Chapter – I

INTRODUCTION

Lifestyle diseases are diseases that appear to become ever more widespread as countries become more industrialized. These diseases are different from other diseases because they are potentially preventable, and can be lowered with changes in diet, lifestyle, and environment. Modern scientists and researchers have absolutely changed the style in which man lives. Stress and strain are the causes of physical as well as mental distractions. Yoga has the surest remedy for man’s physical as well as psychological ailments. It makes the organs of the body active in their functioning of human body.

It is rightly said that, understanding is the first step towards change. In order to follow the ways to attain good health, understanding them is the first step. Good health is acquired when one follows a healthy diet, regular exercise, positive thinking, unhurried pace of living, and a sublime faith in the divine. Disease manifests in the body when nature’s health laws are transgressed. Yogic discipline with its Asanas, Pranayama, and meditation is a way to good health. This ancient therapy helps in treating diseases, which
eventually improves personal efficiency and assists in achieving mental peace. When yoga becomes a lifestyle, it effects a radical transformation in an individual. Any health conscious person can turn to yoga and reap the benefits it offers.

Diabetes mellitus is the most common and possibly one of the oldest metabolic disorders in the world, i.e. characterized by multi-system dysfunction due to an elevated blood sugar level. Diabetes mellitus is a metabolic disease in which the primary problem is the defective utilization of sugar by the body. Dietary sugars and starch are broken down to glucose by the process of digestion and this glucose is the major fuel for the various process, organs and cells of the body.

Diabetes mellitus is a well known psychosomatic disorder. The causation factors of this disease are sedentary habits, physical and mental stress of strain. It is also well known that diabetes could be very well controlled with the help of medicine, exercise and diet regulation.

The Goal of the therapy is to maintain blood glucose to as near normal as possible. This is associated with fewer complications in the long run. The danger of low blood sugar during therapy has to be carefully tackled.
There are varieties of user friendly gadgets for home monitoring. Periodic laboratory check up is essential for counter checks.

Diabetes was once thought to be a disorder of the rich, but now with refined foods, super sweets and junk foods disastrous malady. The human body and its physiology is so adjusted that it can control all metabolic life processes within a wide range of the normalcy in the diet, and the constant consumption of sweet liquids, that the modern body cannot adjust sufficiently and simply goes “on strike”. The resultant “feed back” leads to the many disasters associated with diabetes and it’s wide range of effects, complications and allergies.

There are a number of long range and immediate causes for the failure of the insulin- producing Islets of Langerhans in the pancreas secreting sufficient hormones to adjust blood sugar level. Once one starts taking drug medication, these Islets of Langerhans become less efficient and may in time completely stop functioning. Chemical therapy through medication is not the answer though it supplies a type of control. The real answer to eradication of diabetes lies in eliminating the problem at the ‘cause’ and not by manipulating effects, or symptomatic.

Diabetes mellitus afflicts millions of Indians. While it was previously thought that diabetes is a disease mostly confined to Western Countries,
recent studies have shown that Indians have in fact a higher chance of developing diabetes. In fact, diabetes affects approximately 10% of adult middle class urban Indians and rivals heart disease as a cause for morbidity and death.

In general, there are two types of diabetes. The first kind is found mainly at a young age which affects people of normal weight, and requires insulin for its management. This type of diabetes is known as Type I or insulin-dependent diabetes. The second kind of diabetes, which is by far the more common type, arises in middle or older ages, affects people who are overweight, and at least initially does not need insulin for control. This form of diabetes is known as Type II or non-insulin dependent diabetes. Factors which predispose to this kind of diabetes include a positive family history of diabetes, overweight and sedentary habits.

The complications which can arise due to poor control of blood glucose are the same in both the forms of diabetes. Thus diabetes can affect the eyes, kidney and nerves. In addition, because diabetes leads to increase in circulating body fats, it causes an increase in heart disease, stroke, and disease on the feet. It is important for us to remember that diabetes is a chronic illness. Though by various means, it can be controlled, a life long effort is needed for this.
The treatment of diabetes varies with the type of diabetes. In both forms of diabetes, attention first needs to be directed to diet and exercise. The recommended dietary calories vary according to body weight and occupation. The diabetic diet is like any ordinary diet. The only things which need to be avoided are simple sugars and extra fats. There is no need to avoid rice or potatoes. Exercise is strongly recommended because it not only reduces blood glucose but also improves blood pressure and decreases the chance of heart disease. The drugs need to be given in relation to the type of diabetes. Young patients will almost invariably need regular insulin injections. Older patients with diabetes can often be managed with diet and exercise or with oral tablets, which increase insulin secretion from the pancreas. However, it should be realized that even those patients who are originally managed on oral tablets may, with passage of time, require insulin injections. In addition to all these, it is very necessary for patients to regularly monitor their blood or urine sugars at home. This will help the doctor to decide their control and improve the management. Finally, knowledge of diabetes and its treatment is most important, since the patient and not the physician has the primary role in diabetes management.

