

The effect of Yoga and Diet therapy on Diabetes

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JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

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A Book on

“The effect of Yoga and Diet therapy on Diabetes”

By-

Jv’n Anushka Tyagi

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Jv'n Anushka Tyagi

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CHAPTER-1

Introduction

- Need of Study
- Review of literature

INTRODUCTION

Human body in an action system. Body has many antioxidants and immunity centers within us which work against pathogens. For the quality works we need Good health and wealth. In present times with increasing harmony for Health and Wealth one becomes lazy and devoid of laborious work as the results individual is suffering from many diseases. And one of them is *diabetes*. Lack of physical work and life of full luxuries leads to disease termed as *diabetes*. Diabetes is a word which is very familiar to world now a days.

In this disease level of glucose increase in Blood and urine. Out of 100; 4-5 people suffer Diabetes also known as Diabetes Miletus. In few case, the level of Glucose in urine does not increases but increase in the blood; this condition in termed Hyperglycemia. Main reason for *diabetes* is unbalanced and improper Diet with disturbances of carbohydrate metabolism. In this, B-cell of pancreas lacks in insulin secretion, insulin mainly transforms glucose to glycogen. Glycogen is stored matter in liver cells and muscle cells. When there is low or none secretion of insulin then glucose level increase in the blood. Thus is excreted through urine. The patient feels weakness, weight loss, thirst and appetite are increasing; this is only known as Diabetes.

In ancient time, the disease was confined only to the rich community, people who used to intake high caloric food with low energy output. But in recent times; people doing labor are also under this disorder the main reason prescribes polluted food and environment and inhaling high calorie food with low energy output labor including highly spicy food, drug addiction, improper living pattern or time table , adds to this problem .Diabetes is most complicated disease in own self ; one suffering this intuitis our problems as a gust which gives pain to ageing.

Science of Yoga proves that all aspects of our life are influenced by the harmony of Prana. Modern science devotes Prana as life force, capacity to resist

diseases, bio electricity or electromagnetic energy etc. In Yoga therapy, yogic perspective of life is of foremost importance. Today the scientists across the globe unanimously agree that majority of the diseases of mankind are psychosomatic in nature. Psychological problems crop up as result of lack of right perspective of life, then our life energy can be utilized properly and this then becomes the fitting measure of getting rid of psychological tensions and anxieties. But it is an irony that in spite of knowing drawbacks man constantly run behind only wealth not health. That result in psychosomatic diseases like asthma, diabetes & various skin disorders etc. Yoga has exhibited some beneficial effects in curing diabetes. The yoga exerts that are ordered for curing diabetes is different from typical hatha yoga exercise because it regards places shoehorned to do by certain statuses, as well as speculation, relaxation and stretching exerts.

Researches in India has been recognized Diabetes as a psychosomatic disorder with causative factors being sedentary habits, physical, emotional and mental stress. Many studies there have confirmed that the practice of the postures can rejuvenate the insulin producing cells in the pancreas of diabetics of both types, and that doing the postures in a relaxed manner, without exertion, yogic meditation and breathing help most patients to control the causes of diabetes.

There are many alternative therapies to cure the disease namely – Diet Therapy, Yogic therapy, Ayurvedic Therapy, Life style modification. In this dissertation work we will emphasize mainly on prevention measure of diabetes mellitus through diabetes yogic and diets treatment. Yoga is an old, tradition, India psychological, physical and spiritual exercise regimen that has been studied for several decades for its role in the management of several chronic disease. Yogic practices not only help in reversing the progress of diabetes but also improve the resistance of body and psycho physiological level. YOGA provides solution to this complication. It is often seen that, regular yogic practice glucose

dose not stores in cells and insulin need is inhibited. For curative properties with the Yoga ; Diet or balanced diet is also important. It has been said in the one Indian text that until or unless a proper diet is adopted, one can not think of achieving good health. Indian says have proclaimed in the context of diet and its effect.

The good and bad intentions with which we consume food, the happy or sad environment in which we eat our food and other mind factor plays a very significant role in the development of one's personality. Although in biochemistry, it has not been possible so far to document such effect and influence of diet on human body, diet dose have a decisive effect on our body, thought and mind. Where we eat making taste as the deciding factor for selecting food, it may not prove beneficial for health.

The food that we eat in the form of fat, protein, sugar, water and salts is used by the body to manufacture about 2000 different useful compounds. Along with the selection of food we also need to pay attention to how and where we eat. Now, we will go to the question about what is diabetes? Types of it? Its sign and symptoms? Diagnosis? Complication? And so on.

Knowing the weakness that is the cause of diabetes; we can treat it more effectively. Therefore, we can see Yoga and Diet is one of the best techniques in solution to Diabetes problem.

NEED OF THE STUDY

In the present era, due to sedentary life style people are suffering from various diseases. “Human Being” is the valuable and precious design of God among all creatures. In present time, due to increasing conflicts man is facing various psychological and physiological problems.

Diabetes is most common and prevailing disease and modern medicine doesn't have complete solution to this problem. Researches statistically reveals that this is quite beneficial through Yogic techniques, Yoga therapy is a boon to us in present era; by these therapies anyone can become healthy. Yoga is helpful in making healthy life. Yoga is like a miracle to us; as it connect our body, mind, soul. In the present era; with sedentary lifestyle and dietary habits create lifestyle diseases. Diabetes is one of the leading diseases among these. Polluted mind and polluted Diet invites many disorders and diseases.

World wide more than 140 million people suffer from diabetes, as it exists in one of the most common non communicable diseases. Number of affected individuals with diabetes is expected to 240 million by 2025. The countries with the largest number of diabetic patient are India, China and US. In most instances their complications appear approx. 15-20 years after the onset of hyperglycemia. Cardio Vascular even such as Myocardial infarction, renal vascular insufficiency and cerebrovascular incidents are the most common cause of mortality in long standing diabetes. It accounts for up to 80% of death in type 2 diabetes, infarct, diabetics have 3 to 7.5 times greater incidents of death from cardiovascular cause compared to the non diabetic population. Diabetes affects an estimate 16 million people in United States of America as many as half of whom are undiagnosed. Each year an additional 80000 individual develop diabetes in this country and 54000 die from diabetes related causes. Diabetes is leading cause of end stage renal disease, adult onset blindness and non traumatic lower extremity amputation.

Now a days, Diabetes is the most common disorder so , I want that first of all we should known their treatment, so I selected this topic for my Dissertation work and I think that I got some what success in knowing it deeply.

REVIEW OF LITERATURE

1.Singh V., Kumar (2009) . *“The Impact of yogic package on blood Glucose level and Blood pressure of Type-2 Diabetes”* Research result at conclusion it can be asserted that intervened yogic practice caused significant beneficial effect on the subjects of diabetes Type-II and with average age 42 years.

2. Moorthy M.V.(1987). *“Effect of selected yogic practices on blood sugar level of the Diabetes patient”* There was significant improvement in 23 diabetes patient in respect of blood sugar level at the end of three months of yogic training program.

3. Mahapure Hemant H, Shete Sanjay U, Bera TK, (2008). *“Effect of yogic exercise on superoxide dismutase levels in diabetic”* Reactive oxygen species are known to aggravate disease progression. To counteract their harmful effects, the body produces various antioxidant enzymes, viz, superoxide dismutase, glutathione reeducates’ etc. Literature reviews revealed that exercises help to enhance antioxidant enzyme systems; hence, yogic exercises may be useful to combat various diseases. This study aims to record the efficacy of yoga on superoxide dismutase, glycosylated hemoglobin (Hb) and fasting blood glucose levels in diabetics.

Forty diabetics aged 40-55 years were assigned to experimental (30) and control (10) groups. The experimental subjects underwent a Yoga program comprising of various Asanas (isometric type exercises) and Pranayamas (breathing exercises) along with regular anti-diabetic therapy whereas the control group received anti-diabetic therapy only. The results revealed that Yogic exercise enhanced the levels of Superoxide dismutase and reduced

glycosylated Hb and glucose levels in the experimental group as compared to the control group.

In another study from New Delhi on diabetes, researchers tried to find out if yoga asanas (postures) could help diabetes by releasing insulin from the pancreas. Twenty healthy young volunteers were given four sets of yoga postures to perform. The asanas given were: Dhanurasana (bow pose), Matsyendrasana, Halasana (plow pose) Vajrasana , Naukasana (boat pose) Bhujangasana (cobra pose) Setubandhasana (bridge pose) Pavanamuktasana(wind relieving pose). Each volunteer performed the above sets in random order for five days with a two day interval between consecutive sets of asanas. Based on blood test results, the authors found that performance of yoga postures led to improved "sensitivity of the b-Cells of the pancreas to the glucose signal." They concluded that this improvement in insulin sensitivity was due to the cumulative effect of the volunteers performing the postures.

5. Singh, S., et al (2004). *“Role of yoga in modifying certain cardiovascular functions in type 2 diabetic patients”* The present study was conducted with twenty-four Type 2 diabetic cases. Patients were trained in yoga asanas 30-40 min/day for 40 days. There was a significant decrease in fasting blood glucose levels from basal 190. Blood diastolic blood pressure also decreased.

6. Malhotra, V., et al. (2002). *“Effect of Yoga asanas on nerve conduction in type2 diabetes.”* Twenty Type 2 diabetic subjects were studied to see the effect of 40 days of Yoga asanas on nerve conduction velocity. The Yoga exercises were performed for 30-40 minutes every day for 40 days in the above sequence. Right hand and left hand median nerve conduction

velocity increased. Control group nerve function parameters deteriorated over the period of study.

7.Monro. Robin, et.al (1992).*“Yoga therapy for NIDDM; A controlled trial.”*_21 patient with NIDDM, taking medication (13) and on diet control alone (8).the yoga group offered classes with a standard set of postural, breathing & relaxation exercise. The result shows both FBG & Hb alc improved significantly ($p<.05$) in yoga group as compared to controlled group.

8. Jain SC, Uppal A, Bhatnagar SO, & Talukdar B,(1993). *"A study of response pattern of non-insulin dependent diabetics to yoga therapy."* Changes in blood glucose and glucose tolerance by oral glucose tolerance test were investigated after 40 days of yoga in 149 non-insulin-dependent diabetics. One hundred and four patients showed a fair to good response to the yoga therapy. Sixty-nine percent of the respondents showed a fair to good response to yoga therapy. There was a significant reduction in hyperglycemia and a decrease in oral hypoglycemic drugs required for maintenance of normoglycemia.

9. Gore, M.M. (1988).*“Yogic treatment for diabetes”* The beneficial effect of yoga training was observed on 6 out of 9 diabetics in respect of fasting & PP. blood sugar, sugar in urine, glucose tolerance & medication. Avoidance of exertion and emphasis on relaxation & tranquilization were the main objectives of yoga training and practice,

10. Tulpule, T.H, Marshall Govindan, Emilia Ripoll-Bunn, (1977).*“Yogic exercises and diabetes Mellitus (Madhumeh)”*

Many studies have reported the beneficial effect of the practice of yoga on diabetes. Some studies have mentioned up to 65 percent beneficial effect of yogic therapy for diabetes. K.N. Udupa has even mentioned 5 cases of juvenile diabetes who were completely controlled by yogic treatment. All of these studies have emphasized the possible mechanism of the yogic practices.

11. Sahay, B.K., MURTHY (1988) *“Long term follow up studies of 30 diabetics on yogic practice.”* Fasting and post lunch blood sugar level of diabetics came down significantly the patients developed a sense of well being within 10 days ,with lowering of the dosage of drug and diminished incidence of acute complication like infections and ketosis. There were significant change in the ‘insulin kinetics’ and those of counter regulatory hormones like cortisol. The follow up study for 2-7 years. Revealed normalization of the periodic blood sugar value and hypoglycemia.

12.Desai, B.P.(1985) *“Influence of yogic treatment of serum lipase activity in diabetics”* A significant reduction in serum lipase activity was observed in eight diabetes patients at the end of seven weeks of yogic training treatment.

13. KELLY M.T,(2012).. *“Diet Therapy of Diabetes: An Analysis of Failure”* A review of the available evidence shows clearly the rarity with which diabetics understand and follow their diet prescriptions. The reasons for these shortcomings and their persistence are many and complex. They include the tendency of physicians to underestimate the formidability of developing, implementing, and adjusting a diet prescription that is both acceptable and effective over a long period of time. Another problem is the limited conceptual and technical knowledge of most physicians concerning dietary principles, strategies, and tactics as they apply to the various types of

diabetes. Recent research confirms the important potentials of diet regulation in mitigating diabetes and its complications. But apparently much of our effort in diet counseling is ineffective and wasteful. It seems desirable, therefore, to review in some detail the reasons for this failure and then to use candid appraisals for developing more effective approaches in the diet therapy of diabetes.

14. Sharma, B.R.(2005) “Concept of ahara (food) in indian perspective-an analytical study” ahara (food) has a broad connotation in india thought which not only nourishes the gross body but also the subtle body as the sensory input are also considered as ahara and therefore, food has been recommended on the basis of its source and effect.

CHAPTER-2

History of diabetes

- What is diabetes?
- Nature of diabetes
- Signs & symptoms of diabetes
- Causes of diabetes
- Types of diabetes
- DIAGNOSIS OF DIABETES
- Complication

HISTORY OF DIABETES

The term *diabetes* (Greek: διαβήτης, *diabetes*) was coined by Aretaeus of Cappadocia. It was derived from the Greek verb διαβαίνειν, *diabaínein*, itself formed from the prefix *dia-*, "across, apart," and the verb *bainein*, "to walk, stand." The verb *diabeinein* meant "to stride, walk, or stand with legs asunder"; hence, its derivative *diabētēs* meant "one that straddles," or specifically "a compass, siphon." The sense "siphon" gave rise to the use of *diabētēs* as the name for a disease involving the discharge of excessive amounts of urine. Diabetes is first recorded in English, in the form *diabete*, in a medical text written around 1425. In 1675, Thomas Willis added the word *mellitus*, from the Latin meaning "honey", a reference to the sweet taste of the urine. This sweet taste had been noticed in urine by the ancient Greeks, Chinese, Egyptians, Indians, and Persians. In 1776, Matthew Dobson confirmed that the sweet taste was because of an excess of a kind of sugar in the urine and blood of people with diabetes.

Diabetes mellitus appears to have been a death sentence in the ancient era. Hippocrates makes no mention of it, which may indicate that he felt the disease was incurable. Aretaeus did attempt to treat it but could not give a good prognosis; he commented that "life (with diabetes) is short, disgusting and painful."

Sushruta (6th century BCE) identified diabetes and classified it as *Medhumeha*. He further identified it with obesity and sedentary lifestyle, advising exercises to help "cure" it. The ancient Indians tested for diabetes by observing whether ants were attracted to a person's urine, and called the ailment "sweet urine disease" (Madhumeha). The Korean, Chinese, and

Japanese words for diabetes are based on the same ideographs which mean "sugar urine disease".

Diabetes, with its attendant acute and long term complication, and the myriad of disorders associated with it, is a major health hazard. In keep in with the scenario of most developing countries, India has long passed the stage of diabetes epidemic. The problem has now reached, in scientific language, “pandemic” proportions. To put it simply, it has crossed the dividing line in which it is a problem associated with individuals, no matter how large this number may be, and is now a very large public health problem, growing astronomically year after year. More than a matter of individual health and well being, the pandemic calls for an effort in which attention must be paid not only to treating a patient with diabetes. It involves a collective response which includes the setting up of a complete infrastructure which involves attention to prevention as well as making diabetes care “**Available, accessible and affordable**” to all the persons with diabetes.

In 1997 WHO report has shown that there is a marked increase in the number of people affected with diabetes and this trend is scheduled to grow in geometric proportions in the next couple of decades

YEAR	No. of People affected (in millions)
1995	124.7
2000	153.9
2005	299.1

The crude prevalence rate of diabetes in urban areas is about 9% and that the prevalence in rural areas has also increased to around 3% of total

population. If one takes into consideration that the total population of India is more than 1000 million then one can understand the sheer numbers involved. Taking a urban-rural population distribution of 70:30 and an overall crude prevalence rate of around 4%, at a conservative estimate, India is home to around 40 million diabetics and this number is thought to give India the dubious distinction of being home to the largest number of diabetics in any one country.

SOURCE: (W.H.O, 1999)

Surveys have shown that the prevalence of Impaired Glucose Tolerance (IGT) is also high. It has been reported that the prevalence of IGT is around 8.7% in urban and 7.9% in rural areas. It is widely accepted that more than 35-40% of people show the presence of some diabetes related complications at the time of diagnosis.

