

Chapter - I

INTRODUCTION

—Life is not over because you have diabetes. Make the most of what you have, be grateful. □

-Dale Evans Rogers

1.1 HEALTH

The state of health is defined as a state of complete physical, mental, social and spiritual well being and not merely an absence of disease or infirmity.

"Health is a state of complete harmony of the body, mind and spirit. When one is free from physical disabilities and mental distractions, the gates of the soul open."

-B.K.S. Iyengar

1.2 MEANING OF YOGA

The word Yoga is derived from Sanskrit root ‘yuj’ means to mind and yoke. It is true union of our will with the will of God. Our ancient sages have suggested eight stages of yoga to secure purity of body, mind, soul and final communion with God.

Yoga defines itself as a science, that is, as a practical, methodical, and systematic discipline or set of techniques that have the lofty goal of helping human beings to become aware of their deepest nature. The goal of seeking to experience this deepest potential is not part of a religious process, but an experiential science of self-study. Religions seek to define what we should believe, while a practical science such as meditation is based on the concrete experience of those teachers and yogis who have previously used these techniques to experience the deepest Self. Yoga does not contradict or interfere with any religion, and may be practiced by everyone, whether

they regard themselves as agnostics or members of a particular faith. Yoga brings complete and comprehensive union of body, physiological system and the mind in every action.

—Yoga, as a way of life and a philosophy, can be practiced by anyone with inclination to undertake it, for yoga belongs to humanity as a whole. It is not the property of any one group or any one individual, but can be followed by any and all, in any corner of the globe, regardless of class, creed or religion□.

- Sri K. Pattabhi Jois

1.3 CONCEPT OF YOGA

- Yoga is an ancient discipline
- It is the most important valuable gift for our culture.
- Yoga is a change in attitude
- With the development of science and technology yoga provides man more Comforts for his basic necessities.

1.4 OBJECTIVES OF YOGA

- Yoga improves physical posture.
- Yoga creates appropriate outlets for excessive energy and emotional overload.
- Yoga Increases the intake of oxygen and improves the functions of all the systems of the body.
- Yoga promotes self-esteem, self-control, and respect for self and others
- Yoga prevents and cures the psychosomatic diseases such as depression, anxiety, stress, etc.,

- Yoga Revitalizes when energy is sluggish.
- Yoga gives the capacity to face the life challenges.
- Yoga helps to improve focus and attention.
- Provides practical, peaceful strategies for conflict resolution.

1.5 ASANAS

Pathanjali has defined asana as ‘Sthir Sukha Asanam’ that is ‘Asana means steady and comfortable posture’. Yogasanas are not to design muscles, but rather to bring the whole body to the peak of physical perfection and top efficiency by a series of carefully designed position. All the asanas, which have an effect on the diaphragm, help to massage the heart and at the same time it also massages the abdominal organs. By virtue of their effect on the endocrine system which regulates the entire system, they help to keep the body in proper shape and to increase the power of resistance. They have a curative, recuperative and preventive effect because they are based on deep breathing which can work wonders.

—The Body is My Temple, Asanas Are My Prayers□

-B.K.S.Iyengar

1.6 PRANAYAMA

The word pranayama consist of two parts prana and ayama. —Prana□ means —breath, life, vitality or cosmic energy□. —Ayama|| means —control ||. Thus pranayama means control of the vital force by regulated breathing. It is a deliberate technique of inhalation, retention, exhalation. Great sage Patanjali says — Tasmin Sati Svasa

Prasvasayoh gativiched an Pranayamah ||. It means pranayama is the regulation of the incoming and outgoing flow of breath with retention. Just as bathing is necessary for purification of body, pranayama is essential for purification of mind.

"When you inhale, you are taking the strength from God. When you exhale, it represents the service you are giving to the world."

-B.K.S.Iyengar

1.7 MEANING OF DIABETES

Diabetes 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 typically presenting with chronically raised glucose levels in the blood with disturbances in the carbohydrate fat and protein metabolism, which are a results in inadequate amount or improper functioning of insulin produced within the pancreas.

Diabetes Mellitus is a disease which has plagued man for centuries through its incidence is the most challenging health problems in the twenty first century, especially in the more developed areas of the world, is higher than it has ever been in the past. Diabetes is the third leading disease that causes death after heart disease and cancer.

