

Understanding Diabetes Mellitus

Diabetes is fast increasing in the Bhutanese community. The case is same in all developing countries. India and China, the two giant neighbours of Bhutan rank first and second respectively in diabetes case load in the world.

Diagnosis of diabetes often comes with uncertainty, and cause fright and unnecessary despair in the family. One must understand that one is lucky because the disease is diagnosed. There are many people who are living with the disease undiagnosed. Early diagnosis and proper care averts life threatening complications from occurring.

Unlike many other disorders, diabetes requires active involvement of the patient and family members in it's management. Hence it is important for them to understand the disorder and actively participate in its management.

This brochure is to help the readers better understand “diabetes mellitus” and to provide basic information and skills to appropriately manage the disease. This brochure gives broad general guidelines on management as well as self care of diabetes. However, if the information in the brochure varies from what your doctor tells, please follow the instructions of the doctor.



Diabetes Mellitus

1.1. What is diabetes

Diabetes is a metabolic disorder. It is said to occur when blood glucose remains high for a good period of time. Among normal people fasting plasma glucose remains less than 100mg/dl and two hours after taking food, it rises to less than 140mg/dl. If glucose concentration is detected to be more than 126mg/dl while fasting for 8 to 14 hours and /or 200mg/dl or more 2 hours, after taking 75gm of glucose, then a person can be diagnosed as a diabetic. The person probably is having diabetes if random blood sugar is >200 mg/dl. It is a disease influenced both by genetic and environmental factors. In rare cases a few other diseases or infections cause diabetes.

1.2. Diabetes is NOT an infectious or contagious disease

For want of energy and strength one needs food based on carbohydrate, protein and fat. In a diabetic patient, carbohydrate and other food are not utilized properly. It is due to inactivity or lack of proper supply of a hormone, named insulin for metabolic assimilation of carbohydrate, protein and fat. Insulin is produced inside pancreas, an organ lying just under the liver.

It must be understood that diabetes is not an infectious or a contagious disease.

1.3. Symptoms of Diabetes

Following are some common symptoms that make one suspicious of diabetes. However, most diabetes, especially in elderly,



do not have any symptom or sign and are detected during routine blood examinations.

- a) Repeated urination
- b) Excessive thirst
- c) Usually high appetite
- d) Emaciation even after taking ample food
- e) Tiredness and fatigue
- f) Skin disease
- g) Rapid loss of eyesight
- h) Poor healing wounds

1.4 . Physical conditions that predispose one to developing diabetes

Following are some physical conditions that predispose one to developing diabetes

- a) Being overweight or fat
- b) Pregnancy
- c) Mental stress
- d) Physical stress like injury, wound, surgery.

1.5 Who Gets Diabetes

Anybody can develop diabetes, but following types of persons are prone to developing it.

- a) Those who have diabetes in their family-father, mother or any blood relative
- b) Those who are overweight, and
- c) Those that do not exercise or perform less or no physical labour.



Understanding Diabetes & Self Care guideline

- d) Those that have impaired fasting glucose of 111 to 125 mg/dl (IFG)
- e) Those who have impaired glucose tolerance, 2 hours after ingestion of 75 grams of sugar, plasma glucose are 141 to 199 mg/dl (IGT)

1.6. Is Diabetes Curable

Diabetes is a lifelong disease. **“Once a diabetic, always a diabetic.”** However, it can be kept well under control, if proper instructions and advice of health workers are followed. A disciplined diabetic can lead a near-normal, active and happy life.

1.7. Types of Diabetes

Diabetes can be classified primarily into following three categories:

- a) Type 1 diabetes: Insulin Dependent Diabetes Mellitus
- b) Type 2 diabetes: Non-insulin Dependent Diabetes Mellitus
- c) Gestational Diabetes Mellitus (GDM)

1.7.1.Type 1 Diabetes

Type 1 diabetes is caused by destruction of body’s insulin-producing cells in the pancreas. Type 1 diabetes patients have to take insulin externally, because insulin is not produced in their body. Generally, persons below 30 years of age belong to this group. Their body is lean and thin. Ketones are sometimes traceable in their urine.

Type 1 diabetes can occur at any age, though it develops most often in children and young adults.



- Symptoms usually appear suddenly.
- About 5 percent of people with diabetes have Type 1 diabetes.

Symptoms and signs

- Frequent urination
- Extreme hunger and thirst
- Weight loss
- Weakness and tiredness

1.7.2. Type 2 Diabetes

Type 2 diabetes generally occur in persons above 30 years of age. Type 2 diabetes has several causes. Heredity, age and weight are important contributing factors. Most people with Type 2 diabetes make enough insulin, but are not able to use it properly. Weight loss and exercise can often improve this problem. Type 2 diabetes can develop very slowly.

One may experience only mild symptoms, or have no symptom at all. One can have diabetes for several years and yet not even know it.

- About 90 to 95 percent of people with diabetes have Type 2 diabetes
- Type 2 diabetes usually develop slowly.
- Most people with Type 2 diabetes are overweight and are over 40 years old.

Symptoms and signs

- Feeling tired/Weight loss
- Blurred vision
- Dry, itchy skin



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- Increased hunger and thirst
- Increased urination
- Tingling or loss of feeling in hands or feet
- Non-healing infection of skin, vagina and or bladder (UTI),
- Sexual dysfunction
- Often no symptoms is present when Type 2 diabetes is diagnosed.

1.7.3 Gestational Diabetes Mellitus (Diabetes in Pregnancy)

Gestational Diabetes Mellitus (GDM) is diabetes that develop during pregnancy. It manifests mainly in the later half of pregnancy. However, it will revert to normoglycemia after completion of pregnancy. Pregnant women face increased risk of congenital malformation of their fetus and complications and even death affecting both mother and fetus. It is managed with diet, and insulin. All women must be checked for diabetes in the sixth month of pregnancy (24-28 weeks). If gestational diabetes is diagnosed, one should follow up with ones physician till the end of pregnancy.

- Approximately 2 to 3 percent of all women who become pregnant develop gestational diabetes.
- Gestational diabetes is more likely to occur in women who are overweight and or are older.
- About 35 percent of women who develop gestational diabetes will later develop Type 2 diabetes. Maintaining a healthy body weight decreases the risk.

1.8 Impaired Glucose Tolerance (IGT):

In some people, blood glucose is higher than in normal person, but is less than a diabetic. Such a condition is termed Impaired



Glucose Tolerance (IGT). In an IGT patient, blood sugar following 2 hours of intake of 75 gm glucose ranges between 141 mg/dl to 199 mg/dl. IGT patients should abide by all the regulations of a diabetic, because they can face the same complications as diabetes. At least 30% of IGT patients convert to being diabetic at a later period.

