Training Manual for SEHAT Workers

Phase 2- Diabetes

Project SEHAT
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PART 1- PROGRAM OVERVIEW

INTRODUCTION

This user manual has been developed for Community Health Workers (CHWs) to use during Project SEHAT. The CHW, also known as a SEHAT worker, is expected to carry the manual as she goes about doing her work and to use the manual as a reference point.

PURPOSE OF THIS MANUAL

This is the second of three manuals which will help train a SEHAT worker to identify, record and manage individuals who have high blood sugar or diabetes. This manual will focus on identifying individuals with Diabetes and managing them in the setting of their homes. This will try to educate the SEHAT worker about Diabetes including the consequences of suffering from it, the way to identify people with it and provide appropriate advice to help people control it.

PART 2- HEALTH INFORMATION

HUMAN BODY

The basics of the various organs of the body have been discussed in the first manual. Here we will discuss some additional concepts about the human body and the way Diabetes affects the various organs.

The Brain (Nervous System) – Diabetes, like Hypertension, increases the risk of having a stroke. People who have both Hypertension and Diabetes, are at a higher risk of having a stroke than people who have Diabetes or Hypertension alone.

The Heart and Blood vessels (Cardiovascular System) – Heart attack is the main cause of death amongst people with Diabetes. People who have both Hypertension and Diabetes are at an even greater risk of having a heart attack than those who have only one condition. Heart attack usually presents with sudden onset chest pain and can result in death very early without admission to a hospital.

The Kidneys (Renal System) – Diabetes causes damage to the kidneys slowly, and people who have uncontrolled Diabetes are at high risk of developing kidney failure slowly. Kidney failure usually develops slowly, after many years of high blood sugars, unlike heart attacks, which can cause sudden death. Once a person develops kidney failure, he has to undergo Dialysis three times a week or he will die.

The Gastrointestinal (GI) System – People with Diabetes are more likely to develop constipation and gas problems. The solution is to emphasize the need to include more fiber in the diet, as we will discuss in the section on diet.

Legs- Diabetes causes a lot of damage to the legs, and leads to loss of feeling and pain. The changes are mostly in the feet. Due to lack of feeling in the legs, people with Diabetes are often unable to notice when their legs get cut or injured. As a result, often the injuries become very severe before they are noticed by the patient. It is therefore necessary for a Diabetic person to take good care of his feet, more than the normal person.

Eyes- Diabetes, like high blood pressure, can permanently damage one's eyesight. This is usually a slow process and the damage is usually greater in patients with very high sugar levels.

Pancreas- It is an organ that is located behind the stomach. It is the part of the body that produces Insulin.

INTRODUCTION TO RISK FACTORS FOR CARDIOVASCULAR DISEASES

The top two killers of people who suffer from diseases of the heart or blood vessels: heart attack and stroke.

You have already learnt about Hypertension. We will now focus on learning about the other diseases that can lead to cardiovascular disease. To revise, there are 4 main causes of heart attacks, stroke and other cardiovascular disease. These are–

- High blood pressure.
- Smoking
- Diabetes
- High Cholesterol

These four are the most important risk factors for heart disease and stroke. 80% of heart disease and stroke can be prevented by controlling these 4 factors.

What is a risk factor? Who is at risk for heart disease and stroke?

A risk factor for heart disease or stroke is a behaviour or condition that makes a person more likely to have heart disease or to have a stroke.

Heart disease and stroke have many of the same risk factors. Reducing your risk for heart disease will reduce your risk for stroke; and vice versa.

Why are heart diseases and stroke important?

- Heart disease is the number one cause of death in India
- Stroke is the third leading cause of death in India.
- Heart disease and stroke are also the leading cause of permanent disability among working age adults. Having a disability means a person is unable to do some or all of the tasks of daily living such as going to the bathroom, eating, etc.

High cholesterol

Eating an unhealthy diet that is poor in fruits and vegetables, can lead to high levels of fat circulating in the blood. This is known as high cholesterol. High blood cholesterol can then get deposited in the walls of the blood vessels, especially the heart and brain leading to their eventual blockage, which causes heart attacks and stroke. A doctor can measure blood cholesterol with a test that measures various kinds of cholesterol- such as LDL, HDL and Total Cholesterol. The treatment of high cholesterol is with drugs that end with '-statin'.

