk of developmental damage to the brain and nervous system, while to all populations kidney damage is a risk.

Chronic exposure to benzene at sufficient concentrations is known to be associated with higher incidence of leukemia. Mercury and cycloadienes are known to induce higher incidences of kidney damage, some irreversible. PCBs and cycloadienes are linked to liver toxicity. Organophosphates and carbamates can induce a chain of responses leading to neuromuscular blockage. Many chlorinated solvents induce liver changes, kidney changes and depression of the central nervous system. There is an entire spectrum of further health effects such as headache, nausea, fatigue, eye irritation and skin rash for the above cited and other chemicals. Clearly at sufficient dosages a large number of soil contaminant cause death.

**Ecosystem effects:** Soil contaminants can have significant deleterious consequences for ecosystems. Hazardous chemicals can eliminate endemic microorganisms and arthropods resident in a given soil environment. The result can be virtual eradication of some of the primary food chain, which in turn have major consequences for predator or consumer species. Effects occur to
agricultural lands which have certain types of soil contamination. Contaminants typically alter plant metabolism, most commonly to reduce crop yields. This has a secondary effect upon soil conservation, since the languishing crops cannot shield the earth's soil mantle from erosion phenomena.

**Pesticides in food and beverages:** Pesticide is used greatly in pest control and increasing agricultural output. If the credits of pesticides include enhanced economic potential in terms of increased production of food and fibre, and amelioration of vector-borne diseases, then their debits have resulted in serious health implications to man and his environment. There is now overwhelming evidence that some of these chemicals do pose potential risk to humans and other life forms and unwanted side effects to the environment. No segment of the population is completely protected against exposure to pesticides and the potentially serious health effects, though a disproportionate burden is shouldered by the people of developing countries and by high risk groups in each country. The world-wide deaths and chronic illnesses due to pesticide poisoning number about 1 million per year.

Ideally a pesticide must be lethal to the targetted pests, but not to non-target species, including man. Unfortunately, this is not so. The controversy of use and abuse of pesticides has surfaced. The rampant use of these chemicals, under the adage, "if little is good, a lot more will be better" has played havoc with human and other life forms. In India, the first report of poisoning due to pesticides was from Kerala in 1958, where over 100 people died after consuming wheat flour contaminated with parathion. This prompted the Special Committee on Harmful Effects of Pesticides constituted by the ICAR to focus further attention on the problem.
Certain environmental chemicals including pesticides termed as endocrine disruptors are known to elicit their adverse effects by mimicking or antagonising natural hormones in the body and it has been postulated that their long-term, low-dose exposure are increasingly linked to human health effects such as immunosuppression, hormone disruption, diminished intelligence, reproductive abnormalities and cancer.

All these pollution due to modern living affect physical health of men. For healthy living we need not only to reduce pollution but also to enhance our immune system so as to resist the harmful effects. This can be possible by regular practice of yoga. The details of how yoga can boost our immune sytem is detailed in chapter-4.
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