1.9. Impaired Fasting Glucose (IFG):

Some people have fasting glucose of 111 to 125 mg/dl. This is termed impaired fasting glucose. These people have increased risks of developing all complications of diabetes than those who have normal fasting glucose and they must follow same life-style measures like a diabetic.

Type 2 Diabetes

What happens:

- In some people, pancreas starts to produce less insulin which impair blood sugar from entering cells for its utilization. Usually, insulin resistance make it more difficult for blood sugar to enter the body's cells. Body can't use Insulin effectively. Eventually, Insulin producing cells tire out and can no longer perform properly. This is when glucose level rise and diabetes develop.

Type 1 Diabetes

What happens:

- The body destroys insulin - producing cells in the pancreas resulting in inability to produce insulin



Who develops it?

- Generally people who are over 40 years and are significantly over weight

Risk factors to develop Type 2 Diabetes:

- Family history of diabetes
- Lack of regular exercise
- History of gestational diabetes or giving birth to a baby weighing more than 4 kg
- High blood pressure and or high concentration of fat in blood

Treatment

- Diet and exercise
- Many people need oral medication.
- Only some need Insulin

Who develops it?

- Generally children or young adults (<30 years) but can occur at any age.

Risk factors to develop Type 1 Diabetes

- Immediate family member with Type 1 diabetes

Treatment

- Diet, exercise
- All patients need insulin



Short term and life threatening complications of Diabetes

Diabetes can result in life threatening short term complications. Diabetes patient may present with sudden loss of consciousness. This may follow an array of symptoms and situation. Loss of consciousness in diabetic could either be following too low blood sugar thereby resulting in hypoglycemic coma or too high blood sugar culminating into diabetic ketoacidosis. Both these conditions are emergencies and the patient must be taken for physicans care immediately.

2.1. Hypoglycemic coma

Insulin injection and oral tablets are prescribed to reduce sugar in blood in a diabetic person. However if sugar falls down rapidly, it is known as hypoglycemia. This may result in following symptoms:

1. Blurring of vision
2. Excessive appetite or hunger
3. Palpitations
4. Shivering of body
5. Excessive sweating
6. Unsteadiness of limbs
7. Unusual behavior/attitude, and
8. Loss of consciousness/coma.



All patients taking oral hypoglycemic agents or insulin must be aware of these features of this complication. One must take medicines in time which must be followed by food.



2.1.1. Why and how these symptoms are encountered

1. If dosage of medicine (tablet or insulin) is higher than that required for food eaten
2. If intake of food is insufficient
3. The patient does not take food after medicine is taken
4. If patient delays taking food long after taking insulin,
5. Excessive physical labour or exercise is done.

2.1.2. What must be done if hypoglycemia is encountered

When above symptoms are encountered, the patient should immediately mix 4 to 6 tea-spoonfuls of sugar into a glass of water and drink it. One may take a glass of fruit juice, couple of pieces of sweet biscuits, hand full of sugar or some sweet fruits. This should be followed by a meal. If the patient is comatose, he/she should be taken to a hospital. He/ she requires intravenous 25% glucose immediately.

2.2. Diabetic ketoacidosis: Diabetic Coma

Patient dependent on insulin may encounter diabetic coma. When a patient takes lower dose of Insulin or forgets to take Insulin in time, does not take Insulin deliberately or encounters physical stress like infection, his/her blood sugar rises. Due to lack of Insulin, sugar in blood can not be utilized properly. The body tries to use its own stored fat, but due to improper assimilation of fat, some harmful chemicals, named ketones, form and accumulate in blood. Consequently, the patient becomes delirious and lapses into unconsciousness. Acetone also accumulates in the body and is passed in urine. This condition is called Diabetic Coma.



2.2.1. Why does blood sugar rise

Blood sugar rise due to any of the following factors:

- 1) If more food is taken than prescribed diet
- 2) If physical labour or exercise is not done adequately
- 3) If Insulin is taken at a reduced dose or it is not taken at all
- 4) If oral medication is not taken
- 5) If there is attack by any infectious disease or virus, the patient is in severe physical or mental stress, and or
- 6) Insulin treatment is discontinued due to other treatment.

2.2.2. Symptoms of Diabetic Coma:

Following are some signs and symptoms of diabetic coma:

- 1) Excessive and repeated urination
- 2) Excessive appetite and thirst
- 3) Sickness and fatigue
- 4) Weakness
- 5) Headache
- 6) Blurred vision
- 7) Drowsiness
- 8) Nausea
- 9) Rapid rate of breathing
- 10) Collapse
- 11) Smell of acetone in breath,
- 12) Unconsciousness
- 13) Seizures

As soon as one or more of these symptoms are present, the patient should immediately be taken to a hospital and managed by a physician.

This is a medical emergency.



Long Term concerns

Severe complications may arise from uncontrolled diabetes over a period of time. Long term complications that are encountered due to poor diabetes control are blindness, paralysis, heart disease, kidney failure, tuberculosis, loose motion, inflammation of gums, sexual dysfunction, severe infections and skin disease.

People with diabetes are living long and more productive lives than ever before. Research has provided more and better treatments for various complications of diabetes. The longer someone lives with diabetes, greater the chance of developing long-term complications. High blood glucose level contributes to long-term diabetes complications because it damages both small and large blood vessels. Also, high blood glucose levels cause inside wall of blood vessels to thicken. Over a period of time, small vessels of kidneys and nerves, and large vessels of heart, head, arms and legs, can become so damaged that oxygen and other nutrients cannot reach the areas in need. Besides these, complications of delivery, birth of unusually large baby, premature birth, still-birth, neonatal death and different birth defects, infections of diverse kind including tuberculosis are encountered. A diabetic should control his/her body weight, along with controlling the disease. High blood pressure must be controlled meticulously. Complications of diabetes and hypertension are additive, hence overall complications are markedly increased.



A person with diabetes may be more likely to have:

- A heart attack or stroke
- Impaired vision and blindness (retinopathy)
- Decreased circulation (peripheral vascular disease)
- Foot problems and amputations
- Nerve problems (neuropathy)
- Kidney disease
- Frequent infections
- Sexual problems including infertility and impotence

Ongoing preventive care and good blood glucose control will delay or prevent long-term complications.

3.1. Heart and Blood Vessel Problems/Stroke

Diabetes greatly increases risk of development of changes in blood vessel. These changes may lead to heart attack, stroke or may impair blood flow in the legs and feet.