Excess sugar in blood, Hyper Glycosuria, is found in our ancient Sanskrit texts. Indeed, at least three conditions are mentioned in Sanskrit
works on Ayurveda, the Science of Vedic Health, and in manuscripts on Yoga Chikitsa. There, Diabetes Mellitus, Sugar Diabetes, is called Madhumeha. “Madhu” is the Sanskrit word for honey. Diabetes, innocens or Renal Glycosuria, (as in the Kidneys) is called Prameha in the Sanskrit, while Diabetes Insipidus, Congential Diabetes, is termed Vahu Mutraroga. The term ‘Vahu’ probably more correctly ‘Bahuka’ which literally means ‘an arm’ and is a synonym for an insipid condition that literally reaches out throughout the body. The term ‘diabetes’ is from the Greek ‘Ditbainein’, which means to ‘cross through’ as a high blood sugar literally crosses through the thresh-hold of metabolic tolerance and the excess sugar is thrown out through the urine. Polyuria or frequent passage of urine is the major characteristic of this disorder. Diabetes Insipidus is often congenital and passed along where there is unusual permeability of the kidneys to glucose. This permeability permits the sugar to cross through the kidneys although the concentration in the blood remains within normal limits. Diabetes Insipidus is often congenital and passed along by genes from cross line heredity. Diabetes Insipidus can also follow certain severe kinds of infection or by severe injury of the kidneys or of the pituitary gland in the brain. This particular form of diabetes is typified by dehydration, polydipsia or an abnormal craying for water and Polyuria, frequent discharge of urine.
The urine is very pale in colour and of low specific gravity when tested. Along with Diabetes Mellitus, the other conditions are caused by faulty carbohydrate metabolism, and mainly due to a lack of insulin, the hormone secreted by the Islets of Langerhans in the pancreas. A lack of Insulin results in the over production of sugar in the liver and the condition termed Hyper Glycosuria. In Diabetes Mellitus the specific gravity of the urine is high, because of the sugar content. In advanced stages, there is ketosis and ultimately, coma. There is a condition called Starvation Diabetes where there is high sugar content of the urine after prolonged fasting which is attributed to the body's reduced ability to form glycogen, which is termed animal or human starch, the form to which glucose or sugar is converted for storage in the body. Ketosis is often symptomized by drowsiness, headache and overly deep and laboured respiration.

Diabetes Infantalis is a congenital condition and sometimes called Juvenile Diabetes. It is one of the new scourges of mankind as diabetes is on the increase world wide. This particular form of diabetes may not completely respond to Yoga Therapy as the cells of the body have mutated through genetic changes. These changes could be bred out for a future healthy generation by taking totally to living unified Yoga Life.
Diabetes would now have taken the place of one of the number one killers of the world had it not been for the discovery by the Canadian Sri Frederick Grant Banting (1881-1941), who discovered that the use of animal insulin controlled diabetes was one of the major causes of death in modernizing society, as well as the cause of loss of hearing, sight and internal urinary problems. These urinary problems were classified in ancient times under the term “Mutradosha,” urinary diseases, although the term “Prameha” was also used to cover a broad group of conditions affecting the kidneys, the bladder and the urinary tract. Infectious urinary disorders like gleet were also classed under either Prameha or Vahumutraroga. Metabolic disorders were certainly comprehended in Yoga Chikitsa. The various Pranas are associated with metabolic and other life processes. It was known that carbohydrate foods had to be masticated or chewed until they became liquids, mixing the digestive secretions of the mouth with the intake of food so that “shock” was not administered to the digestive system. Certain Asana, Kriyas and Mudras in the Hatha Yoga System are designed to stimulate the pancreas and the collections of special cells called Islets of Langerhans scattered throughout the pancreas. These Islets secret Insulin directly into the blood stream controlling blood/sugar balance, or imbalance.
Diabetes is a disease that sets in due to the body’s inability to make proper use of the foods consumed as a result of insufficient insulin. Bacteria, viruses or other microbes do not cause it. Due to the inability on the part of the body to perform certain vital functions, the diabetic is unable to use the carbohydrates, the sugars and starches, and convert them into heat and energy that his body needs to operate normally.