The word —diabetes|| comes from Latin diabetes, which literally means —a passer through a siphon ||. ultimately, the word comes from Greek —diabainein || meaning —to pass through|| , which is composed of dia, meaning —through|| and bainein, meaning —to go|| . The word —Mellitus|| comes from the classical Latin word mellitus, meaning —Mellite|| (i.e, sweetened with honey; honey-sweet). It was Thomas Willis in

1675 added —mellitus‘ to the word —diabetes —as a designation for the disease, when he noticed that the urine of a diabetic had a sweet taste (glycosuria). Diabetes is one of the oldest known diseases. The great Indian physician Sushruta (6th century BC)

identified the disease and classified it as Madhumeha. The ancient Indians tested for diabetes by observing whether ants were attracted to a person's urine and called the ailment —sweet urine disease|| (madhu meha).

In the west Willis first noticed the disease and was characterized by sweetness of the urine in 1675B.C.The prevalence of diabetes is rising all over the world due to population growth, aging, urbanization and an increase of obesity and physical inactivity. Unlike in the West, where older persons are most affected, diabetes in Asian countries is disproportionately high in young to middle-aged adults. This could have long-lasting adverse effects on a nation's health and economy, especially for developing countries.

Glucose metabolism is under the control of the hormone insulin, which is secreted by the pancreas a large gland behind the stomach. When this gland becomes stressed or exhausted, the hormone insulin becomes deficient in quantity or sensitivity. As a result, the blood sugar level becomes high and uncontrolled. This long-term raised glucose (hyperglycemia) causes chronic damage in the functioning of certain organs namely,

- eyes
- Kidneys
- Nerves
- Heart
- Blood vessels

1.8 CAUSES OF DIABETES

Diabetes mellitus occurs when the pancreas doesn't make enough or any of the hormone insulin, or when the insulin produced doesn't work effectively. In diabetes, this causes the level of glucose in the blood to be too high.

Type I diabetes the cells in the pancreas that make insulin destroy, causing a severe lack of insulin. This is thought to be the result of the body attacking and destroying its own cells in the pancreas - known as an autoimmune reaction. It's not clear why this happens, but a number of explanations and possible triggers of this reaction have been proposed.

These include:

- Infection with a specific virus or bacteria;
 - Exposure to food-borne chemical toxins; and
 - Exposure as a very young infant to cow's milk, where as a yet unidentified component of this triggers the autoimmune reaction in the body.
- However, these are only hypotheses and are by no means proven causes.

Type II diabetes is believed to develop when the receptors on cells in the body that normally respond to the action of insulin fail to be stimulated by it - this is known as insulin resistance. In response to this more insulin may be produced, and this over-production exhausts the insulin-manufacturing cells in the pancreas. There is simply insufficient insulin available; and the insulin that is available may be abnormal and therefore doesn't work properly. The following risk factors increase the chances of someone developing Type II diabetes:

- Increasing age;
- Obesity; and

- Physical inactivity.

Rarer causes of diabetes include

- Certain medicines;
- Pregnancy (gestational diabetes) and

With this reason the Scholar is interested of assessing the influence of yoga practices on selected Biochemical and Psychological variables by using middle aged Type II diabetic men as subjects.

1.9 TYPES OF DIABETES

There has been a lot of confusion as different classification has been cropping up at regular intervals. The classification adopted by World Health Organization is given in clinical classification of diabetes mellitus.

- 1) Type I Diabetes Mellitus- previously known as Insulin Dependent Diabetes mellitus (IDDM) (Or) Juvenile Onset Diabetes Mellitus
- 2) Type II Diabetes Mellitus- previously known as Non Insulin Dependent Diabetes mellitus (NIDDM) (Or) Adult Onset Diabetes Mellitus
- 3) Gestational Diabetes Mellitus

1.10 TYPE I DIABETES MELLITUS (IDDM)

Type I diabetes mellitus or Juvenile Onset Diabetes mellitus is seen in people where a large proportion of β (beta) cells of the pancreas (which produce insulin) have been damaged or destroyed. This could be the result of our immune system destroying the body's own cells (in the case of the β cells). In this type of diabetes the hormone insulin is completely or almost completely absent from the islets of langerhans .

In this case insulin treatment is essential and compulsory periodic insulin administration to control the rise of blood glucose level is important. It occurs at any

age, though it most commonly occurs during younger age. Hence it is called Insulin Dependent Diabetes Mellitus.

The second type of Type I diabetes mellitus is where the cause of damage to these cells is not known. This is termed as Idiopathic Type I Diabetes Mellitus. This type usually arises in early childhood or in the teens. This could present dramatically and without a warning. At this time it becomes difficult for the patient and his/her family to accept the fact that the child has diabetes.

A lot of research is going but as yet, it is the same old two factors, i.e. heredity and environment that are incriminated. Fortunately only 5 % of all diabetes fall in Type I category. Here the downside is that the patient has to take insulin injections every day of his life.