Signs that are indicative of stroke include:

- Loss of consciousness
- Feeling dizzy
- Sudden loss of sight
- Slurred speech
- Feeling numb or weak in arm or leg of one side of body

Following symptoms may be caused by serious heart problem:

- Chest pain or pressure
- Shortness of breath



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- Swollen ankles
- Irregular heart beat

If one has any of the above signs, one should immediately go to an emergency room. Pain or cramping in calves, thighs or buttocks during walking that goes away with rest suggests bad blood flow in the legs. One should inform the doctor about the appearance of symptoms. They may require further investigation or treatment.

3.1.1. To prevent and treat heart and blood vessel problems one should

- Control blood glucose
- Cease or never start smoking
- Control blood pressure
- Check lipids annually (Cholesterol and Triglyceride). High levels of these require treatment
- Reduce weight, if over weight
- Exercise regularly. If one has heart or blood vessel problems, one need special medical advice on physical activity (strenuous exercise may be dangerous.)
- Decrease intake of alcohol

3.2. Eye Disease: Retinopathy

Over time, uncontrolled diabetes can cause permanent damage to small vessels of eye, especially back of eyes (retina). This damage is called retinopathy.

In its early stages, retinopathy doesn't affect vision. As damage gets worse, blood vessels can leak and if left untreated, can eventually cause blindness. New weak vessels form. Blood leaks from



these weak vessels and it can result in blindness. Retinopathy can be treated by using laser therapy and surgery to seal off leaking vessels and remove blood blocking retina.

3.2.1. To reduce chances of developing retinopathy

- Have annual eye examination done by eye physician. Report any change in vision. Hyperglycemia can cause blurred vision. This is usually temporary and will clear up in 4 to 6 weeks with better blood glucose control.
- Early treatment can prevent or delay vision loss.
- Keep blood pressure under control.
- Do not smoke.
- Check blood glucose regularly and keep it under control.
- Notify doctor and ophthalmologist for any change in your vision.

3.3 Nerve Damage (Neuropathy)

Nerves affect all body functions. Diabetes can damage nerves by injuring the covering of nerves causing a condition called neuropathy. Keeping blood glucose close to normal prevents nerve damage. Regular physical exercise also helps to keep nerves healthy. Systems of body affected by neuropathy include:

- **Feet and legs:** Feet and legs are the most common areas affected by neuropathy. Symptoms of nerve damage to feet and legs include numbness, burning, loss of hot/cold sensation, tingling, pain and cramps.
- **Digestive and Urinary tract:** Damage of nerve to stomach, intestines or bladder can cause constipation, diarrhoea, nausea, vomiting and inability to urinate properly.



Understanding Diabetes & Self Care guideline

- **Blood pressure:** Nerve damage can prevent blood pressure from rising as it should when one changes body positions. Sudden low blood pressure can cause dizziness.
- **Sexual Organs:** When small blood vessel and nerve to sexual organ are damaged, man may experience impotence and women, vaginal dryness and loss of sensation. Good long term control of blood glucose can help prevent or reduce diabetes related sexual problems.

The health worker should test neuropathy once every year. There are ways to treat diabetes nerve damage. Some medicines are available but it is most important to keep blood glucose under good control.

3.4 Kidney Disease: Nephropathy

Kidneys filter waste products from body into urine which is excreted. Diabetes cause small vessels in the kidneys to thicken, resulting in kidney damage (nephropathy). Damaged kidney cannot filter body's wastes effectively and these waste begin to build up in body causing illness. Eventually, damaged kidneys may fail, making it necessary to have dialysis and / or a kidney transplantation.

3.4.1. Signs and Symptoms of Kidney problems:

- Early morning swelling around eyes
- Swelling of legs
- High blood pressure
- Protein in urine



Kidney damage can be effectively prevented by controlling blood glucose and blood pressure. If the health worker tells that some damage to kidney has occurred, one can still do quite a lot to preserve the remaining kidney by meticulously controlling blood glucose and blood pressure.

Bladder or kidney infections should be treated well. If one has symptoms of urine/bladder infection (cloudy urine, bloody urine, frequent urination, pain and burning during urination, back pain, fever with chills) contact a health worker immediately.



Other Health Issues in Diabetes Mellitus

4.1 Smoking

People with diabetes are particularly predisposed to harmful effects of tobacco. Quitting smoking is the single most effective way to improve your health and make your life longer and healthier. “Quit it straight away”. It may be easy if you really want it, otherwise you may ask your doctor to help you; there are a number of effective methods to support you in quitting this bad habit.

4.2 Hypertension

As hypertension (too high blood pressure) occurs more often and is especially risky for people with diabetes, one should check blood pressure regularly. Ask the health worker to measure it during each visit to the clinic.

If blood pressure exceed 140/90 mm Hg on more than two occasions, treatment should be instituted. Relatively simple methods may help to keep blood pressure at a desirable range (reduction of alcohol and salt intake, weight reduction and regular exercise). If those methods are not effective, ask the health worker’s opinion on institution of drug treatment.

4.3 Obesity

If one is overweight or obese (see attached weight chart) gradual decrease of body weight will help to keep your glucose at a de-



sirable range. The program should be started in consultation with the health worker. Remember that it is not difficult to lose few kilograms. It is much more difficult to keep weight at a reduced level for long time. Therefore continuous, regular physical exercise and low calorie diet should be introduced and maintained indefinitely. Initial setting of realistic goals and putting a reasonable time-frame is very important.

4.4 Pregnancy

If one is a diabetic and planning pregnancy, one should consult the health worker well before hand to adjust treatment. Keeping your glucose level close to normal, both before and then throughout pregnancy, is essential to assure uncomplicated delivery of a healthy baby. If good control cannot be attained by means of diet alone, Insulin should be instituted. No oral diabetes medicines are allowed during pregnancy. As pregnancy can cause both high and low blood glucose levels, frequent monitoring is essential. If pregnant, one should not use non-nutritive sweeteners like aspartame or saccharine.

4.5 Special Problems in Women

Women with diabetes may have more frequent bladder problems. The usual symptoms include cloudy or bloody urine, pain or burning during urination, itching around private part and need to urinate often. If you are having such symptoms, consult the health worker as this will need treatment.

Yeast infections of vagina that manifest with itching in the vagina occur more often in diabetic women and should be treated.



Understanding Diabetes & Self Care guideline

Trouble with sexual function like vaginal itching and dryness can be treated. Do not forget to make regular breast and Pap smear examination.

4.6 Alcohol

Alcohol is a major risk factor for causation of several non-communicable diseases. Prolonged use of alcohol result in permanent damage of liver, heart, brain and nerves, insulin producing cells in pancreas, cause ulcer of stomach and several kind of cancer in different parts of body. Alcohol is also the commonest cause of intentional as well as non intentional injury and accident.

Alcohol brings unfathomable woes due to social disruption and economic losses in the family. Alcohol is an important contributing factor of causation of Type 2 diabetes.