The carbohydrates that you eat are converted into a form of sugar known as glucose, which the cells in the body use as a source of energy. This glucose increases the level of blood glucose, which in turn helps in the release of a hormone known as insulin. This insulin is released from the islet cells of the pancreas, a gland in the abdomen, and the level of glucose in the blood is regulated by insulin which assists in utilizing and storing glucose in the body.

The body needs insulin, and most people have sufficient supply of it. A diabetic may have none at all, or probably not sufficient to aid in the transfer of the glucose from the blood to the respective cells. When there is no insulin, glucose builds up in the body, leading to diabetes.

Though there is no cure for diabetes, yet it can be controlled. It is not contagious. A diabetic should know everything about the disease — its nature, problems, treatment, control, self-help remedies, etc. Armed with
these facts, he will be better equipped to cope with the disease everyday of his life.

The body to make possible all the numerous physical and chemical activities necessary for life uses the nutrients that we consume and the oxygen that we breathe in. Metabolism involves two processes known as anabolism and catabolism. Anabolism means building up, while catabolism means breaking down.

The food that we eat is reduced by digestion into simple chemicals. These are rearranged and built into new cells, tissues, blood, bone, muscles, etc. Cells and tissues that have served their purpose, and are no longer in use, are broken down into simple chemicals. They may either be eliminated as waste from the body, or rearranged and used in some other form. During this process, energy is released. To maintain good health, there is need for a balance between the foods we eat and the metabolic requirements of the body. Starvation leads to depletion of energy and chemicals, while excess food leads to storage of fat in the body, and hence obesity.

With age the metabolic activity slows down, and a diabetic shows symptoms of starvation. While a starved person can assimilate the carbohydrates that he eats, the diabetic has them but cannot use them. The unused glucose amasses in the bloodstream and tissues, and the excess gets
into the urine. The kidneys strain to eliminate the excess sugar, causing water also to be eliminated. Dehydration with insatiable thirst sets in.

When the body is starved of energy, it begins to consume itself, leading to the formation of poisonous chemicals known as ketone bodies. Gradually acidosis sets in, and, if neglected, it leads to coma, and finally death.

Incidence of diabetes is steadily increasing in our country. As per a survey conducted in India in 1977 by the Indian Council of Medical Research, about 20 lakhs of Indians are affected by diabetes. International Federation of Diabetes and World Health Organization point out the steadily growing incidence of Diabetes mellitus and introduced it as a broader based non-communicable disease control program in 1989.

Diabetes mellitus in Greek means “siphon sweet”. Diabetes mellitus was known to ancient Indian physicians as Madhumeha. It is caused by a metabolic disorder due to the lack of insulin or surplus of insulin antagonist. Diabetes can also result as a hereditary disorder which passes on from one generation to another. Treatments of these diseases are known from ancient times. So many herbal products and several metals and minerals have been described for the cure of diabetes in ancient literature. It has been shown that diabetes patients are more vulnerable to health problems caused by
environmental contaminants. Studies carried out on laboratory animals have shown that diabetic rats magnify the toxicity of the pesticides.

India holds one of the richest and diversified ethno botanical traditions in the world and there is always a place in every village where people have a free access to traditional treatment. In almost every state of our country, both rich and poor, depend on traditional medicines which are mostly of plant origin, for treating various ailments. Ayurveda has been the first to give an elaborate description of diabetes, its clinical features and the pattern and its management by herbal or herbomineral drugs.

Herbs in which are exert hypoglycemic effect are found in abundance in India. Plants like onion, Thulasi, cow pea, Shilajeet, Guggul, banyan tree, fenugreek, blackberry, celandine, eucalyptus, lady's mantle, seeds of coriander, dried berries of juniper, bulbs of garlic have been reported to posses antidiabetic effect. Surprisingly not many studies have been carried out on plants that have antidiabetic effects, though sporadic reports are available. Research on identification of medicinal plants and isolations of active principles of plant extracts, which are said to be effective in bringing down blood sugar, have to be encouraged. These could be a better solution than the allopathic drugs, close at hand, useful to mankind not only in India, but all over the world.
Swami Sathyananda Saraswati (1981) attainment of Dharma, Artha, Kama and Moksha is possible through a healthy body only. Our sages propagated Yoga for the public good with this point of view. In the present era, the man having entered the scientific age is able to acquire the latest devices and on the other hand he is being tense due to polluted atmosphere, contaminated food and other reasons and due to this, many incurable diseases are being created whose diagnosis and treatment is possible completely through yoga only.