1.11 SYMPTOMS OF TYPE I DIABETES MELLITUS

The primary symptoms exhibited in Type I diabetes are nausea and vomiting. These symptoms keto acidosis which leads to breaking down of energy giving muscles and tissues thus result in loss of weight. This leads to severe electrolyte disturbances and dehydration which may have a poor prognosis leading to coma and death.

1.12. TYPE II DIABETES MELLITUS (NIDDM)

Maturity Onset Diabetes Mellitus type of diabetes is much more common among the people who are over 40 years and overweight. Since it occurs in the later stage in life it is termed as maturity onset diabetes. This is the most common form of disease accounting 90% to 95% of diagnosed cases. Approximately 50% of men and 70% of women are obese at the time of diagnosis. In this condition of diabetes the hormone insulin is often present in plasma at near normal or even above normal level and additional insulin is not requires to sustain life and to maintain normal blood

glucose level. This happens probably due to defects in the molecular machinery that mediates the action of insulin on its target cells. That is why this diabetes is called Non-Insulin Dependent Diabetes Mellitus.

As always, there is a consensus on a few factors that could cause or contribute in causing type II diabetes mellitus. They are;

- ◆ Genetic predisposition
- ◆ Obesity
- ◆ Life style, especially a sedentary life style
- ◆ Gestational diabetes mellitus

1.13. SYMPTOMS OF TYPE II DIABETES MELLITUS

The symptoms might not present themselves at all in certain cases. The important symptoms are;

1) POLYDYPسيا AND POLYURIA

When the sugar level exceeds the upper limit in blood, the kidney cannot manage this extra sugar and this is thus passed through frequent urination (polyuria) and increased thirst (polydypsia) is also a known feature of diabetes.

2) WEIGHT FLUCTUATION

Unexplained sudden weight loss despite leading a normal lifestyle. A few cases may show weight gain due to increased appetite.

3) POOR WOUND HEALING

Delayed wound healing and recurrent infections, especially infections of the glands penis and vaginal areas in females (vulvovaginitis) .

4) BLURRY VISION

Sudden blurring of vision but tends to clear off as soon as the sugar levels return to normal is a symptoms of diabetes.

5) FATIGUE

Fatigue is a very common complaint .This is simply because glucose does not enter the cells and thereby energy available in the cells is less.

6) GUMS INFECTION

Increased blood sugar leads to gums infection and this in turn may lead to tooth decay also.

7) NERVE WEAKNESS

Raised blood sugar causes nerve dysfunction which leads a decreased sexual libido.

8) POLYPHEGIA

The hormone insulin is responsible for stimulating hunger. With the loss of glucose from the body the person feels more hungry (Polyphagea), the insulin which leads to increased hunger control is most important for preventing further damage.

9) INFECTION

The body gives few signals whenever there is a fluctuation in blood sugar (due to suppression of immune system) by frequent skin infections like fungal or bacterial or urinary tract infection.

10) NUMBNESS ,TINGLING IN FEET,HAND

Patients complain of a feeling of pinpricks because a raised blood sugar causes nerve damage. Initially this is transient problem but later, it could be very distressing when pin-pricks are replaced by a feeling a severe burning and pain.

1.14 GESTATIONAL DIABETES MELLITUS

In about 2.5 percent of all pregnancies, one could encounter an abnormal metabolism of glucose. This disease entity is referred to a gestational diabetes mellitus as it comes with pregnancy and disappears on termination or completion of the period of pregnancy. Luckily enough, it abates after delivery but leaves behind a reminder that sometime later in life; it could come back as Type II diabetes. This condition is usually encountered in the last three months of the pregnancy and is characterized by birth of large babies.

1.15. DIABETES MELLITUS DISTRIBUTION IN INDIA

Diabetes (Madhumeha/ Prameha) is probably one of the well described disorders in ancient India. The oldest reference to diabetes in Indian literature dates back to 4500 years. The Charaka Samhita explains in detail about the tiopathogenesis, symptomatology, complications and treatment of prameha. Although there is no recorded data on the prevalence of diabetes in ancient India, it is quite evident that the disorder was not uncommon. The treatment options of this —maharoga|| were diet, exercise and medicine. The initial surveys on the prevalence of diabetes in India To do a comparative analysis on the prevalence of diabetes in the first half of 20th century is difficult as there were no standard criteria for diagnosing diabetes. One of the earliest studies on the prevalence of type 2 diabetes in India was done at Kolkatta, in1938. This study, based on urine sugar showed that the prevalence of type 2 diabetes was

1%. Another hospital based study from Mumbai reported a prevalence of 0.7% in 1959. In 1966, a population based survey reported a prevalence of 2.3% from Chandigarh. In the same year, a survey done in Puducherry using blood sugar for diagnosis reported a prevalence of 0.7%. A prevalence of 1.2% was reported from Cuttack in 1971. In 1972 the prevalence of diabetes in urban Hyderabad was 2.5% and Delhi had a prevalence of 2.3%. A study from Bangalore showed a prevalence of 2.3% in 1973.