Do not initiate drinking alcohol if you are a non-user. Stop alcohol if you have been using it already. Support those who are trying to quit alcohol. Quitting alcohol does many good to you and your family.



Principles of Diabetes Management

Diabetes is a life long disorder. Diabetes can not be cured. However, it can be kept under control. Diabetes can be controlled by a combination of five different activities

1. Education
2. Diet modification
3. Drug (Medication)
4. Physical activity
5. Discipline

5.1 Education:

This requires the patient as well as family members understanding the disease very well and actively participating in its daily management.

Hence it is vital for all diabetic and their family members to learn about the illness and help to support the diabetic in making several life-style changes that are required of him/her.

A well informed and motivated patient can (a) learn methods of controlling the disease well, (b) accept changes in his/her life style, and (c) cope with any unwanted complication and emergency.

It is very important for a diabetic to understand that balance of physical activity that utilize calorie, appropriate diet and regular medication, which is tailored to individual need, is of vital



importance in keeping blood sugar and diabetes under control. It is of equal importance that keeping blood sugar under control prevents or delays life threatening as well as “difficult to manage” complications of the disease.

5.2. Diet:

Diabetics need same food as when diabetes was not contracted. A diabetic will need to take nutritionally well balanced diet with some regulations to maintain health. The goal is to keep body healthy and to maintain blood glucose level within normal range.

5.2.1. Principles of diet are:

- **Body weight:** It must be reduced if one is fat, maintain present weight if it is normal, one require gaining weight if one is thin. Maintain body weight as near as ideal weight for height and sex.
- **Eat diverse food:** Eat a variety of food. Eat more fiber-rich food (leaves, vegetables with skin, salad without dressing, lentils etc.)
- **Free food:** Follow the list of food mentioned as food that are not restricted (can be taken freely). These food are clear soup, salad without dressing, green leaves, “dau” etc.
- **Food that can be used in moderation:** Take limited or advised amount of carbohydrate food (cereal and other starchy food) root tuber, pulse, fruit and egg.
- **Food that need to be avoided:** Take less saturated fat (fat from food of animal origin), butter, ghee, chocolate, jam, jelly, honey and other sweet.
- **Drink sugar free:** Avoid sweet in any form. One can use non-caloric sweetener like saccharine. Do not add sugar to tea or coffee.



- **Reduce salt intake:** This help to control blood pressure. Use less salt while cooking. Avoid tinned food that contain extra salt as well as pickle.
- **Choose food prepared by healthy cooking method:** Grilled, steamed, baked, poached and barbecued or boiled.
- **Eat regularly:** Food should be distributed as even as possible throughout the day (three main meals and atleast two in-between snacks). Do not skip meal.
- **Restrict alcohol:** Restriction of alcohol is important. Do not substitute alcohol for meal and never drink in empty stomach. Alcohol produces calorie (1gm yield 7 calorie) but it is not food and it is not helpful in nutrition. Alcohol drinking has its effect on low blood glucose. It can mask the usual signal of hypoglycemia.

5.3. Drug (Medication):

All diabetics must control diet and be disciplined in maintaining diet and life-styles. Many diabetics, especially older patients may keep their diabetes under control only by regulating their diet and maintaining a disciplined life-style. However, Type 1 diabetics have to take insulin in addition to diet control and maintaining disciplined life. Type 2 diabetics who are not controlled on diet and exercise will need oral medicine for their control. Some of them may need insulin.

5.3.1. Oral Medications

Type 2 diabetes require intake of medicines called oral hypoglycemic agents used to lower blood glucose. Oral hypoglycemic agents help pancreas produce more insulin and make the body's cells more sensitive to its own insulin. However, some Type 2 diabetes may need insulin.



When taking oral diabetes medicine:

- Follow doctor's instructions. Take only prescribed dose, never more. Follow prescribed schedule.
- Balance meals and physical activity. Not enough food or too much physical activity can cause blood glucose level to drop too low.
- Keep a record of medication.
- Ask doctor about drinking alcohol. Some oral medicine may cause uncomfortable symptoms when mixed with alcohol.
- Visit your doctor before your medicine stock is exhausted.

5.3.2. Insulin

If adequate control of diabetes can not be achieved by means of diet and physical exercise alone, the health worker may prescribe insulin injection. Type 1 diabetes always require insulin injection whereas Type 2 require oral medication alone or in combination with insulin injection. It is important to know how and when to take medicine as well as how to regulate dosage of insulin. It is recommended that diabetics on insulin monitor their blood sugar at home. They can learn to adjust the dosage of insulin according to blood sugar level.

Insulin Facts

Insulin is a hormone body needing to convert sugar, starch and other food into energy for daily living. There are different types of insulin and schedules that can be used. It is important that people who take insulin understand how insulin works, what factors affect its action and what schedule will work best for them.



- Every one must have insulin to survive. Insulin normally is released by healthy pancreas in adequate amount.
- People with Type 1 diabetes make little or no insulin, so they need daily insulin injection.
- Many people with Type 2 diabetes still make insulin, but are unable to use it well. They may need insulin to control glucose.
- To date, insulin can successfully be given only by injection or insulin pump.
- Most people who need insulin take two or more injections per day and use more than one type of insulin (plain and lente, for example)
- Now a days mixed insulin are made available to our patients.
- Absorption rate of insulin varies in different area. It is recommended that injection site be rotated. The abdomen (belly) is the most recommended site.

Do not massage the injected area

5.3.3. Method of increasing and reducing dose of insulin

Ordinarily dose of insulin, should be increased or decreased according to the advice of doctor. Patients themselves can increase/decrease their insulin by a small amount of 2 units in each injection depending on previous day blood sugar level. Insulin injection should not be stopped totally without consulting the doctor.

5.4. Exercise:

Exercise or physical work is very important in controlling diabetes. Exercise relieves stiffness of limb and muscle and helps enhancing circulation of blood. Exercise keeps body fit. It enhances action



Understanding Diabetes & Self Care guideline

of insulin and stimulates insulin secretion. Walking for at least 60 minutes everyday is a necessity for diabetics.

Exercise Overview

Exercise boosts fitness level while reducing blood glucose and blood pressure. Regular physical activity is essential for good health. Consult health worker before beginning a new program, especially if you are 40 years or have had diabetes for 10 years or longer

Exercise

- Helps body to use insulin more effectively.
- Can lower blood glucose level.
- Strengthens heart and lungs
- Reduces body fat and increases muscle bulk and strength
- Assists with weight control
- Helps cope with stress
- Improves self-image
- Helps in reducing risk factors of heart disease
- Lowers blood pressure

Alternate exercises are dancing, swimming, aerobics, gardening, playing golf, archery, “khuru” etc. Choose an activity that you enjoy. Most importantly exercise regularly. Start with a little and add extra minutes gradually.