Human body is a strong, perfect, and automatic machine. It needs fuel like all other machines to function and the same is produced by the blending of Dhatus, salts and blood sugar. The blood sugar is incessantly metabolized by the insulin by which required fuel is generated to keep the human machine in motion. An aberration in this process invariably increases the ration of sugar in the food. These phenomenons are termed as diabetes.

Diabetes is rampant among the people of the affluent class because their food contains plenty of fats and starch. In this absence of manual labour these substances harm the digestive glands which is not compensated and consequent the production of insulin come to a stop.
The patients have to effect certain changes in their food. Till the disease in completely cured they should not take excess carbohydrates, proteins, fats and sugar. Use of alkaline substances is rendered indispensable in order to equalize the enhanced percentage of blood sugar.

Krishna Raman (1998) Yoga provides an alternate source of healing for diabetes. Yoga helps to strengthen the immune system, improves blood circulation and the flow of vital energy or prana to the internal organs of the body. The secretion of stress hormones, due to faulty diet, hectic lifestyle or wrong thinking is controlled by the practice of yoga.

Statement of the Problem

The purpose of the study was to investigate the effect of selected Asanas, Pranayama and the combinations of Asanas and Pranayamas on Blood Sugar and Urine Sugar levels of Type-I & II diabetic patients.

Delimitations

1. The study would be delimited to 12 week participation in selected asanas, pranayamas and combinations of Asanas and Pranayamas on type I & II diabetic patients.
2. The study would be further delimited to males having type I & II diabetes.
3. The study would be also delimited to the subjects belonging to the age group of 35 to 60 years type I & II diabetic patients.

4. The study would be delimited to:
   (i) Blood Glucose Estimation (BGE) fasting and postprandial
   (ii) Urine Sugar Estimation (USE)
   (iii) Glucose Tolerance Test (GTT) up to 2 hours after administration of 50 gms of glucose orally.
   (iv) Urine Sugar Estimation along with GTT.

**Hypothesis**

Research Scholar has substantially gone through literature available on diabetes and based on the understanding it was hypothesized that:

There would be a significant effect of selected Asanas, Pranayama and the combinations of both Asana and Pranayama practice on blood sugar and urine sugar levels of Type I & II Diabetic patients.

**Definition and Explanation of Terms**

**Diabetes Mellitus**

Diabetes mellitus is the most common and possibly one of the oldest metabolic disorders in the world. It is characterized by multi-system dysfunction due to an elevated blood sugar level. And in diabetes the level of sugar in the blood can not be regulated. There are two forms of diabetes.
Type I - Insulin dependent
Type II - Non insulin dependent

Asana

The posture which gives comfort and steadiness is called asana.

Pranayama

Pranayama is the science of breath control. It is a deliberate technique of inhalation, retention of breath, exhalation and the suspension of breath in exhalation.

Significance of the Study

Undoubtedly the understanding of diabetes may be helpful to the doctors and patients for its preventive and curative aspects. Therefore this study will be of significance in the following ways.

1. It will help the doctors to use this knowledge for controlling the diabetes.
2. It will help the patients to use this knowledge for controlling the diabetes and get a new life.
3. It will add further to the knowledge of yoga and yoga therapy.
4. It will help the doctors to use an alternative medicine for controlling the diabetic.

5. The result of the study will help to reduce the life shortening effects due to diabetes mellitus. (Such as heart problems, paralysis, weakness of limbs and kidney problems etc).

6. After some modification in exercise program, might be used for any age & sex group.

7. Yogic exercises will also help in reducing the life shortening effect of old age such as decrease gastro-intestinal function, poor cardio respiratory fitness, loss of bone mineral mass, decrease in liver and kidney functions.

8. As everybody knows that almost all medicines have negative side effect on the body, especially in old age. Because their ability to metabolize drugs reduces, thus the result of the study might help to minimize the use of medicine.