The first multi centric study in India was done by the Indian Council of Medical Research (ICMR, New Delhi) between 1972 and 1975 in six different areas of India. The study reported a prevalence of 2.3% in urban areas and 1.5% in rural areas. From these reports, it is evident that till the 1970s, the prevalence of diabetes was less than 3% even in urban areas. Subsequent studies from different parts of India revealed a rapid rise in the prevalence of diabetes in India.

The International Diabetes Federation (IDF) estimates the total number of people in India with diabetes to be around 50.8 million in 2010, rising to 87.0 million by 2030. The primary goal in the management of diabetes mellitus is the attainment of near-normal glycaemia. In India, more than half of patients have poor glycaemic control and have vascular complications. Therefore, there is an urgent need to develop novel therapeutic agents of diabetes without the development and progression of complications or compromising on safety. Diabetes mellitus (DM) comprises a group of metabolic disorders that share the common phenotype of hyperglycemia, polydipsia, polyuria and hyperphagia. Added metabolic dysregulation in the form of deranged lipid profile, impaired insulin secretion and insulin resistance is a feature of type 2 diabetes. Most patients are obese when they develop diabetes and the obesity is

becoming a major health hazard worldwide. The incidence of type 2 diabetes is also increasing with the increase in age, physical inactivity and sedentary lifestyle.

The National Urban Diabetes Survey (NUDS), a population based study was conducted in 2006, six metropolitan cities across India and recruited 11,216 subjects aged 20 yr and above representative of all socio-economic strata. An oral glucose tolerance test was done using capillary glucose and diabetes was defined using the WHO criteria. The study reported that the age standardized prevalence of type2 diabetes was 12.1 per cent. This study also revealed that the prevalence in the southern part of India to be higher-13.5 per cent in Chennai, 12.4 per cent, in Bangalore, and 16.6 per cent Hyderabad; compared to eastern India (Kolkatta), 11.7 per cent; northern India (New Delhi), 11.6 per cent; and western India(Mumbai), 9.3 per cent. A study from Jaipur reported an age-standardized prevalence of 8.6% in 2003. A study (2011) from rural Maharashtra showed a high prevalence of 9.3%. The Amrita Diabetes and Endocrine Population Survey (ADEPS), a community based cross-sectional survey done in urban areas of Ernakulam district in Kerala has revealed a very high prevalence of 19.5%.Recently presented preliminary results from the Diabcare India 2011, study also showed mean Hba1c of $8.97 \pm 2.2\%$ where data of more than six thousand diabetic patients from India was analyzed indicating the poor glyceimic control in India. The results of study substantiate the observations of previous studies with mean Hba1c of 9.2 ± 1.4 at the baseline. It is a clear indication that the —clinical inertia□ is still playing a major role in maintaining the glyceimic burden to Indian diabetic patients. Moreover, whatever may be the therapy, the Hba1c levels were way beyond the recommended targets. This indicates that there is definitely delay in initiating effective treatment, a further reflection of —clinical inertia|| on the part of

physicians in India. A diabetes epidemic is sweeping across India. According to International Diabetes Federation (IDF), India leads the world in the number of diabetic subjects in India is around 41 million in 2006 and this is set to rise to 70 million by the year 2025.

Today there is estimation that approximately 9% of the populations have diabetes. The number of cases is said to be rising 6% each year. Of all the diseases that inflict human beings possibly diabetes is the only disease which causes ill effects nearly every organ in the body. Diabetes mellitus is one of the most common chronic diseases across the world and number of diabetic patients is on rise. In 2011 there were 366 million people with diabetes globally, and this is expected to rise to 552 million by 2030. Most people with diabetes live in low- and middle-income countries like India, and these countries will also see the greatest increase over the next 19 years. In 2013 ICMR-INDIA published a national study report that there are 62.4 million people with type 2 diabetes (T2DM) and 77 million people with pre-diabetes in India. These numbers are projected to increase to 101 million by the year 2030. By 2030, India will have maximum number of diabetics 7 out of every 100 adult. The reason for this that, through technological achievement, both stress and affluence have become increasingly widespread and people have developed the tendency to avoid strenuous physical exercise and to over eat.