5.5. Discipline:

Discipline is the key to diabetes management. A diabetic must maintain discipline during his/her entire life.



- a) Take balanced food regularly and adequately
- b) Exercise regularly and adequately
- c) Abide by the health worker's instruction
- d) Keep body and environment clean and healthy
- e) Take good care of feet.
- f) Avoid sweet, sugar, honey and all food sweetened with sugar or honey
- g) Do not stop diabetes treatment without consulting the health worker
- h) In case of any physical problem, inform the health worker

5.6. Stress Management

Reducing stress can lower blood glucose and blood pressure and improve overall health. Some relaxation tips to help reduce stress are:

- Schedule relaxing activities into your day. Try reading a book, working in garden, watching movie or hiking
- Exercise regularly
- Laugh, laughter is an excellent stress reducer
- Rest is important. Your body needs plenty of sleep
- Follow diabetes care routine

5.7. Blood glucose examination at home (self monitoring)

Urine examination for sugar gives a rough estimate of blood sugar. In some cases, urine remains sugar free even when blood sugar is fairly high. Therefore, for proper evaluation of diabetes control, blood sugar estimation is essential. Nowadays one can measure ones blood sugar sitting in the drawing room or in the office by



Understanding Diabetes & Self Care guideline

pricking ones finger with a needle, and getting a drop of blood by the use of a glucometer and glucostick. The whole process takes about two minutes.



Frequent self-monitoring is the key to manage your diabetes. Record all results for your doctor to go through them when you visit next time. Ask the health worker how frequently he wants you to estimate your blood sugar.

5.8. Targets for diabetes control

Parameter	Good	Fair	Poor
Fasting Blood glucose (mg/dl)	80-110	111-140	>140
Sugar 2 hours after food (mg/dl)	80-140	141-199	>200
Urine sugar	Nil	+	++
Blood Pressure (mm Hg)	<130/80	136-140/ 81-90	>140/90

Keeping your blood glucose level as close to normal as possible reduces the risk of complication in eyes, kidneys, nerves and the heart.

For tight control, as in Type 1 cases, blood sugar may have to be examined five times daily. For Type 2 diabetics, two sample examination may suffice. One should try to keep fasting blood



glucose below 100 mg/dl and random blood glucose below 140 mg/dl.

Examination of blood for Haemoglobin A1 C:

This is a new test and is very useful because it shows an average blood sugar level of the last three months in contrast to blood sugar estimation which shows blood sugar of one day only and that too for a particular time. This test is getting very popular nowadays. Normal blood HbA1C is less than 6% for diabetics and reading of less than 7% can be considered fair control.



Self care in Diabetes Mellitus

6.1. Sick days

Illness, such as cold or flu, can cause serious problems with diabetes control. Because every one reacts differently to illness, talk to the health worker about the best way to manage when you are sick.

Follow sick day guidelines and see the doctor when:

- Blood glucose is over 240mg/dl
- You cannot eat
- You have persistent vomiting or diarrhoea
- Your fever persist longer than 24 hours.
- Take your usual dose of regular insulin or oral medicine. You may need extra dose of regular insulin to keep blood glucose under control.
- Check your blood glucose every 4-6 hour and record result.
- Check your temperature four times a day.
- Drink plenty of calorie-free liquid (200-300ml per hour)
- If you are vomiting, sip about 100 ml of juice or regular soft drink.
- Eat your regular meal.
- If you cannot eat your meals, drink regular liquid (with sugar) and replace meal with food that are easy to digest such as “*thuep*”, slice of bread, soup, hot cereal, juice, milk, egg etc.



6.2. Mouth and Dental care

Care of mouth and teeth are very important for diabetics. One should brush one's teeth every day after breakfast and before going to bed. After brushing, gums should be massaged for one minute. If there is a cavity in the teeth or a black spot or if there is



bleeding from gums consult a dentist immediately. **Avoid taking betel nut and tobacco.**

- Tightly control blood glucose level.
- Brush and floss daily. Use a soft-bristle brush in circular motion
- Tell your dentist you have diabetes and ask for dental care advice.
- Check with your doctor before being treated for advanced dental problems.

6.3. Foot care

Nerve damage, narrowing of blood vessel, high glucose level and infection can lead to serious foot problem, including infection culminating in amputation. Diabetic foot problem include ulceration, deep wound, spreading infection and gangrene that often result in amputation. Diabetic foot is the commonest non-traumatic reason of amputation of foot.

Regular foot care is the best prevention.



6.3.1. What should diabetics do regarding foot care

- Inspect your feet (top, bottom and between your toes) daily for presence of scratch, crack, cut, blister, corn and callosity. You may use a mirror or ask a family member to help you.
- Wash your feet every day in lukewarm water, dry them carefully using a soft towel (also between the toes.)
- Before washing your feet, check water temperature with your elbow (too hot water may injure your feet)
- Apply thin coat of lubricant (oil, lotion or cream) if your skin has a tendency to dryness (but do not put it between your toes)
- Always keep your feet dry
- Trim your toe nails after washing your feet (it is safer to cut nails when they are soft)
- Wear shoes that fit well. Shoes should be comfortable at the time you buy them. Slowly break in new shoes by wearing them one or two hours a day.
- Wear shoes and socks at all times (cotton or wool socks are the best)
- Change shoes often
- Do not wear wet and dirty stockings
- Inspect your shoes, both inside and outside, before putting them on (search for loose object and rough area).
- Do have your feet examined by a health worker at every visit to the clinic (at least four times a year). As a reminder, take off your shoes and socks when you are in the examination room.

Prevention of serious foot problems depend on the patient. Appropriate foot self-care can prevent most amputation in people with diabetes.



6.3.2. What should diabetics not do

- Do not walk barefoot, even at home.
- Do not cut corn and callosity (you may gently use a pumice stone to rub them but better ask your health worker's opinion)
- Do not cut your nail into the corners.
- Do not leave sharp edge of nail
- Do not use hot water bottle, heating pad or electric blankets, as these can burn your feet.

6.4. Now I can manage my diabetes myself !!!

You can do a lot about your diabetes. Obviously, you still need advice and treatment from doctor, health educator and nurse. But it is your every day way of life that determines the course of your diabetes and your future. So try to influence your everyday life-style. This will make a difference for today, tomorrow and future years. By knowing about your disease and involving actively in its care, you can positively influence your own life and lives of other members of your family.



Planning Diet

Regular diet intake is one of the basic principles of treatment of diabetes. Simultaneously, proper nutrition that is well balanced meal is necessary to maintain good health. A variety of food in proper amount will provide all nutrient you need. Your doctor, diabetic nurse, dietician or other health worker will help you in planning your meal.