PART 3- DIABETES

INTRODUCTION TO DIABETES

Use with Video 1 (https://www.youtube.com/watch?v=MGL6km1NBWE)

Diabetes is when your body doesn't make enough of a substance called 'Insulin', that results in the level of sugar (sugar) in the blood becoming excessively high.

To understand this better, let's start with some basics.

Our body needs energy to work, just like a motorcycle needs petrol to run. Everything that we do- walking, sleeping, thinking- depends on this energy. This energy is derived from the breakdown of food that we eat every day. When we eat, the food is broken down to become energy for our body to use.

Different kinds of food become different kinds of energy. There are three main kinds of energy- energy from breakdown of protein, carbohydrates or fats. For example, meat and eggs are broken down to protein by the body. Foods like rice, roti, sweets and vegetables are broken down to carbohydrates and finally, oil and and butter are the source of fat.

When carbohydrates are further broken down by the body, they become small particles called sugar (also known as sugar). The sugar then leaves our stomach, and is absorbed into our blood, and then travels to every part of the body through the blood. When it reaches the different parts of the body, it enters the part, and then gives the body part the energy to function normally.

Then why do some people get Diabetes, which is basically too much sugar (or sugar) in the blood? What is the role of the substance Insulin?

In a normal person, when the sugar reaches the body part (also known as cell- there are crores of such cells in the body), the body part is usually locked. Insulin is the key that opens the body part and allows the sugar to enter it. If there is no Insulin, or the gate is not responding to Insulin (like a key getting jammed in the door), then the sugar is unable to enter the body part and starts accumulating in blood. This is when the blood sugar level starts rising and the person is said to have Diabetes.

So without Insulin, the sugar can't get into cells and starts increasing in the blood stream. This is when people start having high blood sugars. Why is this a problem?
1) Body parts won't have enough energy to work at 100%
2) Having too much sugar in the blood can make one feel tired, sleepy, excessively hungry and thirsty (though not always).
3)The biggest problem, however, comes when the blood sugar remains high for long periods, many months to years. This can cause complications to numerous body parts, resulting in heart attacks, strokes (paralysis), kidney failure, blindness, weakness, pain in legs and hands, and early death.

But one can control the amount of sugar in the blood. Remember the only way for sugar to get into one's body is through the food, so if one eats less sugar, and exercises regularly to use that sugar, then the blood sugar level be lower.

Since the blood sugar is in the entire blood that circulates through the body, this sugar can be sampled from blood anywhere in the body. Since the fingers are the easiest place to access for pricking, we use finger prick testing to check blood sugar levels with the machine.

Diabetic diet

We have reviewed the basics of what constitutes carbohydrates, protein and fats. Some additional concepts are mentioned below-

Carbohydrates- All the carbohydrates that we eat are converted to blood sugar in the stomach and intestines, and are then absorbed into the blood. Rice and rotis are the main source of carbohydrates in our diet, and certain starchy vegetables (such as potatoes and peas) are also rich in carbohydrates. Carbohydrates are essentially of 2 types- starch and non starch. Starchy foods are rich in carbohydrates but poor in fiber. Non starchy foods, on the other hand, have less carbohydrates and more fiber making them healthier.
Foods that are rich in starch (such as white rice, potatoes , peas and corn) lead to rapid rise in blood sugar and should be avoided. Non starchy vegetables (examples mentioned below) and non starchy grains (such as brown rice, atta (whole wheat), bajra, jowar) lead to a more slow rise in blood sugar levels, and are therefore more healthy for Diabetics.

Protein- After carbohydrates, protein is the most important part of the diet. Protein is mostly found in meat and dal. While choosing meats for proteins, it is important to prefer white meat (found in chicken and fish) over red meat (beef, pork and mutton). Red meat has more fat and cholesterol, and worsens sugar control in diabetics and increases the chances of them having heart attacks, if eaten too frequently or in excess quantities.

Fat- Like the common population, Diabetics should avoid excess fats. Fat rich food include fried food, ghee, oil and butter. Good fat, as found in fish, can be consumed in moderation (not fried fish).