It is widely accepted that the health, socio-economic and personal costs of diabetes and its attendant complications is unacceptably high, not only to the individual, but also to the nation as a whole when one consider the sheer number of people who are already known to be diabetic. India has a distinct need for a comprehensive diabetes care program. This should not be confined to reports on the standards of diabetes care which are prevalent here, but needs to be more wide ranging.

"Diabetes in various word forms bears upon up to 5 percent of the macrocosm population with 12 million diabetics in Western Europe alone. Of the different modes in which diabetes shows, non-insulin-dependent diabetes mellitus (NIDDM) is probably the most commonly met genetic disease. NIDDM or Type II diabetes is multi factorial, depending also on environmental factors including fleshiness, sedentary life styles and nutritional unbalances. Among many dreaded diseases, Diabetes tops it all. Its uncanny

and highly prevalent presence makes it the number one disease in almost every part of the country. Diabetes troubles over 22 million people with a direct medical cost of US alone of over \$94 Billion. It has been estimated that over 42 million Americans have pre-diabetes with almost 4210 new diabetic patients being diagnosed on a daily basis. The number is increasing. With modern medicines having sprung up in the market, general public still await a Natural process to get rid of diabetes forever. Around 60% of the patients suffer from the accompanying pain with the disease such as a relentless numbness, tingling pain, burning sensation and acute pain in the legs, arms, feet. Most of them have complained of unbearable pain even more than arthritis.

SOURCE: (W.H.O, 1999)

“Diabetes increases the risk of coronary events twofold in men and fourfold in women. Part of this increase is due to the frequency of associated cardiovascular risk factors such as hypertension, dyslipidemia, and clotting abnormalities. In observational studies, people with both diabetes and hypertension have approximately twice the risk of cardiovascular disease in comparison of non-diabetic people with hypertension. Hypertensive diabetic patients are also at increased risk for diabetes-specific complications including retinopathy and nephropathy. In the U.K. Prospective Diabetes Study (UKPDS) epidemiological study, each 10-mmHg decrease in mean systolic blood pressure was associated with reductions in risk of 12% for any complication related to diabetes, 15% for deaths related to diabetes, 11% for myocardial infarction, and 13% for micro vascular complications. No threshold of risk was observed for any end point.

One of the surveys dealt to heal diabetes was the unity put up by the Yoga Biomedical Trust, launched in 1982 by biochemist *Dr robin Monro*, and an Indian yoga research foundation which noticed that practicing yoga for 30

minutes a day for unity month aided cut back blood glucose level in some diabetics. The yoga patients took ingredient part in unity or two 90-minute sessions a week and were inquired to practice at place. The social classes included the specific yoga exerts of the spinal twist, the bowknot and abdominal ventilation At the end of the 12 weeks blood refined sugar levels fell significantly in all patients in the grouping and were slightly raised in a control grouping which held not fall in the yoga sessions. Three yoga educates pull off to cut back their medicament, including unity adult male who held not changed his drug government for 20 years

(Journal-a- day, 2008)

It has been cognized for a long clip that yoga is helpful for diabetics. Yoga therapy may aid cut back accent levels which could play an ingredient part in adulthood onset diabetes. But unity drawback is that some patients would encounter it hard to maintain up the regular sessions took to prolong the gain. Emphasis internal secretions gain refined sugar levels in the blood. People also gain from the stabilization of their humors which yoga conveys an increased feeling of wellbeing and a feeling of being more in control, which may aid with their diet control.

What is 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 processes of digestion, and this glucose is the major fuel for the various processes, organs and cells of the physical body. 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 deficient in quantity or sensitivity and the blood sugar level becomes high and uncontrolled as a result. The symptoms of diabetes are due to excessive sugar in the blood and caused by a lack of insulin or insulin resistance leading to impaired glucose metabolism. Glucose (a simple sugar) is the key component used by the body's cells to make energy. In order for glucose to move from the blood into most cells insulin is required (exceptions are the brain and exercising muscles). Insulin is a hormone made in the cells of the pancreas and is secreted into the blood in response to the blood glucose level increasing.

Diabetes is very common disease today, especially in our affluent communities. Its incidence has paralleled the rising affluence of our lifestyle. There are two different types of diabetes. People with Type I diabetes require insulin injections on a regular basis, it is referred to as 'insulin dependant diabetes'. This type of diabetes affects around 10-15% of those with diabetes. People with Type II diabetes have 'insulin resistance'. This means their pancreas is making the insulin but due to a number of factors, most commonly weight, the cells of the body are unable to use this insulin properly. This affects 85-90% of those with diabetes. Type II diabetes is managed by a combination diet, weight loss and medications (called hypoglycemic). Type 1 diabetes was called juvenile

diabetes and Type 2 was called mature onset diabetes. These terms are used less these days, as they do not accurately diabetes.

NATURE OF DIABETES

Diabetes

Diabetes mellitus is full name of this disease. This is a condition in which glucose levels in the blood are much higher than normal and hence this condition is also commonly referred to as sugar disease. The defect in this condition is that either our pancreas dose not produces enough insulin or it produces sufficient insulin but the cells of our body are unable to use the insulin property.

Energy

How your body uses the food you eat to nourish and sustain itself ,is indeed, a fascinating story. Our body performs this task by breaking down the foods we eat into the nutrients or ingredients they contain and use them to produce energy, build and repair tissues , and regulated body functions . Theses nutrients are called carbohydrates, proteins and fats.

Carbohydrates

Carbohydrates are the most readily usable sources of energy. It is present in foods such as fruits , some vegetable, bread, milk and rice . the body change the Carbohydrate in the foods into a simple sugar called glucose. The glucose is then released into the blood stream and circulated to the cells of the body which change it into energy for immediate use. if there is more glucose available than the body needs for immediate energy requirements, the body stores it for future use . the extra glucose is changed to a form of Carbohydrate called glycogen and

stored in the liver and skeletal muscles. Some of the extra glucose is also changed into fats and stored in the fatty tissue of the body. When our body needs extra energy in a hurry, as when exercising, it can quickly change the stored glycogen back into glucose.

Protein

Ordinarily protein is not a source of energy for our body. It is used, instead, to build and repair body tissue. Protein is found in foods such as pulses, nuts, cheeses, meat and milks. The only time our body uses protein for energy is when the foods we eat contain more protein than our body needs for building and repairing tissue. Our body changes the extra protein into glycogen or fat and stores it for future use as source of energy.

Fat

Fat is a reserve source of energy for our body. Fats are changed by the body into fatty acids and stored in the body tissues for use during long periods without food. Fat is found in meat and dairy products such as milk, butter and cheese, as well as in oils from corn, peanuts, etc.

Insulin

One other factor must be mentioned to complete the story of how our body uses the food we eat as a source of energy. For glucose to be used by the cells of our body as sources of energy or stored for future use, insulin must be present in the blood stream, circulated throughout our body and assist cells in doing their work. Insulin assists the cells of your body in using glucose and fat for energy, or in storing them for future use. Without insulin, our body will be unable to use the food we eat to sustain itself and function in a normal manner.

SIGNS AND SYMPTOMS OF DIABETES

The classical triad of diabetes symptoms is **polyuria**, **polydipsia** and **polyphagia**, which are, respectively, frequent urination; increased thirst and consequent increased fluid intake; and increased appetite. Symptoms may develop quite rapidly (weeks or months) in type 1 diabetes, particularly in children.

Nearly one in four adults in the United States has hypertension, and more than 10 million adults have diabetes. Moreover, hypertension is twice as common in persons with diabetes as it is in others. Obesity may be a common link between the two disorders, but other factors such as insulin resistance and autonomic dysfunction may also be involved.

The signs and symptoms of type 1 diabetes.

Increased thirst and frequent urination. This diabetes symptom is common with type 1 diabetes; excess sugar (glucose) builds up in your bloodstream. A high level of blood glucose pulls water from your body's tissues, making you thirsty. As a result, a symptom of thirst or you drinks more fluids and urinate more. The excess sugar in your bloodstream passes through your kidneys and leaves your body in your urine.

Extreme hunger. Another diabetes symptom of type 1 diabetes is extreme hunger. Because of inability to produce insulin, the hormone necessary for glucose to enter cells and fuel their functions — leaves your muscles and organs energy depleted. A symptom of hunger makes you feel like eating more until your stomach is full, but the hunger persists because, without insulin, the glucose

produced from dietary carbohydrates never reaches your body's energy-starved tissues.

Weight loss. Despite eating a lot to relieve their constant hunger, another diabetes symptom of people with type 1 diabetes is rapid loss of weight. That's because the body's cells are deprived of glucose and energy, as glucose is lost into the urine. Without the energy glucose supplies, cells die at an increased rate before they can divide and replace themselves. Muscle tissues and fat stores shrink, and body weight declines.

Blurred vision. Another diabetes symptom is blurred vision. A high level of blood glucose pulls fluid from all your tissues, including the lenses of your eyes. The decrease in fluid affects your ability to focus.

Fatigue. A diabetes symptom that occurs when your cells are deprived of glucose, you become tired and irritable.

Type 2 diabetes has the same symptom as that of type 1 diabetes but may include these symptoms

Slow-healing sores or frequent infections. This diabetes symptom affects your body's ability to heal and fight infection. Bladder and vaginal infections can be a particular problem for women.

Nerve damage (neuropathy) . This diabetes symptom is due to excess sugar in your blood that can damage the small blood vessels to your nerves. Symptoms may include tingling and loss of sensation in your hands and feet, as well as burning pain in your arms, hands, legs and feet

Red, swollen, tender gums . This diabetes symptom is due to the infection in your gums and in the bones that hold your teeth in place. Your gums may pull

away from your teeth, your teeth may become loose, or you may develop sores or pockets of pus in your gums — especially if you have a gum infection before diabetes develops.

CAUSES OF DIABETES

1. Diabetes insipidus

Diabetes insipidus (DI) is a rare disease that causes frequent urination. The large volume of urine is diluted, mostly water. To make up for lost water, a person with DI may feel the need to drink large amounts and is likely to urinate frequently, even at night, which can disrupt sleep and, on occasion, cause bedwetting. Because of the excretion of abnormally large volumes of dilute urine, people with DI may quickly become dehydrated if they do not drink enough water. Children with DI may be irritable or listless and may have fever, vomiting, or diarrhea. Milder forms of DI can be managed by drinking enough water, usually between 2 and 2.5 liters a day. DI severe enough to endanger a person's health is rare.

Diabetes insipidus is an uncommon condition that occurs when the kidneys are unable to conserve water as they perform their function of filtering blood. The amount of water conserved is controlled by antidiuretic hormone (ADH, also called vasopressin). ADH is a hormone produced in a region of the brain called the hypothalamus. It is then stored and released from the pituitary gland, a small gland at the base of the brain. Diabetes insipidus caused by a lack of ADH is called central diabetes insipidus. When diabetes insipidus is caused by failure of the kidneys to respond to ADH, the condition is called nephrogenic diabetes insipidus. The major symptoms of diabetes insipidus are excessive urination and extreme thirst. The sensation of thirst stimulates patients to drink large amounts of water to compensate for water lost in the urine.

2.Diabetes Mellitus

Diabetes Type 1

In type 1, the pancreas stop producing insulin due to autoimmune response or possibly viral attack on pancreas. In absence of insulin, body cells don't get the required glucose for producing ATP (Adenosine Triphosphate) units which results into primary symptom in the form of nausea and vomiting. In later stage, which leads to ketoacidosis, the body starts breaking down the muscle tissue and fat for producing energy hence, causing fast weight loss. Dehydration is also usually observed due to electrolyte disturbance. In advanced stages, coma and death is witnessed. Type 1 Diabetes is autoimmune disease that affects 0.3% on average. It is result of destruction of beta cells due to aggressive nature of cells present in the body. Researchers believe that some of the Etiology and Risk factors which may trigger type 1 diabetes may be genetic, poor diet (malnutrition) and environment (virus affecting pancreas). Secondly, in most of the cases, diabetes occurs because there is abnormal secretion of some hormones in blood which act as antagonists to insulin. Example- Adrenocortical hormone, Adrenaline hormone and Thyroid hormone.

Diabetes Type 2

Type 2 Diabetes is also called non insulin-dependent diabetes mellitus (NIDDM) or adult-onset diabetes. It occurs when the body produces enough insulin but cannot utilize it effectively. This type of diabetes usually develops in middle age. A general observation says that about 90-95 % of people suffering with diabetes are

type 2; about 80 percent are overweight. It is more common among people who are older; obese; have a family history of diabetes; have had gestational diabetes. There are number of risk factors found to be responsible for type 2 diabetes like, the more the Etiology and Risk factors carried by an individual, the higher the risk for developing diabetes.

HEREDITARY OR INHERITED TRAITS :

It is strongly believed that due to some genes which passes from one generation to another, a person can inherit diabetes. It depends upon closeness of **blood relationship** as mother is diabetic, the risk is 2 to 3%, father is diabetic, the risk is more than the previous case and if both the parents are diabetic, the child has much greater risk for diabetes. A person with one parent with type II diabetes has 25% chances of developing type II diabetes during adulthood; if both parents have diabetes it increases to 50%. But there is little information about what is inherited. One of the most characteristic features of NIDDM is that it is commonly associated with several other disorders such as obesity, hypertension, and hyperlipidaemia.

AGE:

Increased age is a factor which gives more possibility than in younger age. This disease may occur at any age, but 80% of cases occur after 50 year, incidences increase with the age factor. Diabetes occurs primarily in the middle and late life . between birth and 20 years of age 0.1 to 1 % of children have diabetes between the age of 40 and 50 , 0.5 to 2% of people have diabetes ,while the number increases to 2 and 10% among people 61 years of age and older . in particular , Asian Indians appears to have higher prevalence of diabetes , then many white European populations . the increasing Incidence of diabetes with age

may be related to a general decrease in body function that occurs in all cell with aging.

AUTOIMMUNITY

In this condition the body's immune system(which normally defends the body from disease causing germs ets.)goes a little hay wiv and selectively/mistakenly attack and destroys, some of its oven cells, eg , beta cells of the islets of langerhans in type -1 Diabetes (associated with the persons of autoantibody against islet cells in patients blood) certain unclear environmental factors are believed to trigger this autoimmune phenomenon in genetic susceptible individuals.

POOR DIET (MALNUTRITION RELATED DIABETES):

Improper nutrition, low protein and fiber intake, high intake of refined products are the expected reasons for developing diabetes.

OBESITY AND FAT DISTRIBUTION:

Approximately 50-80% of the people with type –II diabetes are overweight at a time of diagnosis . one of the major reasons type – II Diabetes develops in overweight . excess weight may cause what cause what was only a tendency towards diabetes , to develop into active diabetes. Being overweight means increased insulin resistance, that is if body fat is more than 30%, BMI 25+, waist girth 35 inches in women or 40 inches in males.

SEDENTARY LIFESTYLE:

People with sedentary lifestyle are more prone to diabetes, when compared to those who exercise thrice a week, are at low risk of falling prey to **diabetes**.

STRESS:

Either physical injury or emotional disturbance is frequently blamed as the initial cause of the disease. Any disturbance in Corticosteroid or ACTH therapy may lead to clinical signs of the disease.

DRUG INDUCED:

Clozapine (Clozaril), olanzapine (Zyprexa), risperidone (Risperdal), quetiapine (Seroquel) and ziprasidone (Geodon) are known to induce this lethal disease.

INFECTION:

Some of the streptococci is supposed to be responsible factor for infection in pancreas.

SEX:

Diabetes is commonly seen in elderly especially males but, strongly in women and those females with multiple pregnancy or suffering from (PCOS) Polycystic Ovarian Syndrome.