General rules you need to follow:

- Take your daily meals on time
- Take small amount of food in between your regular meals, limiting within your daily food allowance. Eat 5-7 times in a day.
- Eat same amount of food regularly
- Never skip a meal or do not eat more than what had been advised
- Avoid sugar in all form
- Ask your doctor about taking alcohol.

7.1. Sick day meal

If you are not able to eat your regular food, you should not fast; you should take a glass of milk with some cereals, “*thuep*” etc. at every meal time. Add fruit juice in your diet. If you are on insulin or tablets and if you are not able to eat your meal, you should stop insulin or tablets to avoid hypoglycemic reaction. Consult your doctor immediately.

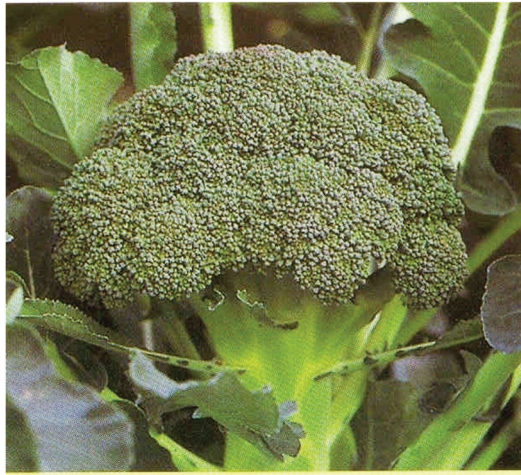


7.2. Food exchange programme

Your dietician, diabetes nurse or doctor will prepare your daily meal plan and will advise you to follow the same. The same food items need not be taken everyday. Food exchange list help you to find alternatives. However item of food can be replaced by another food of the same kind. First try to remember that there are seven food groups.

7.3. Category of food

Food is grouped into seven categories. They are **starch/ carbohydrate, vegetable, fruit, fat/oil, meat, “datchi” and milk.** Each category of food has different items. These items are included according to its availability in the Bhutanese cuisine. Food among the same category can be interchanged according to personal liking.



YOUR INDIVIDUALIZED MEAL PLAN (in serving)

Name: _____ Age/Sex: _____ Wt: _____ Ht: _____

BMI: _____ Ideal Wt: _____ Calorie: _____

Meal	Carbohydrate/ Starch	Vegetable	Fruit	Fat/Oil (Un- saturated fat)	Meat/Meat product (without fat)	Datchi	Milk (skimmed)
Breakfast							
Snack							
Lunch							
Afternoon snack							
Dinner							
Bedtime snack							

Note: Numbers indicate number of serving of each food group

FOOD TO BE TAKEN LIBERALLY

1. Clear soup
2. Raw and green leafy vegetables like, cabbage, cucumber, onion, mushroom, lettuce, radish, chilli, etc.
3. Thin butter milk, "chinta"
4. Spices to taste

FOOD TO BE TAKEN IN LIMITED AMOUNT

1. Cereal - Wheat, Millet, Maize, Rice, Bread Noodle, Roti, Zow, Sip, Kapche, Japche, Kharang
2. Dal, Pulses (Whole pulses: Chana, Rajma, Soyabean instead of split pulses or their dal).
3. Root vegetable - Potato, Sweet potato, Carrot, Tapioca
4. Vegetable oil.
5. Lean meat, fish & egg.
6. Fruit like Apple, Banana, Orange, Gauva
7. Whole wheat powder preferred to refined wheat powder

FOOD TO BE AVOIDED

1. Sugar, sweets, candies, jam, jelly, glucose, cake
2. Alcoholic beverage and soft drink
3. Concentrated milk preparations
4. Fried preparations
5. All types of nuts and oil seeds, Concentrated milk preparations
6. Cream, Dalda, Butter, Lard
7. Fatty meat, organ meat like: liver, kidney and brain



FOOD SERVING FOR YOUR CONVENIENCE
(Following quantity makes one serving of each food)

CARBOHYDRATE/STARCH	VEGETABLES	FRUITS
Measure of serving (Cup)	(Cup)	(Pieces)
Standard size bread - 1 slice	Raw - 1 cup Cooked - 1/2 cup	Small Orange 1 pcs.
Cooked rice 1/2 cup	Asparagus/ Nakey	Small banana 1 pcs
Cooked <i>Kharang</i> 1/2 cup	Beans	Big banana 1/2 pcs
<i>Keptang</i> (medium size - 1 piece	Beet root/ bringle	Mango- 1/2 pcs
Cooked dried pea/bean - 1/3 cup	Broccoli/ leafy veg.	Crapes 1/2 cup (12 pcs) Guava - 1 pcs
Boiled corn 1/2 cup	Cabbage/ Cauliflower	* Water Melon (5 pcs)
Potato - boiled/ mashed - 1/2 cup	Carrot/Radish	* Papaya (5 pcs)
Pop-corn (without fat) - 3 cup	Turnip/Tomato	Apple (Small) 2" - 1 pcs
Dry cereal - <i>Sip</i> , <i>Zaw</i> - 1/3 cup	Cane shoot	Fruits juice 1/2 cup
<i>Kapchi</i> , <i>Zapchi</i> - 1/4 Cup	Mushroom	Peach 1 pcs, Plum 1 Pcs



FOOD SERVING FOR YOUR CONVENIENCE
(Following quantity makes one serving of each food)

FAT (UNSATURATED)	MEAT/MEAT PRODUCT (WITHOUT FAT)	DATCHI	MILK (SKIMMED)
(Tea spoon)	(Table spoon)	Datchi	(Cup)
1 tea spoon full	Cooked meat 2 tbs	Datchi $\frac{1}{2}$ cup	1 Cup (240ml)
Sunflower oil	Beef		milk - 1 cup
Soyabean oil	Chicken without skin		Yoghurt - 1 cup
Sunflower oil	Lean pork		
Olive oil	Yak sha		
Pea nut - 20 pcs	Fish		
Cashew nut - 5 pcs	Paa (fat free) 2- $\frac{1}{2}$		
Walnut - 2 pcs	Egg 1 pcs		
	Cheese $\frac{1}{2}$ cup		

NOTE: 1 cup measure = 240ml. Tea spoon full = 5mls, Tbs - Table spoon full = 10mls
 Food is divided into six different groups. These food groups can be used to choose the right type of food that you need.



7.4. Food serving

Your doctor, diabetes nurse or dietician will plan your meal in “serving” after determining the total calorie intake for the day. Expressing food in serving is the easiest as well as practicable way of meal planning for your convenience.