Fiber- Fiber includes all parts of plant food that your body cannot absorb, and hence it comes out in your toilet. It is important to have a diet high in fiber, as it helps your body digest food and is therefore, very useful in decreasing constipation. It also keeps the blood sugar in check, as it prevents the body from absorbing blood sugar too quickly from the stomach and intestines. Foods rich in fiber include non starchy vegetables, fruits, dals and atta.

General principles of Diabetic food-

1) Eat 3 meals a day- A diabetic person should try and eat his meals regularly at the same time each day. Skipping meals causes fluctuations in blood sugar levels that are harmful. One should also try and eat nearly the same amount each day, as eating different amounts of food everyday again causes wide fluctuations in the sugar levels.

2) Limit sugar and sweets- Eat less mithai, cold drinks, cakes and chocolates. Try and limit the amount of sugar in the diet, and try to get used to drinking tea and milk without sugar. It's often a matter of habit, once you get used to drinking tea without sugar, you will start liking it. One can add some lime (instead of sugar) to tea to make it tasty. One can also use artificial sweeteners that are available in the market for sweetness. These artificial sweeteners do not increase the blood sugar level, however, they are expensive.

3) Control carbohydrate intake- Since all carbohydrates are converted to sugar by the body, it is important to limit carbohydrate intake. While limiting carbohydrate intake, one can increase the intake of fibers (such as vegetables and dal) to help one's hunger.

Common sources of carbohydrates
- Fruit and fruit juice
- Bread, rice (white and brown), Atta, Maida

- Milk, dahi
- Mithai, sweets, sugar
- Starchy vegetables such as potatoes and peas
- Biscuits and chips

4) Reduce your intake of high fat foods- Cutting back on high fat foods can help one lose weight, improve blood levels of cholesterol (which is the fat that is absorbed into the blood from the food we eat) and ultimately improve blood sugar control.

5) Increase your intake of non starchy vegetables- Non starchy vegetables mean those vegetables that are rich in fiber but low in carbohydrates, meaning a double advantage. Non starchy vegetables are also rich in vitamins and minerals, which make them very healthy. Starchy vegetables, on the other hand, are high in both fiber and carbohydrates, making them less nutritious. Examples of starchy vegetables include potatoes, peas.

Examples of non starchy vegetables include

Carrots	Raddish	Onions	Cauliflower	Spinach (Palak)	Tomato
Cucumbers	Cabbage	Beans	Brinjal	Bhindi	Shalgham
Green leafy vegetables		Green Mangoes	Unripe Bananas	Green Jackfruit (Kathal)	
Mocha	Lauki	Tori	Petha	Arbi	Tinda
Karela	Parval				

6) Eat more fiber- Like discussed before, getting more fiber into the diet in place of fat and starchy carbohydrates is the key to a healthy diabetic diet. Fiber helps slow down the rise in blood sugar, which is essential for long term health. To get more fiber, eat atleast 5 servings per day of fruits and non starchy vegetables listed above, choose aata over maida (maida has less fiber and more carbohydrates than atta) and eat more dal.

7) No need for special or expensive foods- There is no need to buy expensive or special food from the market. Knowing which foods are good from amongst our daily foods, and increasing their use while at the same time, limiting unhealthy foods is the key to maintaining good health for a diabetic person.

8)Avoid junk foods: Almost all the readily available packaged food items you can buy from shops like chips, biscuits, colas, chocolates, bhujias are all high in carbohydrates or fats. These are unhealthy and should be avoided. Same goes for foods that you buy at hotels, on the streets and in sweet shops. All of these are high in calories and fats and can easily increase your weight. These are also more expensive than home foods!