1.16 DIABETES MELLITUS – A LIFESTYLE DISEASE.

In medical parlance, ‘stress’ is defined as a perturbation of the body’s homeostasis. Stress, nonetheless, is synonymous with negative conditions. Today, with the rapid diversification of human activity, we come face to face with numerous causes of stress and the symptoms of anxiety and depression. In a challenging

situation the brain prepares the body for defensive action —the fight or flight response by releasing stress hormones, namely cortisone and adrenaline. The state of accumulated stress can increase the risk of both acute and chronic psychosomatic illnesses and weaken the immune system. Stress can cause headaches, irritable syndrome, insomnia, hypertension and diabetes. Stress management is also important in preventing the onset as well as controlling diabetes .Yoga includes moderate exercise, diet restriction, relaxation techniques which are very good for stress management. Insulin Dependent Diabetes mellitus and Non Insulin Dependent Diabetes Mellitus can be controlled by yoga practice. Diabetes management is a constant process; for many, it is an ongoing challenge that may be complicated by the impact of stress. Excessive stress is a major barrier to effective glucose control and a danger to one's general health.

—Nothing gives one person so much advantage over another as to remain always cool and unruffled under all circumstances. ||

-Thomas Jefferson

The youth segment of the community is the prime asset of any nation. When the health of this particular group deteriorates, it is the overall development of the nation that suffers. Diabetes affects the most productive period of life and it will stifle the prosperity of a whole country. Type 2 Diabetes is considered to be a multifactor or complex disease as it involves a wide variety of ramifications, arising from the complex interaction between various genetic and environmental factors in its pathogenesis. At present time modern medical science holds that there is no positive system of cure for diabetes mellitus. The most it can offer is control of the symptoms through dietary controls and daily use of insulin and other drugs. However, ancient

Indian physicians —chakra|| and —sustutha|| have given description of diabetes in their traditional text. They recommended doing physical exercises and ensuring proper diet for the control of diabetes.

Diabetes mellitus has become one of the most commonly encountered disease in adults and young people nowadays. The disease is a group of metabolic disorders which results in deregulation of blood sugar level leading to serious complications. Adequate awareness therefore must be provided to people worldwide regarding the causes and preventive measures required for controlling this disease. As the condition people were associated with higher risks of many diseases, they need to be educated about lifestyle modifications which have been recommended by many researchers.

1.17 MODIFICATION OF LIFESTYLE

Yoga is a way of life, a specific mode of thinking and natural living. Yoga is not merely a system of physical exercise of asanas, but a perfect synthesis of body, mind and spirit. It is the most significant scientific technique for development of integral personality. Yoga is the destroyer of sorrows and miseries, tones up muscles, regulates function of various organs and helps to overcome psychosomatic ailments, digestive, metabolic and organic disorders. practice of yogasana changes our reaction and our attitudes towards stress. —Yogasana supply's energy to every cell, cleans the organism by flushing out waste products, expels the toxin while relaxation guards against neuristhemia and insomnia ||. According to Patanjali (300 BC) one of the earliest authorities in systematically recorded yoga, || yoga leads to self realization awakening of latent powers of the body and personality development and utmost relaxation of the body and mind, refreshing oneself wonderfully ||. Yoga means union, becoming one. It means the union of the human spirit with the supreme. Yoga is the

destroyer of sorrows and miseries, tones up muscles, regulates function of various organs and help to overcome psychosomatic ailments digestive, metabolic and organic disorders. By practice of yogasana change our reaction and our attitudes to stress —yogasana supply energy to every cell, cleans the organism by bringing out waste products, expels the toxins while relaxation, guards against neurasthenia and insomnia.

Yoga helps to tone the body and keep diabetes under the control. For people with diabetes both physical and emotional stress can take a great toll on health when stress occurs, the body prepares to take action. This preparation is called the —fight-or-flight□ response. In the fight-or-flight response level of many hormones shoots up. Their net effect is to make a lot of stored energy, glucose and fat available to cells. These cells are then —primed|| to help the body to get away from the danger. Insulin is not always able to let extra energy in to cells .So glucose builds up in the blood. It is not only essential to control your blood glucose levels, but it is also important to prevent diabetic complications. Suitable life style changes are very much necessary.

Meditation Soothes the emotional strain, removes stress and calms down the mind. Hence meditation is aptly termed as harmless tranquilizer. The mind, the body, the society and the environment are always constantly interacting with each other. The body has to withstand the climatic fluctuation; the mind has to establish healthy coexistence in the society. Sound body and sound mind are interdependent and intrinsically interwoven with each other. Mental status influences the body; physical fitness reflects on mind. The mind is the master of the body. All the actions of the body are preceded by psychic command. Siddha Samadhi Yoga is recognized as a most important technology for mankind for an effective elimination of mental problems and restoration of peace and happiness.