You may get almost the same food value if you exchange same serving of one item in one food list with another food item in the same list. For example, one piece of “*Chapatti*” can be exchanged for half a cup of rice. Amount of each food item is expressed in serving.

7.5. Food measures

The amount of each food in all exchange/serving lists are expressed in household measures.

1. One cup=240 ml
2. One teaspoonful=5 ml
3. One tablespoonful=10 ml.



MEAL PLAN

1500 - Calories Meal Plan

Meal	Starch	Veg.	Fruit	Fat/Oil	Meat	Datchi	Milk (skimmed)
B/fast	2				1		
Lunch	2	1	1	1	2	1	
Afternoon Snack	1			1			
Dinner	2	1	1	1	2	1	
Bedtime snack							1

1800 - Calories Meal Plan

Meal	Starch	Veg.	Fruit	Fat/Oil	Meat	Datchi	Milk (skimmed)
B/fast	2	1		1	1	1	
Lunch	2	1	1	1	2		
Afternoon Snack	1						
Dinner	3	1	1	1	3	1	
Bedtime snack							1

2000 - Calories Meal Plan

Meal	Starch	Veg.	Fruit	Fat/Oil	Meat	Datchi	Milk (skimmed)
B/fast	2	1		1	1	1	
Lunch	3	1	1	1	3	1	
Afternoon Snack	1						
Dinner	3	1	1	1	3	1	
Bedtime snack							1



2300 - Calories Meal Plan

Meal	Starch	Veg.	Fruit	Fat/Oil	Meat	Datchi	Milk (skimmed)
B/fast	3	1	1	1		1	1
Lunch	3	1	1	1	3	1	
Afternoon Snack	1						
Dinner	3	2	1	1	3	1	
Bedtime snack	1						1

2500 - Calories Meal Plan

Meal	Starch	Veg.	Fruit	Fat/Oil	Meat	Datchi	Milk (skimmed)
B/fast	2	1	1	1	1	1	1
Lunch	3	2	1	1	3	1	
Afternoon Snack	2						
Dinner	4	2	1	1	4	1	1
Bedtime snack	2						

2900 - Calories Meal Plan

Meal	Starch	Veg.	Fruit	Fat/Oil	Meat	Datchi	Milk (skimmed)
B/fast	2	1	1	1	1	1	
Lunch	4	2	1	1	3	1	
Afternoon Snack	2			1	1		
Dinner	5	2	1	1	3	1	1
Bedtime snack	2		1		1		



Preventing diabetes

There are certain modifiable risk factors that predispose one to developing Type 2 diabetes. These risk factors are as follows:

- Obesity
- Physical inactivity
- High blood pressure

Other risk factors that can not be modified are age above 40 years; a parent, sister or brother has diabetes, had diabetes in pregnancy and gave birth to a large baby (> 4 kg).

Research has shown that Type 2 diabetes can be prevented from occurring by modifying life style and changing some eating habits. This is especially so in people more than 60 years of age.

8.1. Making wise food choices

You may not have developed diabetes but are at risk of getting it. What you eat has a big impact on your health. Make wise food choices to keep your body weight under control, normal blood pressure and normal cholesterol levels. You can eat all types of food that you were eating earlier but follow the following basic rules:

- Reduce serving size of the main meals that you eat especially of those that contain high fat like dessert, meat, cake.
- Increase amount of intake of vegetables containing high fibre. Half of your meal must contain vegetables.
- Eat fruits in moderation.
- Limit your fat intake to less than 20% of total calorie intake of the day. Some practical tips of reducing fat intake are:



Understanding Diabetes & Self Care guideline

- ◆ Do not eat fried food
- ◆ Avoid eating fat containing meat
- ◆ Remove skin of chicken before cooking
- ◆ Avoid eating nuts
- ◆ Avoid fast food, fried potato wafers etc.
- ◆ Reduce your total calorie intake if you are overweight. Your diabetic nurse or dietician will help you plan your meals
- ◆ You can eat low calorie food in any amount like green salad without topping, 'chinta', tea without sugar, 'dau' and spices to your taste
- ◆ Keep a record of what you eat for the entire day. You will know for yourself where you are.

8.2. Increasing your physical activity

Physical activity can be brisk walking, jogging, playing, gardening, circumbulating chorten, archery etc. Physical activity must be continued for life time. If you are inactive and you wish to initiate physical activity, increase it gradually. To begin with, initiate activity for 5-10 minutes. Gradually increase it each day by 10 minutes upto 45 minutes to 1 hour.

8.3. Maintaining a reasonable body weight

Body weight affects your health in many ways. Obesity is a contributing factor of several disease conditions.

Body mass index (BMI) is a measure of body weight relative to height. You can use BMI to see whether you are underweight,



normal weight, overweight or obese. BMI is calculated by dividing weight in kilograms by height in meters squared. $BMI = \text{kg}/\text{m}^2$

BMI can also be measured by using the BMI chart provided.

1. Find your height in centimeters in the bottom of the chart.
2. Find your weight in kilograms in the right hand side of the chart.
3. Move along the row and column of weight and height to find the intersecting point.
4. The number at the intersection is your BMI. Check whether your BMI is normal or abnormal.
5. You can calculate your ideal weight by finding weight for your height and BMI as 24.