Sample diet plan- (low fat, high fiber, limited carbohydrates)

BREAKFAST-1 cup(tea/coffee/milk/Nimbu pani without sugar), 2 Marie biscuit AND

- 1 chapati (atta) and half cup vegetables OR
- 1 slice bread/half cup poha/half cup upma OR
- 1 cup soaked daal (Mung/moth/barbati) OR
- 1 fruit

LUNCH - Half cup green leafy vegetable AND

- Half cup daal
- One plate salad (cucumber, radish, onion, tomatoes)
- 1 piece of meat (chicken/fish make it in as less oil as possible)
- Half cup rice or 2 rotis (aata without any oil or ghee)

EVENING - 1 cup tea/coffee/milk(without sugar) AND

- 2 Marie biscuits/Muri
- 1 fruit

DINNER- Same as lunch

- One can add vegetables in daal to make it more tasty and to increase the fiber content
- Try and include milk or dahi in the diet everyday
- Avoid eating raw salt. Don't add extra salt after cooking
- Try and cook the food in less oil
- All kinds of fish are good, with saltwater fish being slightly more healthy than freshwater fish. Ilish is likely the most healthy amongst the commonly eaten fishes. However, if the fish is fried, then it is likely to lose its nutritive value and become harmful instead.

Avoid in diabetics	Good for diabetics
Fruits	
Jackfruit **Eat in moderation** Pineapple (1 slice a day, if the whole fruit is divided in 10 parts) Watermelon(1 slice a day, if the whole fruit is divided in 20 parts) Mango (half a mango a day) Chikku (half a chikku a day) Papaya(1 slice a day, if the whole fruit is divided in 6 parts) Lychee (less than 8 in a day) All other fruits (such as sugarcane, dates, pomegranate)	Oranges Grapes Plum Pear Banana **Best in Diabetes** Guava Jamun Apple Lemon
Vegetables	
Pumpkin Potato	All other vegetables
Grains	
White Rice	Bajra Jowar Oats Sooji
Legumes	
	Dal – All kinds Rajma Channa

Top foods to eat for Diabetics	Top foods to avoid or limit in Diabetics-
1) Milk (without fat) and Dahi 2) Nuts- Such as peanuts (moongfali) or makhana (phool makhana). 3) Whole grains- Brown rice instead of white, atta instead of Maida 4) Fish- Baked, steamed, grilled or broiled, instead of fried 5) Dark green leafy vegetables 6) Fruits that are listed above as healthy 7) Dal 8) Mustard oil (instead of other oils) 9) Eggs (without yolk), paneer 10) Unsweetened tea (add a slice of lemon) 11) Chicken without skin	1) Red meat such as beef, pork and mutton 2) Butter, ghee 3) Maida, white rice 4) Sweetened tea 5) Fried fish 6) Chicken with skin 7) Fruits such as Pineapple, Mango, Watermelon, Papaya and Pumpkin. 8) Pickles (aachar) and papad (especially if patient also has Hypertension) 9) Packaged chips, cold drinks and other snacks in the market 10) Samosa, pakoras 11) Most importantly, avoid sweets such as rasgulla, gulab jamun, etc. 12) Puffed rice (muri)

Physical Activity

The details of physical activity was discussed in the first manual. The instructions of physical activity remain the same for Diabetes. The key is 30 minutes of moderate intensity exercise, 5 days a week.

Weight loss

The details are the same as discussed in the first manual.

MEDICATIONS AND DOCTOR VISITS

One of the most effective ways of controlling Diabetes is using medications. This is one of the reasons that all patients with Diabetes should be referred to a physician. Your primary goal is to encourage the patient to go to a physician and to take his or her medicines.

How often do patients need to visit a doctor?

Regular follow up with a doctor every 2-3 months is required till the patient's fasting (morning) blood sugar is below the target of 126. After target blood sugar has been attained, follow up with the doctor every 6 months to 1 year is sufficient. However, if the Diabetes patient has developed complications of Diabetes, then more frequent follow up is required.

How often and for how long do patients need to take their medication?

Patients need to take their medication daily. They should avoid missing doses. Medications need to be continued even after the patient has controlled his blood sugar (fasting <126). This is because the patient's blood sugar will rise again if he stops taking the medication.

These medications generally need to be taken lifelong or as directed by the doctor. If the patient is able to modify his diet to suit his diabetes, exercises frequently and is able to lose weight, he will need less medicines. Very few people are able to make enough lifestyle changes that they don't have to take any medicines. Those people generally have mild diabetes.

What advice should be given to the patient regarding medications?