The asanas and pranayamas are the effective means of promoting the harmonious development of the body and mind. According to yoga –Tattva-Upanishad and yoga Shiva-Upanishad, yoga is of four kinds:-

- ◆ Hatha yoga
- ◆ Raja yoga
- ◆ Mantra yoga and
- ◆ Laya yoga

1.18 HATHA YOGA:

Hatha yoga is called Bahiranga yoga (i.e external yoga) has to do with external practice (body discipline). The word hatha yoga consists of two syllable namely —ha|| and —tha|| . —Ha|| means sun and —tha|| means moon and they represent bingala the right nostril and idagala the left nostril. Bingala refers to heat and Idagala refers to cold. Health is the balance of warmth and cold which Hatha yoga ensures in the body. It is also interpreted that —ha|| refers to positive charge and —tha|| refers negative charge, which imply to balancing of positive and negative emotions. It is also said that —ha|| means male and —tha|| means female implying that hatha yoga is common to both the male and the female.It is a stepping stone to all the various forms of yoga. Hatha yoga is classically divided into eight limbs called astanga yoga, which means eight limbed yoga. The limbs are interlinked, each has numerous facts.

The eight limbs of Hatha yoga are divided in to two states;

The “outer stage” (bahiranga) comprises

1)Yama (Social discipline)

2)Niyama (punctuality)

3)Asanas (Postures)

4)Pranayama (breathing practice)

The “inner stage” (antaranga) comprises

5)Prathyahara (withdrawl of senses)

6)Dharna (concentration)

7)Dhyana (meditation) and

8)Samadhi (Cosmic realization super consciousness)

The first four are basic and physical, and next four are psychic and Meta physical.

Yama(Social Discipline):

Yama involves behavioral commitments in life for positives reinforcement of the psyche at the intellectual level. These commitments include ahimsa (nonviolence),satya (truthfulness), asteya (non-stealing), brahmacharya (celibacy) and aparigraha (non-hoarding).

Niyama : (punctuality)

Niyama involves behavioral commitments in life for positive reinforcement of psyche at the emotional level. These commitments include saucha (purity, cleanliness); santosha (contentment), tapas (austerity), swadhyaya (understanding oneself through study) and iswarpranidhana (surrender of God).

Asana : (Postures)

Asana means a steady comfortable posture. The great exponent of yoga of ancient times. Saint pathanchalli defines asana as —sthiram sukham asanam□ meaning position which is comfortable and steady. A steady and pleasant posture produces

mental equilibrium and prevents fickleness of mind. Various yogic asanas are the most popular aspect of yoga.

Pranayama : (breathing practice)

Pranayama involves tackling of life energy (prana) through breathing discipline in order to sensitize the mind to the process of self-realization.

Pratyahara : (withdrawal of senses)

Pratyahara involves concentrating the attention of sense organs towards the inside of the body by losing effective contact with external objects.

Dharana : (concentration)

Dharana is also a discipline of sense organs and involves concentration one aspect of self-existence at a time.

Dhyana : (meditation)

Dhyana is further refinement of control over sense organs and involves continuous awareness of the same aspect of self-existence for a longer time.

Samadhi : (Cosmic realization super consciousness)

Samadhi is the final stage in achieving control over sense organs. It involves persistent awareness of balanced condition of the self. When the mind is no more a screen, the soul (Atma) is free and it shines as pure crystal with no reflection on it. As the self is free from contact of things that is the state of experiencing Samadhi. If these eight stages are practiced and followed in life, virtues like morality, (morally sound conduct) and good character would develop in man. Besides, there would be an all round progress in human life- physically, intellectually and spiritually and man would attain physical fitness and mental equanimity. However yogasana is not mere physical training but it prepares the mind and the body for meditation and Samadhi.

1.19 OBJECTIVES OF THE PROBLEM

The physical fitness has become an important asset of human being and the modern day man is sincerely interested to improve and maintain this aspect, as this would ensure the man a happy and healthy qualitative life. The contribution of yoga educationists and yoga therapist experts in this area are praiseworthy. Throughout the world, the researchers are conducted to prevent and cure the deadly ailments like Diabetes, Coronary Heart Disease, Hypertension, etc.

This study was conducted with the following objectives:

- ❖ To evaluate health related physical fitness status of the diabetic patients.
- ❖ To impart existed medical treatment to the diabetes patients with the Indian traditional yogic exercises to them.
- ❖ To compare how the selected yogic exercises can contribute to improve health related physical fitness of the diabetic patients with controlled group.
- ❖ This study also creates a path to conduct several researches in the same direction and area with different experimental variables and with different combinations of variables on the risk factors of various diseases.

1.20 STATEMENT OF THE PROBLEM

The purpose of the study is to investigate the effects of integrated modules of yogic practices on selected biochemical and psychological variables among middle aged Type II diabetic men.