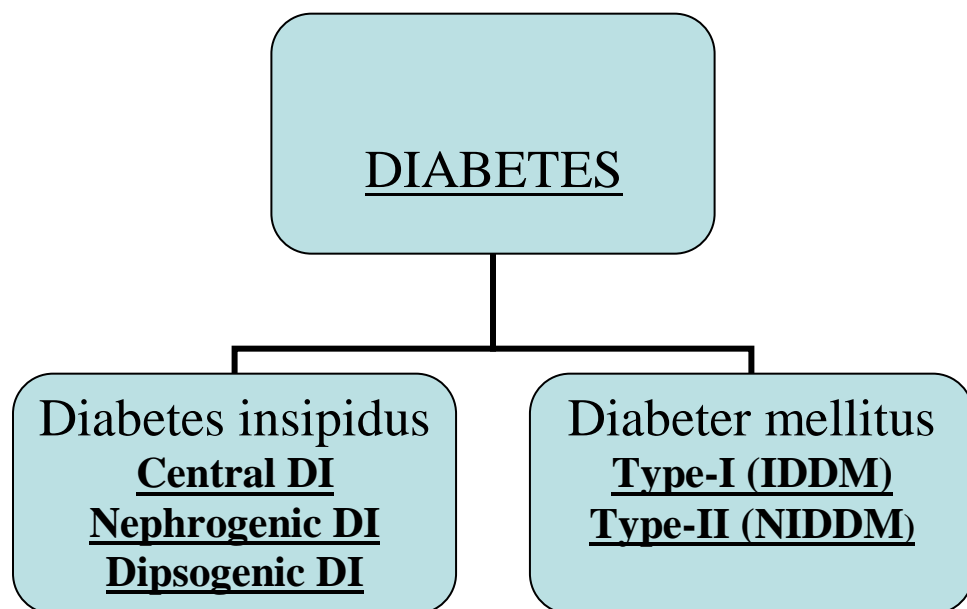
HYPERTENSION:

It had been reported in many studies that there is direct relation between high systolic pressure and diabetes.

SERUM LIPIDS AND LIPOPROTEINS:

High triglyceride and cholesterol level in the blood is related to high blood sugars, in some cases it has been studied that risk is involved even with low HDL levels in circulating blood

TYPES OF DIABETES



Diabetes is a life style related condition due to an imbalance in handling a glucose loads and is not a disease.

1.Diabetes insipidus

Definition

Diabetes insipidus is caused by the inability of the kidneys to conserve water, which leads to frequent urination and pronounced thirst.

What are the types of diabetes insipidus?

Central DI

The most common form of serious DI, central DI, results from damage to the pituitary gland, which disrupts the normal storage and release of ADH. Damage to the pituitary gland can be caused by different diseases as well as by head injuries, neurosurgery, or genetic disorders. To treat the ADH deficiency that results from any kind of damage to the hypothalamus or pituitary, a synthetic hormone called desmopressin can be taken by an injection, a nasal spray, or a pill. While taking desmopressin, a person should drink fluids only when thirsty and not at other times. The drug prevents water excretion, and water can build up now that the kidneys are making less urine and are less responsive to changes in body fluids.

NephrogenicDI

Nephrogenic diabetes insipid us involves a defect in the parts of the kidneys that reabsorb water back into the bloodstream. It occurs less often than central diabetes insipid us. Nephrogenic diabetes insipid us may occur as an inherited disorder in which male children receive the abnormal gene that causes the disease on the X chromosome from their mothers. Nephrogenic diabetes insipid us may also be caused by diseases of the kidney (for example, polycystic kidney disease) and the effects of certain drugs (for example, lithium, amphotericin B, demeclocycline).

Nephrogenic DI results when the kidneys are unable to respond to ADH. The kidneys' ability to respond to ADH can be impaired by drugs—like lithium, for example—and by chronic disorders including polycystic kidney disease, sickle cell disease, kidney failure, partial blockage of the ureters, and inherited genetic disorders. Sometimes the cause of nephrogenic DI is never discovered.

Dipsogenic DI

Dipsogenic DI is caused by a defect in or damage to the thirst mechanism, which is located in the hypothalamus. This defect results in an abnormal increase in thirst and fluid intake that suppresses ADH secretion and increases urine output. Desmopressin or other drugs should not be used to treat dipsogenic DI because they may decrease urine output but not thirst and fluid intake. This fluid overload can lead to water intoxication, a condition that lowers the concentration of sodium in the blood and can seriously damage the brain. Scientists have not yet found an effective treatment for dipsogenic DI.

Gestational DI

Gestational DI occurs only during pregnancy and results when an enzyme made by the placenta destroys ADH in the mother. The placenta is the system of blood vessels and other tissue that develops with the fetus. The placenta allows exchange of nutrients and waste products between mother and fetus.

Most cases of gestational DI can be treated with desmopressin. In rare cases, however, an abnormality in the thirst mechanism causes gestational DI, and desmopressin should not be

2. Diabetes Mellitus

Diabetes mellitus is a syndrome characterized by disordered metabolism and inappropriately high blood sugar (hyperglycemia) resulting from either low levels of the hormone insulin or from abnormal resistance to insulin's effects coupled with inadequate levels of insulin secretion to compensate. The characteristic symptoms are excessive urine production (polyuria), excessive thirst and increased fluid intake (polydipsia), and blurred vision. These symptoms are likely to be absent if the blood sugar is only mildly elevated.

The World Health Organization recognizes three main forms of diabetes mellitus:

- **Type 1 diabetes,**
- **Type 2 diabetes, and**

Type 1 Diabetes

It is also called insulin dependant Diabetes mellitus (IDDM). Type 1 diabetes usually occurs in children and young adults. In type 1, the pancreas makes little or no insulin. Without daily injections of insulin, people with type 1 diabetes won't survive.

Type 1 Diabetes is called Juvenile Diabetes as the onset of it begins in childhood. Children diagnosed with juvenile diabetes are insulin dependent. Insulin is the hormone that enables our body to convert the food we eat into energy which is necessary to function normally. Current research indicates that juvenile diabetes is an auto-immune disorder, similar to other disorders such as; rheumatoid arthritis or multiple sclerosis. A small percentage of individuals may also develop thyroid conditions.

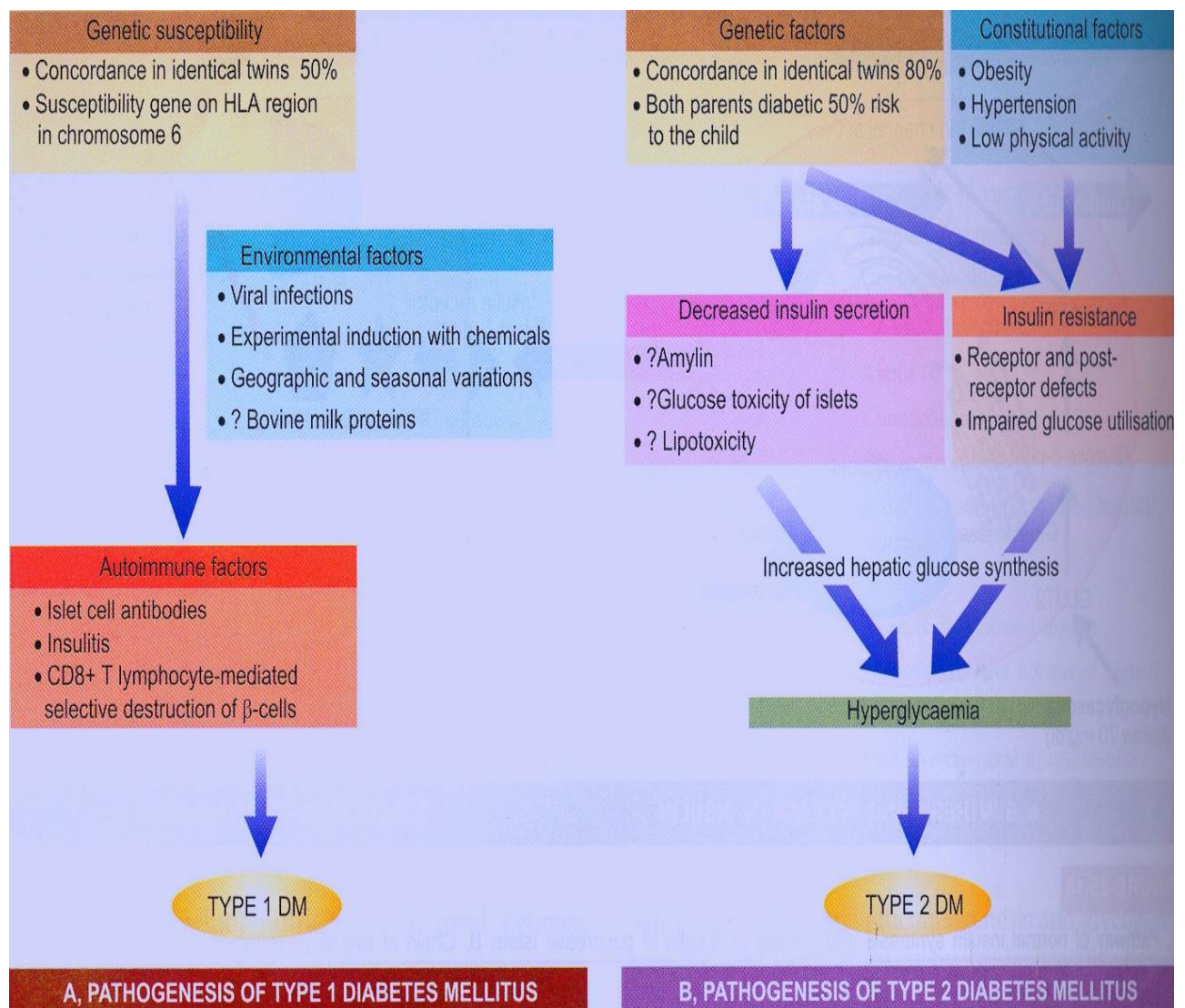
Type 2 Diabetes

Type -2 is also referred to as non-insulin dependant diabetes mellitus (NIDDM).

Type 2 diabetes is the most common form. It appears most often in middle-aged adults; however, adolescents and young adults are developing type 2 diabetes at an alarming rate. It develops when the body doesn't make enough insulin and doesn't efficiently use the insulin it makes (insulin resistance) Typically occurs in adults. However, new research indicates that youngsters may develop type 2 diabetes as well. Many adults with type 2 diabetes will not require daily insulin shots. Instead a healthy diet and exercise can control the diabetes. This form of diabetes typically

occurs in individuals who are over the age of 40, overweight, sedentary, and have a family history of diabetes.

MECHANISM OF PATHOGENESIS OF DIABETES MELLITUS;TYPE1&2



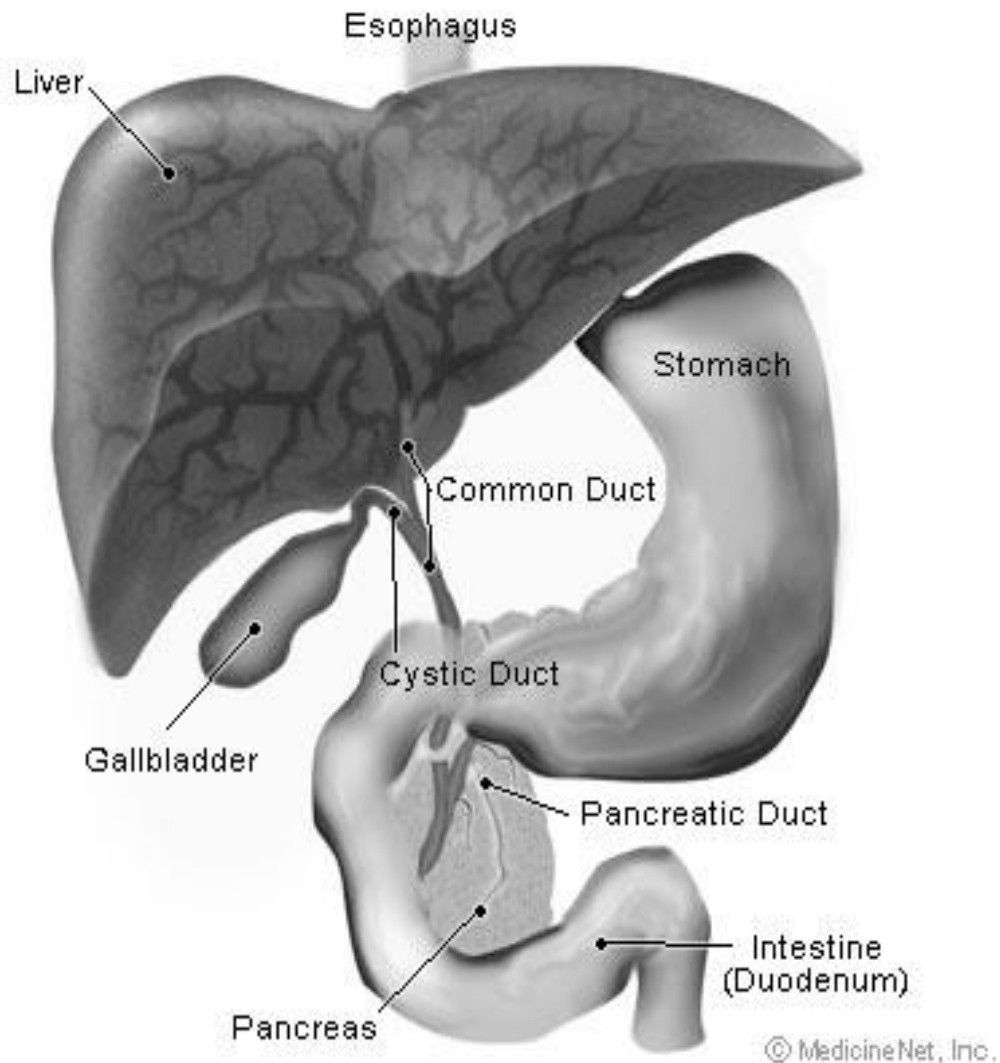
DIFFERENT BETWEEN TYPE-I AND TYPE-II DIABETES

FEATURE	TYPE-I	TYPE-II
Frequency	10-20%	80-90%
Age onset	Early (below 40 years)	Late (after 40 years)
Type of onset	Abrupt and sever	Gradual insidious
Weight	Normal	Obese
Family history	< 20%	About 60%
Genetic locus	Unknown	Chromosome 6
Pathogenesis	Autoimmune	Insulin resistance
Islet cells antibodies	Yes	No
Identical twins	50% chance in identical twin	60-80% chance in identical twin
Blood insulin level	Decreased insulin	increased insulin

Islet cell change	Insulin beta cell depletion	No insulins, mild beta cell depletion
Acute complication	Ketoacidosis	Hypermotorocoma

PANCREAS

Pancreas: A fish-shaped spongy grayish-pink organ about 6 inches (15 cm) long that stretches across the back of the abdomen, behind the stomach. The head of the pancreas is on the right side of the abdomen and is connected to the duodenum (the first section of the small intestine). The narrow end of the pancreas, called the tail, extends to the left side of the body.



The pancreas makes pancreatic juices and hormones, including insulin. The pancreatic juices are enzymes that help digest food in the small intestine. Insulin controls the amount of sugar in the blood. As pancreatic juices are made, they flow into the main pancreatic duct. This duct joins the common bile duct, which connects the pancreas to the liver and the gallbladder. The common bile duct, which carries bile (a fluid that helps digest fat), connects to the small intestine near the stomach.