Obesity and its association



BMI CHART

Wgt. (lbs)	Height (in)																Wgt. (kg)			
	4'10"	4'11"	5'0"	5'1"	5'2"	5'3"	5'4"	5'5"	5'6"	5'7"	5'8"	5'9"	5'10"	5'11"	6'0"	6'1"		6'2"	6'3"	6'4"
00	21	20	19	18	18	17	17	16	16	16	15	15	14	14	14	13	13	13	12	45
05	22	21	20	19	19	18	18	17	16	16	16	15	15	14	14	14	13	13	13	48
10	23	22	22	21	20	20	19	18	18	17	17	16	16	15	15	14	14	14	13	50
15	24	23	23	22	21	20	20	19	19	18	18	17	17	16	16	15	15	14	14	52
20	26	25	24	24	23	22	21	21	20	19	19	18	18	17	17	16	16	15	15	54
25	27	26	25	25	24	23	22	22	21	20	20	19	19	18	18	17	17	16	16	57
30	28	27	26	26	25	24	23	23	22	21	21	20	19	19	18	18	17	17	16	59
35	29	28	27	27	26	25	24	23	23	22	21	21	20	19	19	18	17	17	16	61
40	30	29	28	27	27	26	25	24	23	23	22	21	21	20	19	19	18	18	17	63
45	31	30	29	28	27	27	26	25	24	24	23	22	22	21	20	20	19	19	18	66
50	32	31	30	29	28	28	27	26	25	24	24	23	22	22	21	20	20	19	19	68
55	34	32	31	30	29	28	28	27	26	25	25	24	24	23	22	22	21	21	20	70
60	35	33	32	31	30	29	28	28	27	26	26	25	24	24	23	22	22	21	21	73
65	36	34	33	32	31	30	29	28	27	27	26	25	24	24	23	22	22	21	21	75
70	37	35	34	33	32	31	30	29	28	27	27	26	25	24	24	23	23	22	21	77
75	38	37	36	35	34	33	32	31	30	29	28	27	27	26	25	24	24	23	22	79
80	39	37	36	35	34	33	32	31	30	29	28	27	27	26	25	24	24	23	22	82
85	40	38	37	36	35	34	33	32	31	30	29	28	27	27	26	25	24	24	23	84
90	41	39	38	37	36	35	34	33	32	31	30	29	28	27	27	26	25	24	24	86
95	42	40	39	38	37	36	34	33	32	31	30	29	28	27	26	26	25	24	24	88
100	43	41	40	39	38	37	35	34	33	32	31	30	29	28	27	26	26	25	24	91
105	44	43	41	40	37	38	36	35	34	33	32	31	30	29	28	27	26	26	25	93
110	45	44	42	41	39	38	37	36	35	34	33	32	31	30	29	28	27	26	26	98
115	46	45	43	42	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	100
120	47	46	44	43	41	40	39	38	38	36	35	34	33	32	31	30	29	28	27	102
125	48	47	45	44	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	104
130	49	48	46	44	43	42	40	39	38	37	36	35	34	33	32	31	30	29	29	107
135	50	48	47	45	44	43	41	40	39	38	37	36	35	34	33	32	31	30	29	109
140	51	50	48	46	45	43	42	41	40	38	37	36	35	34	33	32	31	30	29	111
145	52	51	49	47	46	44	43	42	40	39	38	37	36	35	34	33	32	31	30	113
150	53	52	50	48	47	45	44	43	41	40	39	38	37	36	35	34	33	32	31	116
155	54	53	51	49	48	46	45	43	42	41	40	39	38	37	36	35	34	33	32	118
160	55	54	52	50	49	47	46	44	43	42	41	40	39	38	37	36	35	34	33	120
165	56	55	53	51	49	48	46	45	44	42	41	40	39	38	37	36	35	34	33	122
170	57	55	53	51	49	48	46	45	44	42	41	40	39	38	37	36	35	34	33	122

147 150 152 155 157 160 163 165 168 170 173 175 178 180 183 185 188 191 193

Height (cm)

Obese
Highly obese
Extremely high obese

Overweight
Normal
Underweight

Risk of associated disease according to BMI & Waist circumference

Body Mass Index	Grade	Waist < 40 inch(100 cm) in men & < 35 inches(88 cm) in women	Waist > 40 inches (100 cm) in men & >35 inches (88 cm) in women
18.5 or less	Underweight		
18.5 to 24.9	Normal		
25 to 29.9	Overweight	Increased	High
30 to 34.9	Obese	High	Very High
35 to 39.9	Highly obese	Very High	Very High
40 or greater	Extremely obese	Extremely High	Extremely High



If you are overweight or obese, choose sensible ways to get in shape.

- Decrease amount of food that you generally eat.
- Limit amount of fat intake.
- Increase your physical activity. Exercise most days of week. Aim at least 60 minutes of exercise each day.
- Set a reasonable goal of losing at least 500 grams a week and a long term goal of maintaining your BMI at 18 to 24.
- Avoid crash diet

8.4. Other modifiable factors for diabetes prevention Hypertension:

Check your blood pressure at every opportunity. Persons with high blood pressure develop diabetes. If you already have hypertension, keep it under good control.



Cholesterol:

Check your cholesterol and triglyceride at least once a year after 40 years of age

Diabetes in pregnancy:

If you had diabetes in pregnancy or you gave birth to a baby more than 4 kg weight, you have high risk of developing diabetes.

Check your blood sugar at least once a year. Follow other life style modification measures.



Alcohol:

Moderate or stop your alcohol intake. If you are a non-user, do not start drinking alcohol in any form.

Diabetes in Family:

If you have any one in the family (mother, father, brother or sister) who has diabetes, you are at increased risk of getting the disease. Be extra cautious, maintain normal body weight, remain physically active, keep a check on your eating habit and undergo periodic medical check up.



The Way Forward

Obesity and diabetes has already come in epidemic proportions in most developing countries. It is expected to rise exponentially. This holds true in the case of Bhutan too. Quick response is required at population level. It is understood that informing people and educating them about the disease is the right approach. This must be directed at the future generation as diabetes and most non communicable diseases need life style modifications for their prevention. The best and most cost effective approach is educating the children about the disease and preventing picking up poor and unhealthy habits.

Health education should be designed to support following measures.

- Teaching healthy eating habits and providing nutritious food to children as well as adults
- Monitoring weight of children and adults
- Providing adults as well as children with an opportunity of a wide variety of physical activities.

This is time to act as further complacency can result in unmanageable proportions of easily preventable life style related disorders in the decades to follow.



Examination schedule of Biochemical & Anthropometric parameters

Parameter	How often	Target
Glucose control		
HbA 1c	3 monthly	<6%
Self monitoring of blood Sugar	As directed	Fasting: <100mg% Post meal:<140mg%
Biochemical Tests		
Cholesterol	Annually	<200 mg%
Triglyceride	Annually	<200 mg%
Lipids (LDL)	Annually	<100 mg%
Lipids (HDL)	Annually	>45 mg%
Renal functions	Twice a year	
Other Tests		
Fundus (Eyes) examination	Annually	Normal
Feet	Each visit	Normal
Weight	6 monthly	Ideal weight
Waist circumference	6 monthly	M:<100 cm,F <88cm
Microalbuminuria	Annually	Absence
BMI	6 monthly	22 to 24.9
Blood Pressure		
Without Kidney problem	Every visit	< 130/80 mm Hg
With kindey problem	Every visit	< 125/75 mm Hg
Life Style Goals		
Exercise	Daily	60 minutes daily
Stop doma, alcohol, tobacco	Daily	non-use
Improve nutrition	Daily	
Diabetes education	Every day	



CASE HISTORY

Name _____

Registration No. _____

Age _____ Sex _____

Date _____

Symptoms

Duration of Diabetes illness _____

Previous treatment: Yes/No _____

Height _____ Weight _____ BMI _____

Ideal body weight _____



Weight _____ Pulse _____ BP Standing _____

Laying Down _____

Heart _____

Lung _____

Kidney _____

Liver _____

Spleen _____

Nervous System _____

Right Eye _____

Left Eye _____

Funduscopy Examination _____

Other diseases _____



Follow up Notes

Follow up Notes

Follow up Notes

Follow up Notes

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