1.21 HYPOTHESIS

1. It would be hypothesized that there would be a significant difference between integrated modules of yoga practice group and control group on blood glucose (fasting/post prandial), HbA1c, total cholesterol, triglycerides, HDL, LDL, VLDL and selected psychological variables such as, depression, anxiety and stress.

2. It would be hypothesized that there would be a significant decrease in selected biochemical variables such as, blood glucose (fasting/postprandial), HbA1c, total cholesterol, triglycerides, LDL, VLDL and selected psychological variables such as, depression, anxiety and stress after the integrated modules of yogic practices.

3. It would be hypothesized that there would be a significant increase in HDL after the integrated modules of yogic practices.

1.22 SIGNIFICANCE OF THE STUDY

1. The study will assist many to avoid medicines to make themselves fit and to make use of one's own physique to feel healthy.

2. The study as such will create significant health awareness among people, especially among the middle aged men.

3. The study will serve as reference to researchers and statisticians to explore new areas in the field of physical fitness

4. Reduces the risk of heart attack, frozen joints, risk of the kidney and eye problems and controls the body weight.

5. It would also help to find out whether there is any improvement in mental health.

6. The findings of the study may provide knowledge to the researchers about the effects of yoga.

1.23 DELIMITATIONS

The study will be delimited as follows:

1. This study was conducted after consultation with medical practitioner.
2. The study was confined to thirty diabetic male from Puducherry State
3. The age of the subjects ranged from 35 to 55 years.
4. The study was be delimited to 12 weeks of selected yogic practices for 6 days per week (Monday to Saturday)
5. The food habits of the subjects were restricted.
6. Yogasana practice was conducted during morning session only.
7. Before practice, orientation was conducted for the subjects to make them understand the techniques of practicing the yogasanas .
8. The number of groups for the study was delimited to two, group I were named as integrated modules of yoga practice and group II acted as control. The number of subjects in each group was confined to fifteen subjects only on random basis from among the thirty volunteered.
9. The criterion variables selected for this study was confirmed to the following variables.

Biochemical Variables

1. Blood glucose (fasting/post parandial)
2. HbA₁C
3. Total Cholesterol
4. Triglycerides
5. HDL (High density lipoprotein)
6. LDL (Low density lipoprotein)

7. VLDL (Very Low density lipoprotein)

Psychological Variables

1. Depression
2. Anxiety
3. Stress

1.24 LIMITATIONS

1. The changes in climatic condition such as temperature, atmosphere pressure and humidity during the training as well as testing periods could not be controlled and their influence on the result of the study will be recognized as a limitations.

2. The weight and height of the subjects will not be considered.

4. Motivational techniques will not be used to the subjects.

5. Variations meteorological status, the atmospheric temperature, humidity etc. during the pre-test and post-test will not be controlled and recognized as a limitation.

6. The variation in results of the yogic training mainly depends upon the subject's co-operation during their practice yogasanas.

7. Social status, food habits and the way of life style, which could influence on the results, could not be controlled by the researcher, though orientation was given about these aspects to the subjects.

1.25 MEANING AND DEFINATION OF THE TERMS

1.25.1 Yoga

Yoga is the system of philosophy and practice of esoteric meditation having as object the union of the individual human spirit with that of the universe.

Yoga is a method by which one can remove ignorance, the cause of main folders and thus attain union with supreme self.

Yoga is the science of right living and, as such, is intended to be incorporated in daily life. It works on all aspects of the person: the physical, vital, mental, emotional, psychic and spiritual.

1.25.2 Asana

The word asana means —easy comfortable|| and so the postures should be to have their full effects. Asana means a steady comfortable posture. The great exponent of yoga of ancient times, saint Pathanchally defines asana as sthiram sukham asanam meaning position which is comfortable and steady. A steady and pleasant posture produces mental equilibrium and prevents fickleness of mind

1.25.3 Blood Glucose

Glucose is a simple sugar we get by digesting carbohydrates. It is transported in the blood throughout the body and serves as the major sources of energy for each of the body cell. A high blood glucose level is the primary characteristic of diabetes.

1.25.4 Hyperglycemia

This is HIGH blood sugar. It is also called hyper, a reaction or an insulin reaction. High blood glucose, also known as hyperglycemia, can cause major health complications in people with diabetes. Several factors can contribute to hyperglycemia ,

including poor food and physical activity choices, illness or disease, or not getting the right dosage of glucose-lowering medication.

1.25.5 Beta Cell

The cell which produces insulin found in the Islets of Langerhans in the pancreas. The beta-cell is one of the major types of cells present in the islets of Langerhans, which are islands of cells distributed throughout the endocrine pancreas in most mammals. The beta-cell synthesizes and secretes the hormone insulin mainly in response to glucose but also in response to several nutrients, hormones and nervous stimuli.