1. Help the patient identify his/ her Diabetes medication. (Refer to the list at the end of this training booklet)
2. Check the prescription for the doctors advice on how often to take the medication and reinforce this advice.
3. Help the patient identify a target blood sugar and make sure he/ she understands the importance of reaching the target.
4. Reinforce the idea that the medication is working even if the patient cannot feel its effects.
5. Reinforce the importance and benefits of taking the medications daily for lifelong.

What are the barriers to visiting the doctor and taking medications?

1. Medicine is too costly- Encourage the patient to ask his doctor for a cheaper medicine. Identify other areas where the patient can save money, such as avoiding eating unhealthy food from the market, bidis, etc. and encourage the patient to instead use the money for medicines.
2. Side effects from medicine- Instead of stopping the medicine himself, encourage the patient to talk to the doctor about the side effects. Any medicine can sometimes have side effects. In most cases, another medicine can be given which will not have the same side effects.
3. Patient has no symptoms and feels fine- Educate the patient about the silent nature of Diabetes and explain the benefits of treatment and the consequences of not taking treatment.

Role of homeopathy

A lot of people with Diabetes take alternative medicines (Ayurveda, Homeopathy and Unani) to help their Diabetes. The most common reasons to use Homeopathy include lower cost, personal belief in Homeopathy's effectiveness, fear of side effects with Allopathy, better relation with Homeopathy doctors.

However, the benefits of these alternative medicines is unclear, no one knows for sure. Some doctors believe they work but a lot of them do not. Besides India, very few countries in the world use Homeopathy. Most developed countries have achieved control of Diabetes with the use of Allopathic medicines, which is why they are the recommended approach. Allopathic medicines do have side effects, but the risk of side effects are always smaller than the benefit gained from the medicine.

As a CHW you should be neutral, i.e. do not encourage use of alternative medicines but do not discourage them either. However, you should encourage allopathic medicine as we know they work for sure. If your patient is using these alternative forms of medicine and his/her blood sugar is controlled, you need not be concerned. However, if they are using these alternative medications but their blood sugars are not controlled you should encourage him to seek allopathic medicine.

What is important to avoid is discouraging them from going to any kind of doctor- be it Homeopathic, Ayurvedic or Unani, or even local non registered practitioners. It is better for your patients to go to some doctor than not go at all. He can continue taking his Homeopathic medicines if he wants along with his Allopathic medicines, as they are not going to interfere with his Allopathic medicines.

LOW BLOOD SUGAR

Low blood sugar is a condition characterized by abnormally low blood sugar (blood sugar) levels, usually less than 70 mg/dl. Diabetic patients can have low blood sugar as a side effect of their medication, usually if they don't take their medicine and food in the correct manner. Common medicines that are associated with Low blood sugar include Insulin and the Sulfonylureas (Glipizide, Glimepride, etc.)

Low blood sugar symptoms are important clues that one has low blood sugar. Each person's reaction to low blood sugar is different, so it's important that every Diabetic learns their signs and symptoms when their blood sugar is low.

The only sure way to know whether one is experiencing low blood sugar is to check the blood sugar, if possible. If one is experiencing symptoms and is unable to check one's blood sugar for any reason, treat the low blood sugar. Severe low blood sugar has the potential to cause accidents, injuries, coma, and death.

Signs and Symptoms of low blood sugar (happen quickly)- Each person's reaction to low blood sugar is different, but it is usually the same set of symptoms every time for that person

- Shakiness
- Nervousness or anxiety
- Sweating and chills
- Irritability or impatience
- Confusion
- Rapid/fast heartbeat
- Light-headedness or dizziness
- Hunger and nausea
- Sleepiness
- Blurred/impaired vision
- Tingling or numbness in the lips or tongue
- Headaches
- Weakness or fatigue
- Anger, stubbornness, or sadness
- Lack of coordination
- Nightmares or crying out during sleep
- Seizures
- Unconsciousness

Treatment

1. Consume sugar or simple carbohydrates such as 1 tablespoon of sugar or honey. Sugar is the most easily available sugar source and should be consumed immediately.
2. If low blood sugar continues, repeat.
3. Once the person starts to feel a little better, eat a small snack if the next planned meal or snack is more than an hour or two away.