The pancreas is thus a compound gland. It is "compound" in the sense that it is composed of both exocrine and endocrine tissues. The exocrine function of

the pancreas involves the synthesis and secretion of pancreatic juices. The endocrine function resides in the million or so cellular islands (the islets of Langerhans) embedded between the exocrine units of the pancreas. Beta cells of the islands secrete insulin, which helps control carbohydrate metabolism. Alpha cells of the islets secrete glucagon that counters the action of insulin

Insulin Work

Functions of Insulin

In addition to its role of regulating glucose metabolism, **insulin** also

- Stimulates lipogenesis
- Diminishes lipolysis
- Increases amino acid transport into cells
- Modulates transcription
- Altering the cell content of numerous mRNAs
- Stimulates growth
- DNA synthesis
- Cell replication

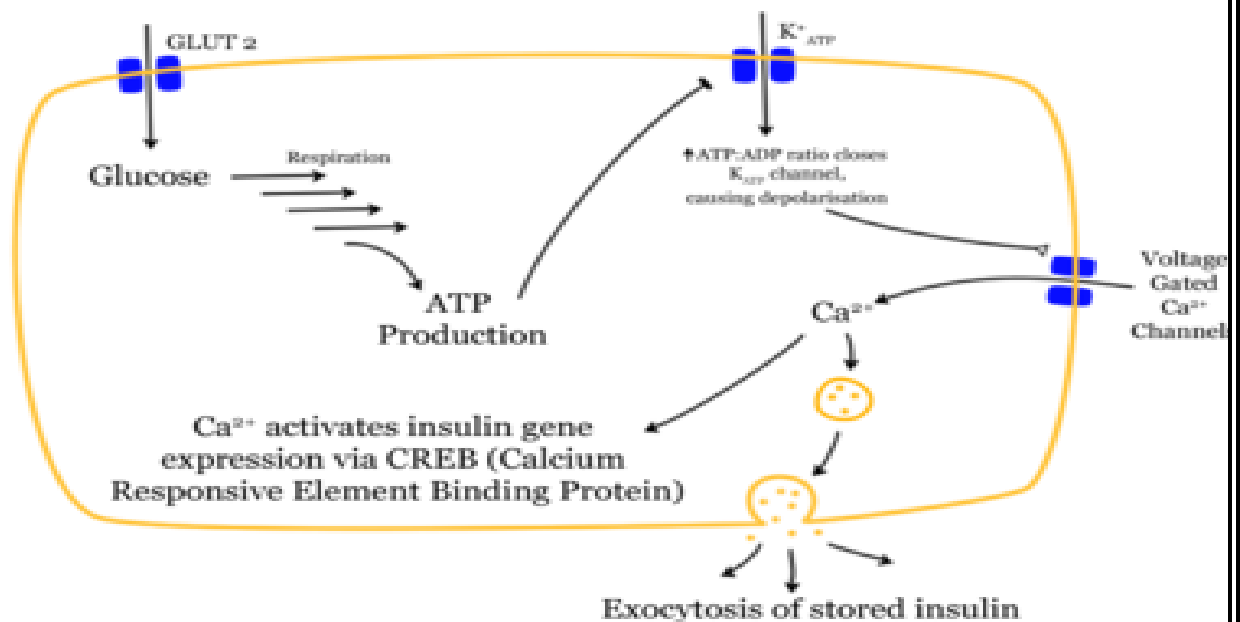
Structure of Insulin

Insulin Pump

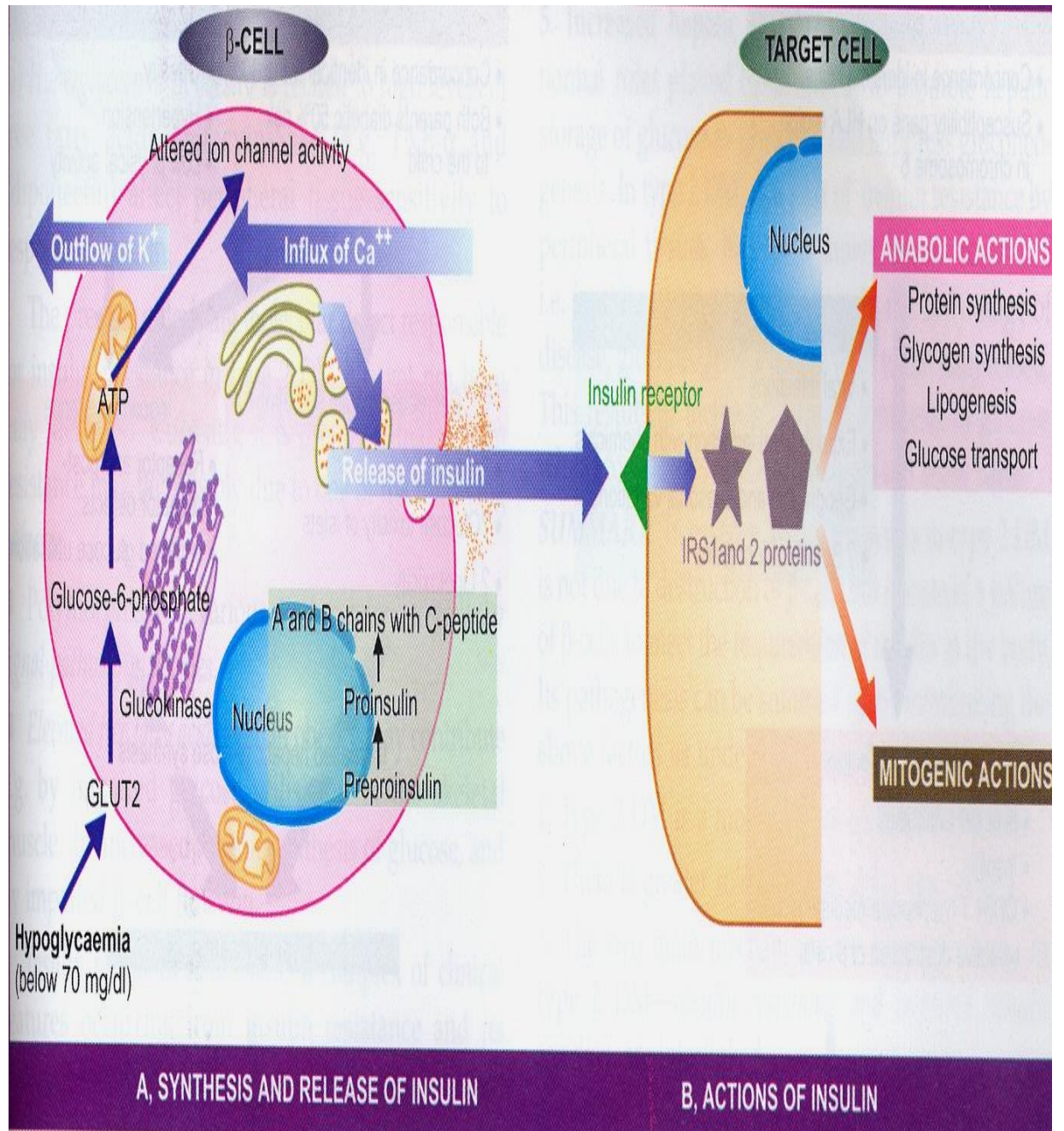
Once open insulin If you are a diabetic and want to get rid of insulin injections then there is a device called **insulin pump**, which can be of utmost use. It is a device that operates on battery. It is very small in size but ensures the required

amount of insulin is delivered to the nerves so that the sugar is utilized properly. The pump consists of a small tank of insulin and this insulin is delivered through a thin pipe of plastic. This pipe is called as infusion set. The infusion set must be worn near the abdomen and the cannula is inserted just below the skin. And the **insulin** is to be refilled after three to four days. This pump is quite useful to keep the sugar levels under a check. **Insulin Pump** is very convenient to use. The best thing about insulin pump is that you are free to take the food when ever you like without any time-bound. You can adjust the delivery of insulin as the pump gives you this facility. So, you don't need to make strict adjustments in your lifestyle. You can help yourself with insulin pump. So, now you can get rid of those tight and strict schedules of injection

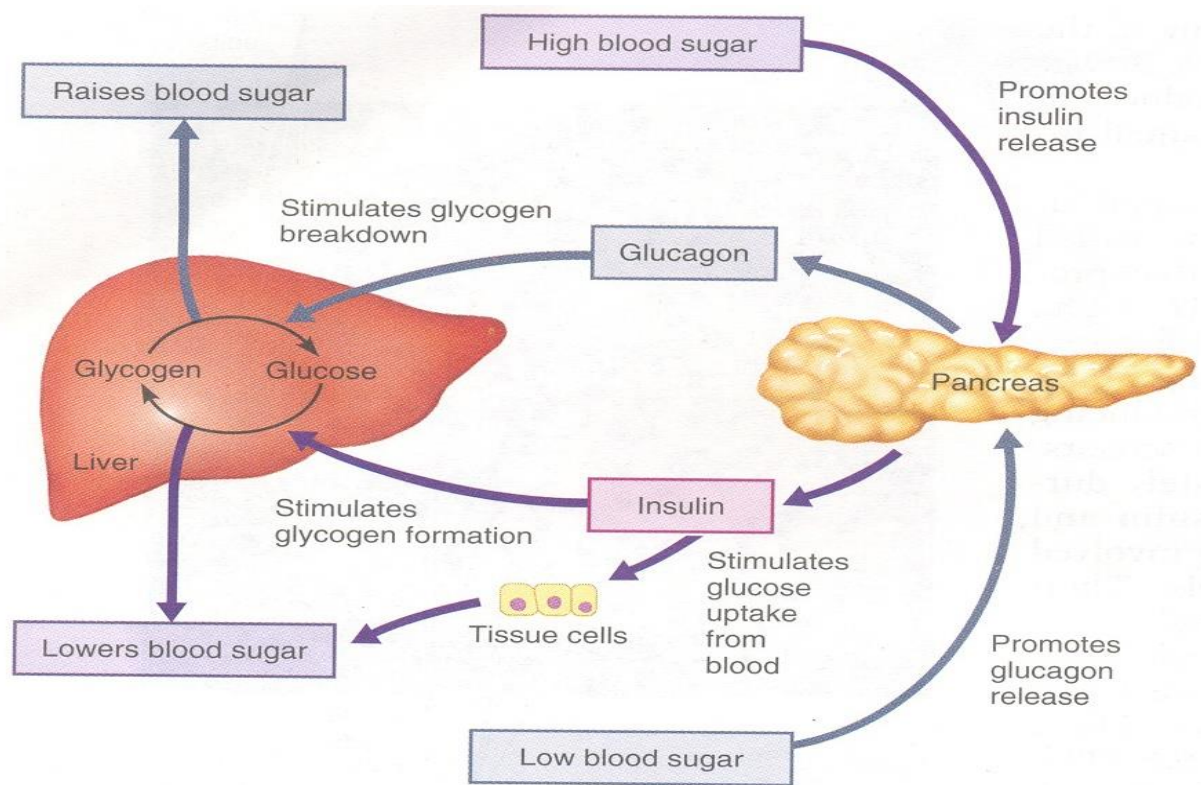
The normal pathway of insulin synthesis & release



Release and action of insulin



Regulation of blood sugar level by INSULIN & GLUCAGON



Blood Sugar Levels

Diabetes is a disease characterized by abnormal metabolism of blood sugar and defective insulin production. Blood sugar levels are an important parameter for the diagnosis, treatment and prognosis of diabetes. Blood sugar level is the level of sugar circulating in blood at a given time. Blood glucose levels vary at different time on various part of the day. Some factors that affect **blood sugar levels** are body composition, age, physical activity and sex. Males and females may also have differing blood sugar level.

Blood Sugar Range

Level of Blood sugar on waking up with an empty stomach should be normally between 80 to 120 mg/dl. Thereafter normal blood sugar should be between 120 to 160 mg/dl two hours after having food and during bedtime the blood sugar values should be between 100 to 140 mg/dl. Any variations from the above mentioned value range of blood sugar is suggestive of diabetes, if the value of an individual's blood sugar tends to be more than the upper limit. Repeated blood sugar test is necessary to confirm diabetes.

Conditions wherein blood sugar level will be higher other than diabetes:

There are certain conditions where blood sugar level of an individual will differ from the normal range and repeated medical tests are necessary to confirm it as **diabetes**. The various conditions are pregnancy and lactation, fasting, after severe binge eating, fever, severe injuries, after severe physical exertion, severe dehydration, for patients undergoing certain medical therapeutic procedures, etc. In such cases blood sugar level changes are normal and not linked to regular diabetes.

Measures to control Blood sugar level:

Diabetes can be controlled to a great extent by controlling blood sugar levels. For controlling blood sugar levels it is mandatory for an individual to undergo periodic monitoring of blood sugar levels under the guidelines of the physician. There are many methods to control blood sugar levels. They are-

- Have proper balanced diet
- Maintain an active lifestyle
- Do regular exercises
- Avoid smoking and intake of alcohol

- Take proper medications
- Do skipping meals or eat unhealthy food.

A properly controlled blood sugar level will keep the diabetes in check.

Adverse effects of blood sugar levels on diabetes patients:

While in most of the cases, blood sugar levels will be high in case of diabetes patients, its level can have adverse effect on the patient depending upon its severity and complications. A severely high level of blood sugar may result in various symptoms like breathlessness. It may also lead to complications involving the circulatory system and the blood vessels. A severely low blood sugar level may lead to unconsciousness. So blood sugar level should be kept in proper control for control of diabetes. It is necessary to monitor blood sugar levels at regular intervals.

Blood glucose levels

In the non-diabetic person, the **Blood Glucose Levels** will stat between 3 and 7 mmol/L. There are a number of different problems that may cause a failure to control the blood glucose level and the development of Diabetes.

- (1) The destruction of insulin producing cells by the bodys immune system.
- (2) A poor response from the body to insulin.
- (3) The damage or destruction of the pancreas.
- (4) A rare genetic defect in the insulin molecule or in the block.
- (5) Tamers producing hormones that make blood glucose levels rise

Glucose

(Blood Glucose, Blood Sugar)

Glucose, a simple monosaccharide sugar, is one of the most important carbohydrates and is used as a source of energy in animals and plants. Glucose is one of the main products of photosynthesis and starts respiration. The natural form (D-glucose) is also referred to as dextrose, especially in the food industry.

In respiration, through a series of enzyme-catalyzed reactions, glucose is oxidized to eventually to form carbon dioxide and water, yielding energy, mostly in the form of ATP. Chemically joined together, glucose and fructose form sucrose. Starch, cellulose, and glycogen are common glucose polymers (polysaccharides). The older name dextrose arose because a solution of D-glucose rotates polarized light towards the right. In the same vein D-fructose was called "laevulose" because a solution of laevulose rotates polarized light to the left.

DIAGNOSIS OF DIABETES

The following investigations are helpful establishing the diagnosis of diabetes mellitus

1.URINE TESTING

A urine analysis may be used to look for glucose and ketones from the breakdown of fat. However, a urine test alone does not diagnose diabetes.

1. Glucosuria: Benedict's qualitative test detects any reducing substance in the urine and is the urine and is not specific for glucose . more

sensitive and glucose sensitive test is dipstick method based on enzyme coated paperstick which turns purple when dripped into urine containing glucose.

2. Ketonuria: Tests for ketone bodies in the urine are required for assessing the severity of diabetes and not for diagnosis of diabetes is almost certain. Rothera's test and strip test are conveniently performed for detection of ketonuria.

2.BLOOD TESTING

The following blood tests are used to diagnose diabetes:

- **Fasting blood glucose level** -- diabetes is diagnosed if higher than 126 mg/dL on two occasions. Levels between 100 and 126 mg/dL are referred to as impaired fasting glucose or prediabetes. These levels are considered to be risk factors for type 2 diabetes and its complications.
 - **Oral glucose tolerance test** -- diabetes is diagnosed if glucose level is higher than 200 mg/dL after 2 hours. (This test is used more for type 2 diabetes.)
 - **Random (non-fasting) blood glucose level** -- diabetes is suspected if higher than 200 mg/dL and accompanied by the classic diabetes symptoms of increased thirst, urination, and fatigue. (This test must be confirmed with a fasting blood glucose test.)

Persons with diabetes need to have their hemoglobin A1c (HbA1c) level checked every 3 - 6 months. The HbA1c is a measure of average blood glucose during the previous 2 - 3 months. It is a very helpful way to determine how well treatment is working.

COMPLICATIONS

Diabetes can cause many complications. Acute complications (hypoglycemia, ketoacidosis or nonketotic hyperosmolar coma) may occur if the disease is not adequately controlled. Serious long-term complications include cardiovascular disease (doubled risk), chronic renal failure, retinal damage (which can lead to blindness), nerve damage (of several kinds), and micro vascular damage, which may cause impotence and poor healing. Poor healing of wounds, particularly of the feet, can lead to gangrene, which may require amputation. Adequate treatment of diabetes, as well as increased emphasis on blood pressure control and lifestyle factors (such as not smoking and keeping a healthy body weight), may improve the risk profile of most aforementioned complications. In the developed world, diabetes is the most significant cause of adult blindness in the non-elderly, the leading cause of non-traumatic amputation in adults, and diabetic nephropathy is the main illness requiring renal dialysis in the United States.

Diabetic retinopathy

Diabetic retinopathy is a type of micro vascular disease in which the micro vessel, supplying blood to the retina of our eye is affected. **Retinopathy** is related to high blood sugar level and obstructs the flow of oxygen to the cells of the retina. Retina is an ultra thin layer of blood vessel made up of rods and cones. As soon as the **retina** receives signals of light, it is sent to the brain

and a three dimensional figure is formed and identified, this is sent back to the eye by which we can recognize the things around us. The high blood glucose level hinders its working and leaves obstacles in passing light through the retina, thus, leading to improper vision.