1.25.6 Pancreas

The pancreas is an extremely important organ in your body. It has a very complex structure and has many functions related to our metabolism. The pancreas is a gland situated in the upper part of the abdomen behind the stomach. One of its functions is to release digestive juices (pancreatic juice). The most important of that hormone is insulin and glucagon. It is both an exocrine and endocrine gland. It is responsible for controlling the blood sugar level in the body as well as providing the digestive enzymes for all three categories of food; proteins, fats, and carbohydrates.

The pancreas also produces a number of hormones which pass into intestine. Another major structure of the pancreas is known as the Islets of Langerhans. These islets are small structures dotted throughout the pancreas, and are responsible for producing insulin, as well as a wide variety of other hormones used by the body. It is estimated that each pancreas contains over one million of these islets. An endocrine hormone is a hormone produced by a gland (such as the pancreas) which is secreted directly in to the blood stream.

27 These hormones include insulin, glucagon, and somatostatin. Insulin is famous for being the hormone which is deficient in people with diabetes. People with diabetes do not produce enough insulin. Insulin is responsible for regulating the amount of sugar which is absorbed into the cells of the body. Without enough insulin, the sugar remains in your bloodstream where it can cause significant health problems.

1.25.7 HbA₁C

The HbA₁C level changes slowly, over 10 weeks, so it can be used as a 'quality control' test. In diabetes glucoses tend to rise more than usual, dropping with yogenic exercise, rising after food, raising a lot more after sweet food and can make it hard to control. HbA₁c levels by coincidence nearly equate to glucose levels. Normal values usually run between 3% and 5.5%. In some cases with poorly controlled diabetes, it may be as high as 20%, which reflects consistently raised blood glucose over the preceding two to three months.

1.25.8 Cholesterol

An odorless, tasteless, white fatty alcohol (sterol) found in all cell membranes and is vital to cell survival and growth. Cholesterol is also a key precursor or intermediate compound in the production by the body of numerous biologically important substances, collectively called steroids. These include various essential hormones plus bile acids, the major excretory product of cholesterol metabolism but also important in dietary fat. The human body contains about 140-145 grams of cholesterol, which is constantly being used and replenished though at different rates in different tissue.

1.25.9 Triglycerides

Triglyceride is an ester of three fatty acids and glycerol, which are the main components of animal and plant lipids. They are the most concentrated source of usable energy in the human body and are stored as subcutaneous fat deposits where they contribute the insulation.

1.25.10 Lipoprotein

Lipids and sterols circulate, as a part of macromolecular complexes known as lipoprotein. These are the means by which insoluble lipids are able to circulate in an aqueous medium. Lipoproteins consist of various combinations of cholesterol, triglycerides and phospholipids with specific peptides known as apolipoproteins. Lipoproteins are divided by their ultra centrifugal properties into chylomicrons, very low-density lipoproteins (VLDL), and low-density lipoproteins (LDL) high-density lipoproteins (HDL).

1.25.11 High-density Lipoprotein

High-density lipoprotein cholesterol is a group of proteins found in the blood plasma and lymph that are combined with lipids. They transport cholesterol from the tissue to the liver to be broken down and excreted.

1.25.12 Low-density Lipoprotein

Low-density lipoprotein cholesterol is a specific kind of lipoprotein that is the form in which cholesterol is transported in the blood.

1.25.13. Psychology

Many texts define psychology as the —Science of mental process and behavior—. However, ‘Psychology’ is difficult to define because the word ‘_mental’ suggests there are no boundaries or limits. —Psyche|| , in|| Psychology|| also suggests

breath, life, soul, or mind, all of which are without limit. It is the the mental or behavioral characteristics of an individual or group or is the study of mind and behavior in relation to a particular field of knowledge or activity.

1.25.14 Depression

Depression is a state of low mood and aversion to activity that can affect a person's thoughts, behavior, feelings and sense of well-being. Depressed people can feel sad, anxious, empty, hopeless, worried, helpless, worthless, guilty, irritable, hurt, or restless.

1.25.15 Anxiety

—Anxiety is complex emotional state characterized by a general fear of fore bonding usually accompanied by tension. It often has to do with inter personal relation social situation and feeling of rejection and insecurity and usually a part of anxiety□.

-Lewellyn and Blucker

1.25.16 Stress

Stress is a physical and mental reaction to perceived danger. Conditions that seem uncontrollable or require emotional and behavioral change tend to be perceived as a threat. Stress is our body's response to changes in our life. Chronic stress, leads to many serious health issues.

—If the problem can be solved why worry? If the problem cannot be solved worrying will do you no good.□

-Santideva