Preventing low blood sugar-
Low blood sugar happens when one takes a drug that can decrease the sugar levels in the blood. This can be Insulin, as it decreases the blood sugar directly, or it can be a sulfonylurea drug that acts on the body to increase the secretion of Insulin, and therefore can cause low blood sugar by increasing Insulin production in the body.

People who use these drugs can develop low blood sugar because of 2 reasons-
1) They mistakenly take an extra dose of the drug, or take too high of a dose.
2) They forget to eat a meal after injecting Insulin or swallowing a Sulfonylurea tablet. For both these medicines, it is essential to eat something half an hour after taking the medicine. If one doesn't eat anything and takes the medicine, then low blood sugar is likely to occur.

Therefore, people with Diabetes should be counselled on the importance of regular meals, not skipping meals and taking their medicines only with meals. Another preventive measure is to always have something sweet nearby so that if one gets hypoglycemic, one has some sugar to eat nearby.

Blood sugar measurement and monitoring

The technique of blood sugar measurement has been taught to you in prior sessions. The frequency with which you should monitor a person's blood sugar depends on how advanced their diabetes is, and what kinds of medications they are on.

For people who are on 1 or 2 oral drugs, their fasting blood sugar should be checked on two separate days to see how well they are controlled with their current medicines. The goal is to decrease the fasting blood sugar to <126, and at the same time prevent Low blood sugar (Blood sugar <70). It's worth remembering that blood sugar less than 70 means Low blood sugar only if a patient is Diabetic and is on a medication that can cause Low blood sugar. A normal person like you and me can have fasting blood sugar <70, that will not be considered Low blood sugar.

For people who are on Insulin, blood sugar needs to be measured more frequently. Such people should have their own glucometer and strips, as they will need to measure their blood sugar every day. They need to measure their blood sugar 2-4 times a day. Times include fasting blood sugar, pre lunch, pre dinner and before going to sleep. Very few people require Insulin to control their Diabetes, most people are controlled on oral medications. A sample blood sugar diary for patients who use Insulin is attached at the end of the book. If a person needs such a diary, you can ask your supervisor for it.

There are certain tablets that can also cause Low blood sugar. These are usually Insulin or medicines that start with 'G', such as Glipizide, Glyburide, Glimepride, etc. When someone is taking these medicines, one needs to be careful that they don't develop Low blood sugar symptoms. If they develop symptoms suggestive of Low blood sugar, then their blood sugar needs to be checked.

Hemoglobin A1C (HbA1C)

This is a blood test that is sometimes used by doctors to see how well someone's blood sugars are controlled over a period of 3 months. Unlike blood sugar measurement, which varies by the kind of food eaten the previous day or in the last few hours, HbA1C can measure the average blood sugar of the person over the last 3 months. This is useful for monitoring long term blood sugar control but is somewhat limited in use as it is expensive. The target in Diabetes is to get HbA1C below 8% and sometimes below 7%. In normal individuals, the HbA1C is usually less than 6.5%.

Complications of DM and monitoring for complications

Diabetes is usually an asymptomatic condition. However, occasionally if a person has extremely high blood sugar he can have some symptoms such as excessive thirst, excessive hunger and excessive urination. If present for a long time, the person can also lose weight due to breakdown of cells in his body.

The complications of Diabetes include

1) Heart attack (similar to Hypertension)- As we have discussed before, diabetes can cause heart attack which can lead to sudden death. Often people are feeling fine, and then they suddenly fall to the ground and their heart stops beating. For people who survive a heart attack, there are high chances of getting a repeat heart attack. The best way for a diabetic person to prevent a heart attack is by taking a medication called '-statin'.

There is no way to know when a person is going to have a heart attack, so there is no way to monitor for it. The best way to prevent it is to take one's medicines every day.

Some people with blocked blood vessels in the heart may not experience a heart attack but can experience pain in the chest whenever they try and do some work or become physically active. Such people are at high risk of developing a heart attack in the future and should go see a doctor for this problem.