The early stage of this disease is called non proliferate **diabetic retinopathy**. The blurred and distorted vision is because of macular edema. Proliferative diabetic retinopathy is the advanced form of diabetic retinopathy; the new blood vessels break, as they are weak and leak blood into vitreous of the eye, which will lead to floating spots in the eye. The pace of damage is not similar in both the eyes but, both the eyes are affected by this disease. Some times one eye is affected more easily than the other. After some period, the swollen and scar **nerve tissue** of the retina is totally destroyed and pulls up the entire layer of retina and detaches it from the back of the eye. **Retinal detachment** is the cause behind blindness among diabetics in middle age. The other two types of eye problems usually seen earlier in the people suffering from **diabetes** are:

- ***Cataract*** :- A thin cloudy layer appears in front of your eye leading to unclear vision. In cataract surgery this thin layer is removed and setting of a plastic layer in front of the lens is done, thus gives you a clear vision again.
- ***Glaucoma*** :- Due to high pressure on the optic nerve, it gets damaged. The damaged optic nerve creates disturbance in clear vision. Laser surgery or simple eye drops may help in regaining the normal vision.

A diabetic must go for the regular eye checkup so that the early stages of diabetic retinopathy can be detected and treated in initial stages itself, with

less harm to the eyes. Blood sugar levels should also be monitored and maintained to prevent blood vessel damage.

Diabetes Skin Infections:

Diabetes affects different body parts of a person including skin. The skin disorders can be seen in normal individual too, but diabetics are more frequently prone to it. Fortunately, most of the skin infections can easily be controlled if detected in early stages. Infection can be bacterial, fungal or simple itching. Some of the specific **skin infections** frequently seen in the **diabetic** patients are **Dermopathy**, Necrobiosis lipoidica, Diabeticorum, Xanthomatosis and Blisters.

Bacterial infections :- Bacterial infections are more commonly seen in people with diabetes than in normal individuals. Styes - Infection of glands and eyelids, Boils and hair follicles infections, **skin** and tissue are affected by carbuncles. These infections are spread by few bacterial germs but the most. Common is Staphylococcus bacteria

Fungal infections :- Candida-albicans is the yeast-like fungus, responsible for red sore skin with frequent sense of itching and developing into blisters and scales. These patchy infections usually appear at skin folding, where moisture is persisting for longer period, like armpits and groin, under the foreskin, under breast, finger and toes-nail (onychomycosis), in the mouth (thrush), in the vagina etc. Some of the known fungal infections are athlete's

foot, ringworms and jock itch.

Itching: - Itching may result from poor blood circulation, dry skin, or any kind of bacterial and viral infection, mostly observed in lower extremities. Wiping your body till completely dry and using good moisturizing agent are the suggestive steps to manage simple itching.

Diabetic Dermopathy :- Dermopathy shows skin changes occurring in diabetics due to affected blood vessels (i.e. oval to circular), slightly indented dry brown to purple and scaly patches. When zinc doses are administered for several weeks it appears to help the lesions resolve over several months, especially when combined with near normal blood sugar.

Necrobiosis Lipoidica Diabeticorum :- Necrobiosis Lipodica Diabeticorum (NLD) seems similar to dermatopathy, but it is more worst than the latter, as it penetrates deeply into the skin, making the spots red with a well defined purple line. See your doctor at right time or else it may crack or break.

Xanthomatosis, Sclerosis and Diabetic blisters :- High blood sugar aggravates these conditions; xanthomatosis is slight yellowish pea like pigmentation in feet, arms, legs, hands, buttocks etc. In sclerosis, **skin** of toe, forehead, hands becomes thick and waxy, and stiffness in the joints is observed. Sometimes painless diabetic blisters erupt in the fingers, toes, hands, forehands and feet look like burned sores. These are commonly seen in overweight, type 1 diabetic, and revert back to normal as soon as blood sugar is controlled out.

Disseminated Granuloma Annulare :- Sharp well define ring or arc shape

raised area of skin is seen, then it is nothing but disseminated granuloma annulare. The common body parts where it can be seen are on the fingers or ears.

Acanthosis nigricans :- This is the condition, in which brown tanned patches appear in different parts of the body like neck, armpits and groin, hands, elbow and knees. This is usually seen in the people with overweight.

CHAPTER-3

Diet therapy

- Food components
- Types of diet therapy
- Diet chart for diabetes
- Diabetic food pyramid
- Nutritional supplement for diabetes
- Herbal remedies

Diet Therapy

Diet is the prime necessity of life. diet play a vital role in the maintenance of good health and in prevention and cure of disease. From ancient period our rishi muni's and other philosopher too have describes its importance in the life. Diet plays a vital role in the maintenance of good health and in the prevention and cure of diseases.

Diet therapy of diabetes itself. Several thousand years ago *Sushruta* and *Charaka* recognized the value of dietary therapy for diabetes. They recommended a reduction in the total quantity of food consumed and the avoidance of animal fats . many of principle recommended by them are accepted even today by the modern day diabetologists. Diet therapy is one of the pillar stone for the management of diabetes and the foods you can eat will include most of the things you normally enjoy, except for a strict limitation on foods high in sugar content. What is important is that we need to plan timely balanced meals to suit our life- style and personal preferences. *Remember-* a diabetic diet is actually a healthy diet for the whole family.

Eating healthy foods is one of the most basic and important tools of diabetes management. The right food choices can help control blood sugar and protect long term health. There are several method of planning meals for improved diabetes control.

In the words of **Sir Robert, MC Carrison**, one of the best known nutritionist “The right kind of food is the most important single factor in the promotion of health; and the wrong kind of food is the most important single factor in the promotion of disease.”

Gandhi ji said- “there is no need of taking medicine in disease only what should be done is to change our diet”

Research show that disease produced by combination of deficiencies can be corrected when all the nutrients are supplied, the maintenance of good health and the healing of disease, such a diet obviously should be made up of foods which, in combination, would supply all the essential nutrients.

Diabetics always need to take care of their diet and also about the food they eat. Care has to be taken because all foods contain not only carbohydrate, but also some energy value. Protein and fat available in the food are converted to glucose in the body. This glucose has some effect on the **blood sugar** level, which has to be taken care of. Furthermore, you needn't have to eat only the bland boring **diet**. Instead, you can eat more fruits, vegetables and whole grains. All it means is that you need to select foods that are high in nutrition and low in calories.

Why is diet so important for a diabetic?

Diet plays a significant role in controlling the diabetes. The diabetic diet may be used alone or else in combination with insulin doses or with oral hypoglycemic drugs. Main objective of diabetic diet is to maintain ideal body weight, by providing adequate nutrition along with normal blood sugar levels in blood. The **diet plan** for a diabetic is based on height, weight, age, sex, physical activity and nature of diabetes. While planning diet, the dietitian has to consider complications such as high blood pressure, high **cholesterol** levels.

- Extra body fat makes it harder for people with type-II diabetes to make and use their own insulin. Following a reduced calorie meal

plan to lose weight is the best way for overweight people with type-II diabetes to improve control of their blood sugar.

- Diabetes medicines must be balanced with the type, timing, and amount of food eaten. Therefore, meal planning is very important for people who take insulin or diabetes pills.
- High blood pressure is more common in people with diabetes. An eating plan to lose excess weight and reduce salt intake is an important part of plan to control blood pressure.
- Diabetes increases risk for heart and blood vessel disease. This risk can be reduced by keeping blood fat levels, especially cholesterol, near normal. Eating less animal fat especially high cholesterol foods help control blood fats.
- High fiber foods , such as dried beans, fresh fruits and vegetables, and whole grains , can help lower blood sugar and blood fat levels.
- Many high sugar foods raise your blood sugar level quickly. They provides few of the vitamin and minerals the body needs . for these reason, foods with large amounts of added sugar are not healthy food choices.
- Diabetes dose not change the need for vitamins , minerals , and other nutrients. Choosing foods that help control diabetes, blood pressure, blood fats, and weight, also help improve overall health and energy.

Food Components

The food we eat is made up several components like carbohydrates, protein, fats, vitamins, minerals, water and fiber.

Carbohydrates

They are the ready sources of energy for the body. They are composed of smaller unit called monosaccharide's. They are divided into two groups.

1. simple sugar like, honey, jam, candy, and sugar.
2. complex like cereal, flour bread, rice, noodles, rava.

The normal daily intake of carbohydrate is approximately 4-6gm/Kg body weight.

Protein

They are complex compounds required for growth and repair work of body. They are made up of smallest unit called amino acids. Food sources of protein are milk, meat, eggs, pulses and nuts. Adults require about 0.8gm-1gm/kg body weight of protein daily.

Fats

They are concentrated source of energy. They are made up of fatty acids and glycerol. The 3 type of fatty acids are:

1. Saturated fatty acid : found in ghee, butter, cream and red meat; intake raises blood cholesterol.
2. Mono-unsaturated fatty acid : found in olive oil and groundnut oil; intake lowers blood cholesterol.

3. Poly- unsaturated fatty acid : found in safflower oil, sun flower oil, corn oil and soya bean oil; intake lower blood cholesterol. The daily intake of fat should be 20% of the calorie requirement (0.5-0.6gm/kg body weight).

Vitamins

They are essential for normal functioning of all. they are classified into :

1. fat soluble vitamins i.e., Vitamins A,D,E and K. Fat soluble vitamin are mainly found in butter, cream and ghee.
2. Water soluble vitamins i.e., vitamin C. Water B-complex and Vitamin are mainly found in fruits and vegetables.

Minerals

They make up about 4% of body weight. Minerals are required in small amounts as compared to other nutrients. Major elements like sodium, potassium, magnesium are essential as electrolytes to maintain electrolyte balance. They are generally found in plant food.

Traces Minerals

Some of the trace element required are iron, iodine, zinc, chromium, copper, manganese and selenium. Each of the trace minerals performs vital role for which no substitute will do. A deficiency of any will be harmful, and an excess of many can have adverse health consequences.

Water

Water is very important constituent of all food. Besides being absolutely essential for survival, sufficient amount of water is essential for proper digestion of food.

Fiber

This includes the indigestible plant cell components present in diet. Essentially these are the unavailable carbohydrates present in cereals, pulses, vegetables, fruits and nuts. Recent studies have shown that high fiber diets are beneficial for diabetic patient. Fiber includes the indigestible plant cell components present in diet.

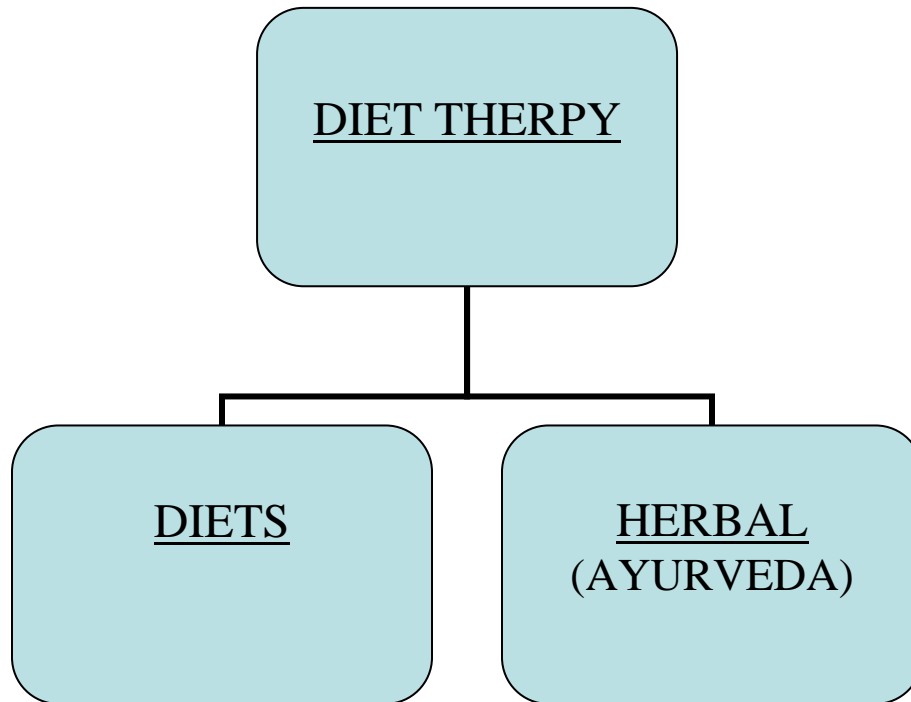
Salt

Salt is essential for health . However, diabetic are at an increased risk of developing high blood pressure and excess salt can aggravate this. Excess salt intake should therefore be avoided.

Artificial Sweeteners

Direct sugar is usually omitted from the diet of most diabetes. Therefore sugar substitutes or artificial sweeteners are extensively used. A small number of diabetics can do away with direct sugar as well as sugar substitutes. They cultivate an appreciation for natural flavors of foods and beverages.

Diet Therapy Types



Diet therapy can be as basic as outlining which foods to eat and avoid, or it may follow a prescribed method, like following an Ayurvedic .Ayurveda is an ancient Indian practice that works to prevent disease and rejuvenate the body. Ayurvedic principles treat every part of the body, mentally and physically, through diet and meditation. Another diet, called macrobiotics, is often recommended for people suffering from cancer or other chronic diseases because it emphasizes eating low-fat, high-fiber food that is wholesome and minimally processed. In general, diet therapy stresses that patients eat food that is fresh, natural and balanced with a variety of vegetables, whole grains and fruit.

DIET CHART FOR DIABETES

Day Time	S\N	Hours	Diet-Therapy
Upon arising	1.	5 a.m. 6.30 a.m.	<ul style="list-style-type: none"> • Two glass of lukewarm water with half a freshly squeezed lemon • A glass of bitter guard juice.
Breakfast	2.	8 a.m.	<ul style="list-style-type: none"> • Soaked prunes. • Whole bread with butter and fresh milk.
Mid-day	3.	10 a.m.	<ul style="list-style-type: none"> • A glass of coconut water.
Lunch	4.	12 noon	<ul style="list-style-type: none"> • A bowl of freshly prepared steamed vegetables • Whole wheat chapattis(2-3) • Salads • A small bowl of curd
Mid- afternoon	5.	3p.m.	<ul style="list-style-type: none"> • Cucumber juice or
Dinner	6.	8 p.m.	<ul style="list-style-type: none"> • Sprout (moong,beans, methi) • A bowl of cooked raw vegetables • 2-3 figs
Bed-time	7.	9 p.m.	<ul style="list-style-type: none"> • A glass of fresh milk. • A cup of tea (suger free)

Note- Diet chart is purely based upon the curative properties for diabetes; it can be changeable with place and time depend upon the dietician.

CHART

Grains	Legumes	Vegetable	Fruits	Spices
<ul style="list-style-type: none"> ▪ Wheat ▪ Old rice 	<ul style="list-style-type: none"> ▪ black gram ▪ aduki beans 	<ul style="list-style-type: none"> ▪ asparagus ▪ avocado ▪ grated coconut ▪ raw banana ▪ sweet potatoes 	<ul style="list-style-type: none"> ▪ bananas(raw) ▪ cantaloupes ▪ cooked apples ▪ fleshy dates ▪ papayas tender ▪ coconut ▪ water melon 	<ul style="list-style-type: none"> ▪ coriander ▪ cumin ▪ curry leaves ▪ fennel ▪ poppy seeds ▪ saffron ▪ turmeric
<ul style="list-style-type: none"> ▪ Other choice ▪ Dats 	<ul style="list-style-type: none"> ▪ Other choice ▪ whole green grains ▪ whole red lentils 	<ul style="list-style-type: none"> ▪ Other choice ▪ Summer pointed ground ▪ battle ground ▪ pumkin ▪ rindged ground winter ▪ flat beans ▪ French beans ▪ Onion stalks 	<ul style="list-style-type: none"> ▪ Dry fruits preferably lteved or soaked ▪ Figs ▪ Raisins 	<ul style="list-style-type: none"> ▪ Occassionly ▪ caraway ▪ cardmomn ▪ cinnamon kaves ▪ parsley
<p style="text-align: center;">Avoid</p> <ul style="list-style-type: none"> ▪ corn ▪ millets 	<p style="text-align: center;">Avoid</p> <ul style="list-style-type: none"> ▪ garbanreo (chick peon) ▪ red kidney beans 	<p style="text-align: center;">Avoid</p> <ul style="list-style-type: none"> ▪ broccoli ▪ cauliflower ▪ raw vegetables 	<p style="text-align: center;">Avoid</p> <ul style="list-style-type: none"> ▪ lemons (too much) ▪ country peans ▪ pears ▪ saur fruits 	<p style="text-align: center;">Avoid</p> <ul style="list-style-type: none"> ▪ ajwain ▪ anise ▪ black pepper ▪ raw garlic.

Diabetic Food Pyramid



Function

Naturally, when a person is sick, she should consume only food that promotes healing and lessens discomfort. Diet therapy is an effective method of healing, especially when utilized as a complementary method of care. Diet therapy is used for people who are trying to increase or decrease their body weight, have a sensitive digestion system that may be prone to allergies, who may not be able to digest certain foods, are trying to produce specific effects in their body (like regulating blood sugar), or are trying to overcome vitamin or mineral deficiencies. For instance, an anemic person will be advised to eat a diet high in iron. A medical practitioner will outline which foods are high in iron and make sure the patient is eating an adequate amount of these foods a day.

There are two primary types of diabetes and the nutritional goals for each are different. With type 1 diabetes, studies show that total carbohydrate has the most effect on the amount of insulin needed and maintaining blood sugar control. There is a delicate balance of carbohydrate intake, insulin, and physical activity that is necessary for optimal blood levels of a sugar called glucose. If these components are not in balance, there can be wide fluctuations, from too high to too low, in blood glucose levels. For those with type 1 diabetes, on a fixed dose of insulin, the carbohydrate content of meals and snacks should be consistent from day to day.

For children with type 1 diabetes, weight and growth patterns are a useful way to determine if the child's intake is adequate. Try not to withhold food or give food when a child is not hungry. Insulin dosing and scheduling should be based on a child's usual eating and exercise habits. With type 2 diabetes, the main focus is on weight control, because 80% to 90% of people with this disease are overweight. A meal plan, with reduced calories, even distribution of carbohydrates, and replacement of some carbohydrate with healthier monounsaturated fats helps improve blood glucose levels. Examples of foods high in monounsaturated fat include peanut or almond butter, almonds, walnuts, and other nuts. These can be substituted for carbohydrates, but portions should be small because these foods are high in calories.

In many cases, moderate weight loss and increased physical activity can control type 2 diabetes. Some people will need to take oral medications or insulin in addition to lifestyle changes. Children with type 2 diabetes present special challenges. Meal plans should be recalculated often to account for the child's change in calorie requirements as he or she grows. Three smaller meals and 3 snacks are often required to meet calorie needs. Changes in eating habits and increased physical activity help reduce insulin resistance and improve blood sugar control. When at parties or during holidays, sugar-containing foods can still be

eaten, but your child should have fewer carbohydrates on that day. For example, if birthday cake, Halloween candy, or other sweets are eaten, the usual daily amount of potatoes, pasta, or rice should be eliminated. This substitution helps keep calories and carbohydrates in better balance.

For children with either type of diabetes, special occasions (like birthdays or Halloween) require additional planning because of the sweets that abound.

Nutritional Supplements for Diabetics

Recent researches carried out by food industries and health experts conclude that herbal supplements such as bitter melon, goat's rue, nopal cactus, fenugreek, bilberry, gurmar, onions and garlic are quite effective in lowering the blood glucose level, thereby helping the patients to undergo less treatment distress.

Diabetics must be always cautious about the source of their calorie intake. Non starchy veggies, skimmed milk, lean chicken, high fiber fruits and low glycemic food products are smart choices for an informed diabetic. Oil low in saturated fats content should be preferred. It had been proved that a balanced diabetic diet contains some important nutrients and useful supplements to help control dancing blood sugar. Let's see few useful **diabetic nutritional supplements** we receive from our food, and their action in controlling diabetes.

- **Biotin** – It helps the body in metabolizing carbohydrates, proteins and fats.
- **Vitamin C** – It prevents sugar from getting attached to proteins. Insulin deficiency hinders effective metabolism and transport of Vitamin C, making its increased intake all the more important. Here, acrobats like Emergent C is more preferred as compared to ascorbic acid.

- **Chromium** – It aids the metabolism of glucose. It is most effective if consumed as niacin.
- **Vitamin E** – It helps in improving insulin sensitivity.
- **Magnesium** – It helps in lowering blood pressure and reducing heart-attack risks by relaxing the muscle tissues.
- **CLA** – It helps in protecting cells from becoming diabetic or getting damaged by atherosclerosis, colon cancer and chronic inflammation.
- **Omega 3 and Alpha Lipoid Acids** - They are effective building blocks and anti-oxidants respectively. They reduce the risks associated with nerve damages by aiding balancing of blood sugar.
- **Vitamin B6** – It helps in preventing neuropathy.
- **Vitamin D** – It helps in reducing insulin resistance and averting the risks of cataract.
- **Zinc** – It helps in improving the action of insulin.

Diabetics have greater needs of **nutritional supplements** for fulfilling the antioxidant and metabolic requirements of the body. Design your food intake as per the above necessities and living the diabetic lifestyle will be a much easier road to travel upon

HERBAL REMEDIES

In Indian literature as already been discussed earlier has shown the great diversities of food habits for different type of disease.

For the diabetes mellitus we will discuss only four of them .they are-

1. JAMUN (*TINCTURA SYZYGIUM CUMINI*)
2. KRELA (*MOMORDIA CHARANTIA INDIANA*)
- 3.GURMAR (*GYMNEMA SYLVESTNE*)

4.SADAPUSHPI (*CATHRANTHUS –ROSECES*)

1. JAMUN (*TINCTURA SYZYGIUM CUMINI*)

This member of the Myrtaceae is of wider interest for its medicinal applications than for its edible fruit. Botanically it is *Syzygium cumini* Skeels (syns. *S. jambolanum* DC., *Eugenia cumini* Druce, *E. jambolana* Lam., *E. djouat* Perr., *Myrtus cumini* L., *Calyptanthus jambolana* Willd.). Among its many colloquial names are Java plum, Portuguese plum, Malabar plum, black plum, purple plum, and, in Jamaica, damson plum; also Indian blackberry. In India and Malaya it is variously known as *jaman*, *jambu*, *jambul*, *jambool*, *jambhool*, *jamelong*, *jamelongue*, *jamblang*, *jiwat*, *salam*, or *koriang*.

Moisture	83.7-85.8 g
Protein	0.7-0.129 g
Fat	0.15-0.3 g
Crude Fiber	0.3-0.9 g
Carbohydrates	14.0 g
Ash	0.32-0.4g
Calcium	8.3-15 mg
Magnesium	35 mg
Phosphorus	15-16.2 mg
Iron	1.2-1.62 mg
Sodium	26.2 mg
Potassium	55 mg
Copper	0.23 mg
Sulfur	13 mg
Chlorine	8 mg
Vitamin A	80 I.U.

Thiamine	0.008-0.03 mg
Riboflavin	0.009-0.01 mg
Niacin	0.2-0.29 mg
Ascorbic Acid	5.7-18 mg
Choline	7 mg
Folic Acid	3 mcg

2.KARELA (*MOMORDIA CHARANTIA INDIANA*)

An herb known worldwide for its well-known result in diabetes mellitus known as *MOMORDIA CHARANTIA INDIANA* in biological terms is an herb that is a boon to mankind. Due to its miraculous properties, it is regarded as one of the best herb existing on this plant. A wonder of nature is that, it is not only beneficial in diabetes in diabetes mellitus but is also very beneficial in many other disorders that have been troubling mankind. Karela not only gives relief but also cures the patient.

Karela's chemical constituents are lectin, charitin and momordicine. It also contains a polypeptide named gurmardin, which is similar to insulin in composition. Well, exact action is still unknown but it is well established that regular use of karela has very good result in disease like diabetes mellitus.

3.GURMAR (*GYMNEMA SYLVESTRE*)

The major bioactive constituents of *Gymnema sylvestris* are a group of oleanane type triterpenoid saponins known as gymnemic acids. The latter contain several acylated (tigloyl, methylbutyryl etc.) derivatives of deacylgymnemic acid (DAGA) which is 3-O-glucuronide of gymnemagenin (3, 16, 21, 22, 23, 28-hexahydroxy-olean-12-ene)². The individual gymnemic acids (saponins) include gymnemic acids I-VII, gymnemosides A-F, gymnemasaponins

We have had numerous requests for safe and clinically proven nutritional treatments for diabetes. Understandably, the scientific evidence that vanadium is toxic at levels that improved signs of diabetes in animals, as well as the fact that it has never been tested in humans, left many people feeling dismayed that vanadium has and is being purported as a effective nutritional therapy for diabetes. After searching the scientific literature for nutritional treatments that are backed by human studies showing both safety and effectiveness, we were astounded by a number of extremely promising studies in diabetic animals, as well as insulin dependent and non-insulin dependent human diabetics, that utilized the herb *Gymnema sylvestre* (GS).

4. SADAPUSHPI (*CATHRANTHUS –ROSECES*)

Sadapushpi is used as herbal medicinal to control diabetes. Through researches it has been came to know that sadapushpi consist of glycosidic and amerogetion. These elements have direct effect on pancreas and pituitary gland(master gland) thus diabetes patients endocrine gland blood glucose and digestive enzymes get remedies by of intake of this herbs (sadapushpi).

CHAPTER-4

Yoga therapy

- Yoga
- Yoga therapy
- Yogic management of diabetes
- Kriyas (shatkarma)
- Asana
- Pranayama
- Effect of yoga therapy in diabetes
- Recommendations

YOGA THERAPY

YOGA

The term *yoga* comes from a Sanskrit word which means yoke or union. Traditionally, yoga is a method joining the individual self with the Divine, Universal Spirit, or Cosmic Consciousness. Physical and mental exercises are designed to help achieve this goal, also called self-transcendence or enlightenment. On the physical level, yoga postures, called *asanas*, are designed to tone, strengthen, and align the body. These postures are performed to make the spine supple and healthy and to promote blood flow to all the organs, glands, and tissues, keeping all the bodily systems healthy. On the mental level, yoga uses breathing techniques (*pranayama*) and meditation (*dyana*) to quiet, clarify, and discipline the mind. However, experts are quick to point out that yoga is not a religion, but a way of living with health and peace of mind as its aims.

YOGA THERAPY

Yoga therapy is instruction in Yogic practices and teachings to prevent reduce or alleviate structural, physiological, emotional and spiritual pain, suffering or limitations. Usually this is taught one-on-one for the specific conditions and purpose of individuals by specially trained Yoga teachers or therapists.

In practice, measures commonly involve systematically using breath and movement to strengthen, stretch and stabilize the muscular-skeletal system,

smooth and deepen respiratory rhythms, improve circulation, balance internal physiology and emotions and in general, target natural recuperative powers to specific systems of the body. All as part of a specific practice for an individual. Another element, not to be neglected, may be examining behaviors and attitudes that contribute to undesirable conditions and then cultivating a practice to support movement in the desired direction.

“Yoga therapy has proved effective in variety of disorders and is being used today not only by yoga practitioner but by wider circle of medical and paramedical practitioners. In the yoga therapy the medical consultation may be very much beneficial”.

- *Swami Vivekananda Saraswati.*

“Yoga therapy, derived from the Yoga tradition of Patanjali and the Ayurvedic system of health care refers to the adaptation and application of Yoga techniques and practices to help individuals facing health challenges at any level manage their condition, reduce symptoms, restore balance, increase vitality, and improve attitude”.

-*American Viniyoga Institute*
Gary Kraftsow

❁ Yoga therapy is that facet of the ancient science of Yoga that focuses on health and wellness at all levels of the person: physical, psychological, and spiritual. Yoga therapy focuses on the path of Yoga as a healing journey that brings balance to the body and mind through an experiential understanding of the primary intention of Yoga: awakening of Spirit, our essential nature.

-*Integrative Yoga Therapy*
(U.S.A.) Joseph LePage, M.A.

❖ Yoga therapy is the adaptation of yoga practices for people with health challenges. Yoga therapists prescribe specific regimens of postures, breathing exercises, and relaxation techniques to suit individual needs. **Medical research shows that Yoga therapy is among the most effective complementary therapies for several common ailments.** The challenges may be an illness, a temporary condition like pregnancy or childbirth, or a chronic condition associated with old age or infirmity.

*-YogaBiomedicalTrust(England)
Robin Monro, Ph.D.*

❖ Yoga comprises a wide range of mind/body practices, from postural and breathing exercises to deep relaxation and meditation. Yoga therapy tailors these to the health needs of the individual. It helps to promote all-round positive health, as well as assisting particular medical conditions. **The therapy is particularly appropriate for many chronic conditions that persist despite conventional medical treatment.**

*-YogaTherapyandTrainingCenter (Ireland)
Marie Quail*

“Yoga therapy is of modern coinage and represents a first effort to integrate traditional yogic concepts and techniques with Western medical and psychological knowledge. Whereas traditional Yoga is primarily concerned with personal transcendence on the part of a "normal" or healthy individual, Yoga therapy aims at the holistic treatment of various kinds of psychological or somatic dysfunctions ranging from back problems to emotional distress. Both approaches, however, share an understanding of the human being as an integrated body-mind system, which can function optimally only when there is a state of dynamic balance.

YOGIC MANAGEMENT OF DIABETES

Diabetes is a life-style related aging disease which is on the increase .the role of emotional and stresses on the mind in hastening the onset and progression of this disease. Yogis in ancient India (5000 YEARS age) went into a very systematic analysis and understanding of the problem of mind in a highly logical and objective manner. They not only understood the mechanisms involved in such life style related problems but have also handed over many techniques to suit individual personality types to reverse these bad effect of stress, yoga understand the disease and health a totally different perspective.

KRIAS (SHATKARMA)

Hath yoga, as described in the early yoga Upanishads. was made up of the shatkarmas and is a very precise and systematic science. *Shat* means ‘six’ and *karma* means ‘action’; the shatkarmas consist of six groups of purification practices. Shatkarmas is to create harmony between the tow major pranic flow, ida ans pingala, thereby attaining physical and mental purification and balance.

1. JALA NETI (CLEANING THE NASAL PASSAGE)

PRACTICE

- Add about half a teaspoon of salt to a neti pot full of sterile lukewarm water.

- Stand with the legs apart.
- Hold the neti pot in your right hand.
- Insert the nozzle of the neti pot into the right nostril.
- Keep the mouth open and breathe freely through the mouth.
- Tilt the head first slightly backwards , then forwards and sideways so the water from the pot enters the right nostril and comes out through the left by gravity. Allow the flow till the pot is empty.
- Repeat the same on the left side.
- To clear the nasal passages of the remaining water , blow out the water by active exhalation through alternate nostrils as in Kapalabhati .

2. SUTRA NETI OR RUBBER NETI

PRACTICE

- Insert the blunt end of a thin soft rubber neti horizontally into the right nostril.
- Gently push it along the floor of the nose until the tip is felt in the back of the throat.
- Insert the right index and the middle finger through the mouth and catch the tip of neti at the back of the throat.
- Pull it out through the mouth and gently massage the nasal passage by catching the two ends of the tube.
- Repeat on the left side.

NOTE

- Take care not to push the neti vertically into the nostril.

- Before you start this practice , cut and trim the nails of the fingers to be used for inserting in the mouth , as it may injure the throat when you are trying to grasp the tip of neti in the throat.

BENEFITS OF JALA NETI , SUTRA NETI

- Jala neti remove mucus and pollution from the nasal passages and sinuses allowing air to flow without obstruction.
- These improve the concentration and strengthens the will power .
- It helps to relieve allergies, colds and sinusitis together with various disorders of the ears, eyes and throat, including myopia, allergic rhinitis, hay fever, certain ,types of deafness such as glue-ears, tonsillitis and inflammation of the tonsillitis and inflammation of the adenoids and mucus membranes.
- Good for eyes specially for Diabetes mellitus.

3.VAMANA

PRACTICE

- Drink about one and a half liter of lukewarm saline water (about 1% saline) as quickly as you can until you feel like vomiting it out.
- Now, spread the legs about tow feet and bend the trunk forward forming an angle of about 90 degrees to the ground .
- Now with the help of the middle three fingers of the right hand , tickle the back of the throat to vomit out (vaman) all the water.

- Repeat the process of tickling the throat until no more water comes out , which may mean that all water has been vomited.
- With continued practice one can stimulate the vomiting sensation and vomit out the water without using the fingers to tickle the throat.
- Have a bland breakfast after about half an hour.
- This is to be done early in the morning on an empty stomach.
- A bland breakfast could preferably consist of Indian kichdi (rice and lentil dhal , cooked with or with or without salt) , along with a tea spoon full of pure ghee . Avoid coffee or tea for breakfast.
- With long practice one can learn to vomit all the water as if it is a continuous jet. This is called Gajarani.
- If a person is having high B.P. then kunjal is not given.

BENEFITS OF VAMAN

- These techniques tone and stimulate all the abdominal organs by including strong muscular contractions in the stomach walls.
- Through kunjal all the toxicity of the body gets removed and the stomach contents can empty in small intestine in a controlled slow manner .
- this greatly reduces the hunger's intensity ,which is one of the major difficulties of diabetes .
- The problems of indigestion, acidity and gas are overcome.

4. SHANKHAPRAKSHALAN

PRACTICE

- In this practice one has to drink total of warm salty water .

- First drink two glass of water and perform a series of five specific asanas: tadasan, triyak tadasan, kati chakrasan, triyak bhujangasan and udrakarshan asana.
- After every two glass of water the asana should be performed until the water starts flowing out of the anus.
- Once clear water starts coming through, one will know that the stomach and intestine are perfectly clean, can stop the practice.

NOTE

- Forty five minutes after the completing the practice of shankhprakashalan, a salt less mixture of cooked rice, mung dal and ghee has to be eaten until the stomach is completely full. There are dietary restrictions to observe for a week, as it is a ‘major operation’ it must be done under expert guidance.
- This is to be done early morning on an empty stomach.

BENEFITS OF SHANKHAPRAKSHALAN

- This technique removes the excess and old bile, mucus, toxins accumulated through out the body. Shankhprakashalan increases the blood circulation through out the body there by providing nutrition to epithelial lining of the entire GIT.
- This increase the exchange of oxygen at cellular level and also the metabolic rate, speeding up the digestive and excretory process. It facilitates the muscles toning of skin as well as the lining of internal organs.
- Shankhprakashalan recommended for those with digestive disorders such as constipation, flatulence, acidity, indigestion and other digestive upsets.

5. NAULI KRIYA

Nauli is an abdominal kriya in which isolated contraction and rolling manipulation of the abdominal recti muscles (rectus abdominis) which form the front liner wall of the abdominal cavity , are folling are preparatory for nauli.

1. Vama Nauli

2. Daksina Nauli

3. Madhyama Nauli

BENEFITS OF NAULI KRIYA

Stimulate and activates the abdominal organs. Stimulate the intestines . tones up recti muscles ,helps to relive constipation , piles and gastritis . Creates the ‘–Ve’ pressure in the abdominal cavity and thus draws the blood to the abdominal cavity improving blood supply to the pancreatic cells.

6. Kapalbhati

It is power-breathing techniques that help to over come blues, stress, negative values and depression in few minutes. It is the only technique used particularly for mind purification among all the yoga-cleansing exercises. It is one of the pranayamas that can cure diabetes. Though, cleansing breath is a simple procedure, but it is important that it should be done properly in accurate way.

PRACTICE

- Sit comfortably in any meditative posture either cross-legged or in vajrasana with spine erect.

- Exhale through both nostrils, contracting the middle and lower abdomen portions. Release the contractions quickly and immediately follow with another forceful exhalation. Inhale passively and effortlessly. Gradually increase the frequency to about 100 strokes/minute.
- After the round take a deep breath and gradually exhale.

BENEFITS OF Kapalbhati

- It has been observed that the heat generated during this exercise has powerful effects on the respiratory system because it purifies the nasal passage and the lungs.
- Regular practice of this exercise will truly show amazing results. Since there is large-scale elimination of carbon dioxide and a huge absorption of oxygen this technique also increases in the lungs manifold.

ASANAS

In the yoga sutras of Patanjali there is concise definition of yogasanas: “*Sthiram sukham aasanam*” , meaning ‘that position which is comfortable and steady’. In this context, asanas are practiced to develop the ability to sit comfortably in one position for an extended period of time , an ability necessary for meditation. Raja yoga equates yogasana to the stable sitting position.

1.PAWANMUKTASANA SERISES- I and II

The pawanmuktasana series is one of the most important series of practices that has a very profound effect on the human body and mind and is thus a most useful tool for the yogic management of various disorders and maintenance of health.

In Sanskrit these practices are referred to as *sukshma vyayama* which means ‘subtle exercise’. The words pawan means ‘wind’ or ‘prana’; mukta means ‘release’ and asana means ‘pose’. Therefore, Pawanmuktasana also means a group of asanas that remove any blockages which prevent the free flow of energy in the body and mind.

2.SURYA NAMASKARA

Suryanamaskar is composed of three elements: form, energy and rhythm. The twelve asanas are the physical matrix around which the form of the practice is woven. These asanas generate prana, the subtle energy which activates the psychic body. Their performance, in a steady, rhythmic sequence body. The application of this form and rhythm to the body\mind complex generates the transforming force which produces a fuller and more dynamic life.

The ideal time to practice Suryanamaskar is at sunrise, the most peaceful time of day. Whenever possible, practice in the open air, facing the rising sun. Sunset is also a good time to practice as it stimulates the digestive fire. Suryanamaskar, however, may be practiced at any time provided the stomach is empty.

3. ARDHAKATI CAKRASANA

PRACTICE

- While inhaling, slowly raise the right arm side ways up.
- At the horizontal level turn the palm upwards.
- Continue to raise the arm with deep inhalation vertically until the biceps touches the right ear, palm facing the left side.

- Stretch the right arm upwards.
- While exhaling bend the trunk slowly to the left.
- The left palm slides down along the left thigh as far as possible
- Do not bend the right elbow or the knees.
- Maintain for about a minute with normal breathing.
- Repeat on the left side ,by bending towards the right side.

NOTE- *Bend laterally. Do not bend either forwards or backwards.*

BENEFITS

Reduces fat in waist region, stimulates sides of the body. Give lateral bending to the spine, improves function of liver.

4.ARADHA CAKRASANA

PRACTICE

- Support the back at the waist by the palms, finger pointing forwards.
- Inhale and bend backwards from the lumbar region. Drop the head backwards, stretching the muscles of the neck.
- Maintain for a minute with normal breathing.
- Return to Stithi.

BENEFITS

Makes the Spine flexible, stimulates the spinal nerves, promotes circulation of blood into head. Gives the strong stretching and relaxation to the pancreas, improves the blood flow to the pancreas. Strenthens the neck muscles. Expands chest and shoulders.

LIMITATION

Persons with problems of vertigo have to avoid this posture.

5.PADA HASTASANA

PRACTICE

- Stand erect with legs together.
- Inhale slowly and raise the arms sideways.
- At this horizontal level, turn the palms upwards.
- Continue to inhale and move the arms upwards until the biceps touches the ears. Turn the palms forward.
- Maintain in this final posture for about 2-3 minutes without bending the knees.

NOTE-

- *Never bend the knees.*
- *Keep the neck up until the forwards bending at the hip the waist is completed and then drop the neck freely to touch the chin to knees.*

BENEFITS

Make the spine flexible, strengthens the thighs. Helps preventing constipation and menstrual problems. Give the strong stretching and relaxation to the pancreas, improves the blood flow to the pancreas. Improve digestion.

6. TRIKONASANA

PRACTICE

- While inhaling spread the legs apart by about a meter by moving the right leg away from the left leg.
- While exhaling, the right hand is taken down to the ground on the outside of the left foot, while the left arm is raised up to the vertical position
- Turn the face up to look at the raised hand.
- Maintain at the final posture for 1 minute with normal breathing
- Return to sthiti and repeat the same to the left side.

BENEFITS

- The deep pressure and release of pressure in complimentary posture done on other side increases the strong stimulation and relaxation effect on pancreas.
- Give rotational movements to the spine. Improves the functioning of kidneys and strengthens the thigh muscles.

7. VAKRASANA

PRACTICE

- Bend the right leg at the knee and place it beside the left knee.
- Straighten and twist the waist towards the right as you exhale. Bring the left arm around the right knee and catch the right big toe.

- Take the right arm back and keep the palm on the ground in such a way that the trunk is kept erect with a proper twist.
- After maintaining for about a minute with normal breathing return to sthiti and relax .
- Repeat the same on the other side.

BENEFITS

Lateral twist gives flexibility to the spin, tones up the spinal nerves. Prepares the spine for matsyendrasana. Helps to cure constipation, dyspepsia, stimulates the pancreas and useful for diabetes. Improve the lung capacity.

LIMITATIONS

People who have recently undergone abdominal surgery may avoid.

8. ARDHA MATSYENDRASANA

PRACTICE

- Bend the right leg at the knees by drawing it along the ground.
- Place the sole of right foot against the inner side of the left thigh.
- Keep the right heel about 4 to 5 inches away from the perineum.
- Bend the left knee and place the left foot on the outer side of the right thigh near the right knee.
- Do not sit the heels.
- Inhale, raise the right arm up vertically and stretch up the shoulder.
- Now take the left hand behind the back and try to touch the right thigh.
- Repeat the same, on the other side.

9.USTRASANA

PRACTICE

- Sit in vajrasana.
- Stand on the knees.
- Place the palms on the waist with fingers pointing forwards.
- Inhale and bend the trunk backwards and place the palms on the heels.
- Maintain for about a minute with normal breathing.

NOTE- the thigh should be perpendicular to the ground.

BENEFITS

Stretching and relaxation of pancreas tones up the pancreas. Makes the spine flexible. Increases circulation to the head region.

LIMITATIONS

Those who have undergone any recent operation at the chest or abdomen, people with hernia problems, severe hypertension.

10. MAYURASANA

PRACTICE

- Stand on the knees keeping them about 10 inches apart.
- Place the hands between the knees, fingers pointing inwards (i.e., towards the feet), elbows close to each other.

- Bend the elbows, lean forwards supporting the trunk on the elbows at the level and place the head down on the floor.
- Stretch and stretch the legs backwards so that toes are on the ground.
- Move forwards on the toes to raise the legs off the grounds. Balance the body on the two hands only.
- Keep the entire body parallel to the ground by keeping the elbows as the supporting points.
- Look forwards. Maintain the final position for sometime with normal breathing.

BENEFITS

Beneficial for poor appetite, constipation irritable bowel. Tones up abdomen, reduces fat on tummy strengthens the forearms, wrists and elbows. Prevents accumulation of gases. Vitalizes the endocrine in the abdomen. Very good for diabetes.

LIMITATIONS

Abdominal surgery, menstrual problems in women, hernias, hyperacidity and ulcers should avoid these postures.

11. DHANURASANA

PRACTICE

- Bend the knees and holds the ankles by the palms.
- As you inhale, raise the head and the chest upwards. Pull the legs outwards and backwards so that the spine is arched back like a bow.

- Stabilize on the abdomen. Do not bend the elbows. Keep the toes together.

BENEFITS

Deep compression of abdominal organs especially pancreas, and dharana and dhyana on pancreas in the final posture give deep rest to the pancreatic cells. Useful for diabetes patients. Removes gastro intestinal disorders, stimulates and helps in slimming the whole body. Give good stimulation and flexibility to the back.

12. SARVANGASANA

PRACTICE

- Inhale raise the legs together slowly and gracefully.(without bending the knees) till it forms about 45° to the ground.
- Continue to inhale and raise the legs further to 90° position. Bring the arms down and place them next to the buttocks.
- Exhale, raise the buttocks and the trunk, taking support of the arms and elbows, without lifting the head. Rest the elbows on the ground firmly and support the back with both palms.
- Maintain effortlessly with normal breathing for about 2-3 minutes. Carefully avoid all jerks.

BENEFITS

Balances the prana flow the pancreas by reducing excess prana thus reduces the auto- immunity. Stimulates and keeps the thyroid healthy. Influences the pelvic organs. Useful in varicose veins, piles, hernia and menstrual disorders.

LIMITATIONS

People with cervical spondylosis, low back pain and hypertension should not do this posture.

13. MATSYASANA

PRACTICE

- Take the right leg and place it on the left thigh.
- Place the left leg on the right thigh as in padmasana
- Place the palm on either side of the head with fingers pointing towards the shoulders.
- Inhale, take the weight on the palms and lift the head and the back off the ground.
- Bring the center of the crown of the head to the ground by bending the dorsal and cervical spine backwards.
- Exhale and remove the hands after the weight is well balanced on the head and catch hold of the big toes hooking the index fingers around them.
- Press the elbows on the ground to bear the weight of the upper half of the body.

- Maintain this position for one minute with normal breathing

BENEFITS

Complementary to sarvangasana, good for diabetes, asthmatics and other respiratory problems.

LIMITATIONS

Those who have recently undergoing any abdominal or thoracic surgery and those with cervical spondylosis should avoid this posture for 3 months.

14. MANDOOKASANA

In mandookasana we put our hands near the abdominal area and put our body forward due to this balance occurs in pancreatic secretion and help in diabetes.

15. SHAVASANA (CORPSE POSE)

Lying flat in the ground with the face upwards, in the manner of the dead body, is shavasana. It removes tiredness and enables the mind to relax (1:32 .HYP).

PRACTICE

Lie flat on the back.

- Separate the feet slightly, place the hands by the side of the body, about one foot away, with the palms facing upwards.
- The head, back, legs should be in alignment, not crooked.
- Relax the whole body, keeps the eyes and mouth closed.
- Breathe naturally through the nose.
- Concentrate on the natural breath and feel the body becoming looser and lighter with each exhalation.

- Keep the awareness on the breath and physical body.
- Try to ignore the mental chatter and concentrate only on the breath and body.

BENEFITS

Horizontal position of the body on the ground helps in normal flow of blood in the body irrespective of gravitational force. No extra energy is required for any system of the body, therefore metabolic rate to come down even heart rate and blood pressure reduce to minimum because there is no need of force to circulate the blood. Complete body relaxation brings about a reduction in the oxygen requirement of the body and in the production of waste materials like carbon dioxide and water vapors. Because of the calmness of the mind and reduction in the number of stress impulses to the hypothalamus, enhanced the parasympathetic activities of the brain. Therefore arterial blood pressure falls, pulse rate slows down, and skin blood vessels dilate overall basal metabolic rate of the body falls by 10-20 percent

PRANAYAMA

Diabetes is a disease in which the body does not produce or properly use insulin. Insulin is a hormone that is needed to convert sugar, starches and other food into energy needed for daily life. Though the exact cause of diabetes is not known properly, it is believed that both genetics and environmental factors like obesity and lack of exercise play important roles. There are many medications and insulin injections available in the market. But can you cure diabetes by pranayama? Yes you can cure diabetes by pranayama.

Pranayama is the breathing process or the control of the motion of inhalation, exhalation and the retention of vital energy. One can control the rhythms of

pranic energy with pranayama and achieve healthy body and mind. Pranayama breathing techniques are not only effective in the control of diabetes, but can also cure the disease as well. Regular practice of pranayama can cure diabetes by reducing blood sugar levels. It also reduces the blood pressure, weight, the rate of progression to the complications, and the severity of the complications as well. The symptoms related to diabetes are also reduced to a great extent.

There are several types of Pranayama mentioned in Hatha Yoga. One of the basic preparations for Pranayama is Nadi shoudhan Pranayama or alternate nostril breathing. This type of pranayama can cure diabetes as alternate nostril breathing has calming effect on nervous system, reduces stress levels and thus helps in diabetes treatment. It has been found that Bhasrika and Bhramari Pranayama can help in curing diabetes. Bhasrika Pranayama is revitalizing Pranayama, which increases oxygen levels and reduces carbon dioxide levels in the blood. In bhasrika pranayama, the abdominal muscles and diaphragm are used which puts pressure on the internal organs. Bharamari Pranayama has calming effect on mind, brain and nervous system. But before practicing these Pranayama, one must learn and practice deep breathing, fast breathing, alternate nostril breathing and Bandhas. There are several other pranayamas, which can cure diabetes some of them are mentioned below.

1. Anuloma-Viloma Pranayama

Anuloma Viloma is in fact an alternate Nostril Breathing Technique and a process of purification. It strengthens the lungs and calms the nerves. It helps the human body to get rid off the toxins that have built up through stress and pollution. This pranayama also helps to cure diabetes, cough and colds, insomnia, chronic headaches and asthma.

PRACTICE

- Sit in a comfortable meditative pose or in padmasana keeping the head, neck and spine erect.
- Fold your index and middle finger of right hand towards palm. Now thumb should remain towards right nostril and ring finger and little finger should be towards left nostril.
- Closing the right nostril with the thumb inhale through the left nostril. Now closing the left nostril with the ring finger and the little finger, exhale slowly through right nostril removing the thumb.
- After exhalation, inhale through the same nostril (right). Now closing the right nostril with thumb exhale through left nostril (removing the ring finger and the little finger) as per previous practice.
- This completes one round of easy Anuloma-Viloma. Care must be taken that the inhaling and exhaling should be done very slowly without making any sound. This exercise should be repeated 10 times.

2. Ujjayi Pranayama

Ujjayi Pranayama stretches the breath, warms it before entering the lungs, and helps to build heat in the body. Ujjayi Pranayama is sometimes called the ocean sounding breath. Inhalation and exhalation are both done through the nose.

PRACTICE

- Ujjayi breathing means breathing slowly through your nostrils - about 4 to 5 heartbeats in and about 4 to 5 heartbeats out.
- The air is taken into the back of the throat with a constriction of the muscles, resulting in a hissing sound - an ocean sound.

- As the throat passage is narrowed the speed of the air passing through it is increased. This makes the breath long and thin.

This pranayama also clears the nasal passage and helps the thyroid gland to function smoothly and benefits respiratory disorders. The people suffering from high blood pressure should not practise Ujjayi.

3. Nadisodhan pranayama

PRACTICE

- Sit in any meditative posture.
- Adopt nasika mudra.
- Close the right nostril with the right thumb and exhale completely through the (left) nostril. Then inhale deeply through the same left nostril.
- Close the left nostril with your ring and little finger of the nasika mudra, release the right nostril. Now exhale slowly and completely through the right nostril.
- Inhale deeply through the same (right) nostril. Then close the right nostril and exhale through the left nostril. This is one round of nadisodhan pranayama.

It promotes balance between the two nostrils apart from the digestive fire and appetite. Brings the balance in sympathetic and parasympathetic nervous system. This helps in reducing the stress and stress hormones. Metabolic rate is reduced by experiencing calm and tranquil mind which keeps the blood sugar at normal level.

4. Sitali pranayama

PRACTICE

- Place the palms resting on the thighs.

- Stretch the tongue forward partly out of the mouth and fold it so as to resemble the beak of a crow.
- Slowly suck in the air through the beak and feel the jet of cool air passing down the throat into the lungs.
- Slowly exhale through the nostrils, feeling the movement of warm air all the way up from the lungs through the throat and the nasal passages.
- This completes one round of Sitali pranayama.

5. Sitkari pranayama

PRACTICE

- Place the palms resting on the thigh.
- Fold the tip of the tongue inwards horizontally. The folded tongue slightly comes out between the two rows of teeth and provides a narrow opening on both sides.
- Slowly suck the air in through the two sides of the tongue. Feel the cool stream of air diffusing throughout the mouth and throat into the lungs.
- Exhaled slowly through both nostrils. Feel the warmth of the exhaled air.
- This complete one round of sitkari.

BENEFITS OF SITHALI AND SITHKARI PRANAYAMA

Cools down the body, relaxes the mind. Good for mouth hygiene specially for diabetes.

6. Bhramari pranayama

PRACTICE

Sit in comfortable meditation asana. The spinal cord should be erects the head straight and the hands resting on the knees in chin or jnanamudras close the eyes and relay the whole body for as throat time. The lips should remain gently closed with the teeth. Chant 'MM' a few times and observe that your lips are closed, rows of teeth are separated the tongue is just behind the lower set teeth.

BENEFITS

The vibration and resonance of bhramari calms down the mind, which leads to the experience of no thought state of mind, which one realizes that it is a state of mind which is not depend on any out side object.

7. Deep Breathing:

Many people do not breathe properly and are unaware of this fact. Proper breathing profoundly improves our whole physical and mental well being. The breath is intimately connected with our state of health and improper breathing will often reflect various disturbances of body and mind. One can breathe with awareness and control the breathing process consciously or one can ignore it and breathe reflexively or unconsciously. If the breathe is unconscious, it falls under the control of the primitive parts of brain where emotions, thoughts and feelings of which we have little or no awareness become involved. In this way the regularity and the rhythm of the breath are disturbed and it flows in uncoordinated way, creating havoc in the body and minute.

PRACTICE

All the subjects were told to lie in shavasana and follow the instruction as spoken by the instructor:

- Become aware of your natural breathing process without altering the breath in any way.
- Be totally aware of the spontaneous and rhythmic flow of breath.
- Now, focus your awareness on the breath in your nostrils.
- Be aware that you are breathing through nostrils.
- Feel the breath entering the nasal passages and flowing up these passages. The breath feels cool as it enters the nostrils upon inhalation and warm as it flows out of the nostril upon exhalation.
- Continue observing this as a detached witness.
- Inhalation is the intake of cosmic energy for the growth and progress.
- It draws in the breath of life as carefully and gently as the fragrances of flower.
- Now, feel the passage of air in the pharynx behind the nostril; beware of the sensation created by this movement of breath.
- Also feels the breath at the back of the mouth, above the throat. Feel the breath flowing up and down to the throat region.
- The in breath is absorbed by living cell in the body, as water is absorbed in the soil.
- The energy of inhalation enters from the nose and is received by the causal frame or spiritual body. In inhalation the consciousness ascends from the navel (Manipur chakra) to the top of chest (vishuddhi chakra).
- Next, focus your awareness to the chest and lungs.
- Do not tense and jerk the dome of diaphragm, but keep it relaxes.
- Each pore of the skin of trunk should act as the eye of intelligence for absorbing prana.
- Keep the eyes closed and relaxed, but the inner vision active.

- Beware of the lungs expanding with each breath in and contracting with each breath out.
- The right method of inhalation removes sluggishness, stimulates and energizes the body and the mind.
- In exhalation, the source or the starting point is the top of chest, exhale slowly but completely till the breath is emptied at a level below the navel.
- As you exhale feel all the waste matter gathered up and expelled by the lungs. Be aware of expansion and contraction of rib cage with the breath.
- Exhalation is the art of calming the nerves and the brain.
- Do not force any movement.
- Bring your awareness down to the diaphragm and concentrate on the motion of diaphragm; it will feel as if it is moving downward as you inhale, and upward as you exhale.
- Do not stress but breathe deeply and become aware of whole breathing process from nostril to diaphragm.

The simplest way to relaxing any mental tension is through diaphragmatic breathing, in this there is slight movement of the lower rib cage, due to abdominal expansion. Deep breathing removes muscle tension and relaxes whole body thus provide proper oxygenation, nutrition to the deepest tissue.

MEDITATION

Practice of meditation is especially useful in management of stress. Initially meditation may be difficult, and one can practice Omkar chanting or concentration on breathing. The objective of meditation is to control the attention. You block out the outer world forgetting everything around you and submerge yourself in your inner world. It takes all the pressure from this world, which for most diabetics is centered on his or her problems and worries about

how the disease will affect the future. Concentration on pancreas during the meditation practice has shown positive effects on sugar levels thus curing diabetes. One can even usually visualize the proper functioning of pancreas, proper, insulin administration, proper insulin administration in the body can help in treatment of diabetes.

EFFECT OF YOGA THERAPY IN DIABETES

HOW DO YOGA ASANAS HELP IN DIABETES MELLITUS

In diabetes mellitus we use those asanas which bring deep rest to the pancreas and release the prana block. Hence the asanas used under special techniques for diabetes mellitus either stretch , compress or twist the abdominal area, so that we may pancereatis area ,focus and then defocus to give very deep rest to pancreas

CLINICAL RESEARCH ON THE BENEFITS OF YOGA PRACTICE ON DIABETES

“Many studies have reported the beneficial effect of the practice of yoga on diabetes. Some studies have mentioned up to 65 percent beneficial effect of yogic therapy for diabetes. K.N. Udupa has even mentioned 5 cases of juvenile diabetes who were completely controlled by yogic treatment. All of these studies have emphasized the possible mechanism of the yogic practices as:

1. Direct influence on pancreatic secretion by rejuvenation of the pancreatic cells, through alternate abdominal contractions and relaxation, during asanas (yogic postures which produce relaxation) and breathing exercises.

2. Reduction in blood sugar due to muscular exercise involved in the asanas.

- S.A.A. Ramaiah's study conducted in Washington, D.C. compared the effects of walking, treadmill, static cycling, Amarantha Kokkuasana (Sitting crane), Nindra Kokkuasana (Standing crane) and Vil asana (Bow pose, rocking, especially side to side). The most effective were found to be the latter. It was concluded that the direct stimulation of the pancreas by the postures rejuvenated its capacity to produce insulin.
- Several studies have focused upon why the practice of yoga has been more successful than other forms of exercise. M.V. Bhole and K.N. Udupa have measured the effects of yoga on mental stresses. Muhammad has shown the differences between physical exercises and yoga. He has reported how doing the yogic practices without exertion has more benefits.

The mechanism of yogic practices and other exercises is very different. Yogic practices are supposed to change one's attitude towards the situations of life, by developing mental relaxation and balance.

- One study focused on the practice of the postures in a slow, smooth and non-exerting manner. The postures were maintained comfortably and easily for a length of time and the patients were taught to focus on breathing or on some infinitely vast object like the sky or the ocean while doing the yoga posture. Two thirds of the patients were significantly benefited by this treatment. The others also showed improvement.

A number of institutions in India offer treatment programs for diabetes. Participants generally stay for between two to five weeks, and follow a program of instruction and practice of yoga asanas for at least an hour in the morning and the evening, dietary control, meditation and breathing exercises.”

(Marshall, G. et.al, 1988)

Yoga Lowers Blood Sugar in Diabetics

Certain yoga asanas, if practiced regularly, are known to have beneficial effects on human body. Researchers at the University College of Medical Sciences, in Shahdara, New Delhi evaluated 24 patients aged 30 to 60 years old who had non-insulin dependent diabetes mellitus, also called Type II diabetes. Diabetics who require insulin are called Type I, while Type II diabetics are treated with diet, exercise, and oral medicines that lower blood sugar. The researchers evaluated the baseline fasting blood sugar levels of the patients, and they also performed pulmonary function studies. These pulmonary function studies measure lung capacity and the amount of air that can be exhaled within the first second of a rapid exhale. After performing these basic tests, yoga experts gave

these patients training in yoga asanas. The yoga practice was done 40 minutes a day for 40 days. These asanas consisted of 13 well known and common postures, done in a sequence. After 40 days of yoga asanas regimen, the testing was repeated. The results indicate that there was significant decrease in fasting blood sugar levels from about 190 initially to 140 after the 40 day period of yoga activity. Fasting blood sugar in people without diabetes is usually below 120. The lung studies showed an average improvement of about 10 percent in lung capacity. These findings suggest that better blood sugar control and pulmonary functions can be obtained in type I diabetics when they stick to a daily schedule of yoga asanas and pranayama. The exact mechanism as to how these postures and controlled breathing interact with physio-neuro-endocrine mechanisms affecting blood sugar and pulmonary functions remains to be worked out.

(Sahelian. Ray, 2008)

Can yoga help? Scientists at Guru Tegh Bahadur Hospital, in Delhi, India, studied a group of 20 type 2 diabetic subjects between the ages of 30-60 years. Their aim was to see whether Yoga asanas had any effect on nerve conduction. The Yoga asanas included Suryanamskar Tadasan, Konasan, Padmasan Pranayam, Pavanmukthasan, Sarpasan and Shavasan. The Yoga exercises were performed for 40 minutes every day for 40 days in the above sequence. The subjects continued their normally prescribed medicines and diet. Blood sugar and nerve conduction velocity of the median nerve (in the hand) were measured and repeated after 40 days of the Yogic regime. Another group of 20 type 2 diabetes subjects of comparable age and severity, called the control group, were kept on prescribed medication and light physical exercises like walking. Their initial & post 40 days parameters were recorded for comparison. At the end of the 40 days, those who did the yoga had improved the nerve impulse in their hands. The hand nerve conduction velocity increased from 52.8 meters per

second to 53.8 m/sec. The control group nerve function deteriorated over the period of study, indicating that diabetes is a slowly progressive disease involving the nerves. The authors conclude that Yoga asanas have a beneficial effect on blood sugar control and improve nerve function in type 2 diabetics who have mild nerve damage. (Sahelian. Ray, 2008)

RECOMMENDATIONS REGARDING THE PRACTICE OF YOGA BY DIABETICS

1. The patient must learn to control and his or her self of diabetes in a holistic manner, at all levels of your being: physical, emotional, mental, intellectual and spiritual, recognizing the effects of stress, emotional imbalance, and dietary and living habits on the disease condition.
2. Before beginning a program, measure ones exercise toleration. Start with simple movements and positions before progressing gradually to complicated postures.
3. Throughout the program, monitor glucose levels and under the supervision of a physician, and take appropriate medicinal dosages as and when required. After several weeks one may be able to reduce such dosages.
4. Practice in the morning and the evening for 40 to 60 minutes the recommended series of postures according to ones capacity. Practice before meals, but after consuming glucid liquids.
5. Avoid exertion that is heavy muscular activity. Perform the movements slowly and smoothly, stretching the limbs and joints, and gently compressing the abdomen, without straining. Maintain the postures for a comfortable length of time. The maintenance period of postures should be increased gradually from

5 seconds to one minute, or even longer depending upon the posture and capacity of the patient.

6. Focus on the breath during the maintenance period of the posture, with the eyes closed or focused on one point, as a means of learning to focus the mind and to manage stress and tension in the body.

7. Perform the Shavasana, or complete peace relax pose on the back, systematically relaxing all of the parts of the body, at the end of the session, or after completing several postures, if one begins to feel fatigued.

8. The following postures have been found to be effective in the control and cure of diabetes :Dhanurasana (Bow pose), Paschimottanasana (Sitting crane), Padangusthasana (Standing crane), Bhujangasana (Serpent pose), Sarvangasana (Shoulder stand), Ardha-matsyendrasana (Spinal twist), Halasana (Plough pose), Yoga mudrasana (Yogic Symbol pose), Supta Vajrasana (Sitting pose of Firmness), Chakrasana (Wheel pose), Shalabhasana (Grasshopper pose,).

9. The practice of Udiyana bandha, or the abdominal squeeze has also been found to be useful.

10. Regulate the diet throughout the program. Avoid simple sugars such as white sugar, honey, glucose and sweets. And eat complex carbohydrates such as wheat, oatmeal, buckwheat, corn, brown rice and beans. Avoid processed food and eat foods with lots of fiber and nutrients.

11. Obese patients can start with different asanas, cleansing processes, bhasrika pranayama and relaxation. Lean and thin patients should start with relaxation and pranayama, and practice in a relaxed manner.

12. Meditation practices have been shown to help the endocrine glands through relaxation of the sympathetic nervous system.” (Marshall, G. et.al ,1988)

Western medical research has focused upon diabetes as only a physical disorder, requiring only physical modalities of intervention. It has been able to confirm that regular physical exercise does have some beneficial effects in diabetics of both types, and that in those who are genetically predisposed to type 2, it could prevent its development. Western studies have recommended exercise of moderate intensity, as a means to adopt a regular diet and insulin dosage, or to control body weight and improve circulation.

Professor Vipin Mishra of GSVM Medical College, Kanpur will deliver a lecture on the subject ‘**Yoga is beneficial in the management of diabetes**’ at the UPDACon-2006, organized by the Kanpur Diabetes Association at International Convention Centre, Kanpur University.

He claimed anyone practicing yoga since childhood could avoid the diseases like diabetes. He said presently there were about 2.5 lakh diabetes patients in Kanpur. If they follow a good yogic regimen they would surely be benefited from the disease.

Yoga can surely control the secretion of sugar in the human body, some Asans like Ardh Mastyendra Asan, Bhujang Asan, Pashchimotthan Asan, followed by Pranayam and morning walk could do wonders in the management of the disease.

Regular practice of yoga does reduce blood sugar levels, the blood pressure, weight, the rate of progression to the complications, and the severity of the complications as well. The symptoms are also reduced to a great extent, so

number of diabetes related hospital admissions. The quality of life questionnaires do reveal a remarkable improvement in the scores. These findings are uniform for all those who are trying to find effect of yoga on diabetes.”

As everyone knows, glucagon secretion is enhanced by stress. Yoga effectively reduces stress, thus reducing glucagon and possibly improving insulin action. Weight loss induced by Yoga is a well-accepted mechanism. Muscular relaxation, development and improved blood supply to muscles might enhance insulin receptor expression on muscles causing increased glucose uptake by muscles and thus reducing blood sugar.” Blood pressure plays a major role in development of diabetic and related complications, which is proven to be benefited by Yoga. The same holds true for increased cholesterol levels, yoga also reduces arteriosclerosis, and it is even effective in blockade of arteries.

Yoga reduces adrenaline, nor-adrenalin and cortisol in blood, which are termed as ‘stress hormones’. In this way, patients are benefited the practice of Yoga.

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