2) Stroke (similar to Hypertension)- Patients with Diabetes can have sudden paralysis in arms and legs, weakness of face and loss of voice due to stroke. The best way for a diabetic patient to prevent a stroke is by taking a medication called '–statin'. There is no way to know when a person is going to have a stroke, just like for heart attack. Therefore, the best way to prevent a stroke is to take one's medicines every day.

3) Kidney failure (similar to Hypertension)- People with Diabetes, if they have persistently high sugar levels, can go into kidney failure. A person with kidney failure might not feel any symptoms till their kidneys are half destroyed. The best way for a person with Diabetes to prevent kidney failure is by maintaining his blood sugar at a normal level. The longer the time that his blood sugar is high, the more likely he is to have kidney failure.

Doctors can monitor if a patient's kidney is showing signs of failure by blood and urine tests. These tests can show kidney damage even when the patient does not feel any symptoms.

4) Blindness (similar to Hypertension)- People with Diabetes can slowly go blind. They might not feel any symptoms till their eyes are heavily damaged and then it becomes too late to do something to prevent blindness.

It's difficult to do tests to check if a person's Diabetes is affecting their eyes. The best way is to be safe and take one's medicines everyday to prevent eye damage.

5) Pain in legs- This doesn't happen in Hypertension, only Diabetes. Patients can experience pain, tingling and numbness in their legs and feet. This is again due to high sugar levels, and the best way to prevent this from happening is to maintain the blood sugar levels at a normal level.

A diabetic patient can have loss of feeling (numbness) in his foot, and therefore he might not know when he injures his foot, as he might not feel the pain of an injury. Every diabetic patient should therefore get into a habit of checking his foot for cuts and injuries, so that he can see them early with his eyes and take care of them. If the injury goes unchecked, it can increase in size and lead to many problems. In few cases, feet injuries in diabetics whose feet are numb can lead to the need for amputation, if not cared for properly.

6) Death- All of these above complications can lead to early death (and also a lot of suffering). Therefore, the best way to prevent this is by controlling a Diabetic person's blood sugar and by taking the medicine '-statin' everyday.

Monitoring for complications-

The only complication that is easy to monitor from the outside is the effect of Diabetes on the foot. People with diabetes develop numbness and lose the ability to sense injuries to their feet. Therefore, they should inspect their feet every day, and make sure there are no cuts or bruises. It is important for a diabetic to not walk barefoot, and to use the appropriate shoes. Shoes that are too tight will cause injury and bruises. If cuts are present, they should take good care of the foot, or their injuries will progress very fast, leading to complicated hospitalizations and sometimes even having to get their leg cut off. They should seek medical condition early in case of cuts and injuries. Diabetics can also develop pain in their foot, which can be difficult to control and requires special medicines from a doctor. Usually, these problems develop in people who have had high blood sugars for many years, and did not control their blood sugars well.

Insulin

Often, when people are unable to control their Diabetes with oral medications, they need to be started on Insulin. This is because some people have more severe disease than others. Typically, patients who require Insulin have a very weak pancreas that is not producing much Insulin on its own, so they need to be on injection Insulin.

Not everybody can be started on Insulin. Insulin is more expensive then oral medicines. It requires the patient to be responsible, and someone who can take care of himself. It requires frequent monitoring, and the patient has to understand why does he need to take the Insulin everyday to better his health.

Insulin comes in small glass bottles (called 'vials'). There are different types of Insulin which have different properties. The main difference between the Insulins is their duration of action. Some Insulins are active only for a couple of hours, while others are active for up to 24 hours.

Types of Insulin

Each type of insulin has an onset, a peak, and a duration time.
The **onset** is how soon the insulin starts to lower your blood sugar after you take it.
The **peak** is the time the insulin is working the hardest to lower your blood sugar.
The **duration** is how long the insulin lasts-the length of time it keeps lowering your blood sugar.

Type of Insulin	Brand Name	Generic Name	Onset	Peak	Duration
Short-acting	NovoLog Apidra Humalog Humulin R Novolin R	Insulin aspart Insulin glulisine Insulin lispro Regular Insulin	15 -60 minutes	30 to 180 minutes	3 to 5 hours
Intermediate-acting	Humulin N Humulin mix Novolin N Novolin mix Humulog mix Novolog mix	NPH insulin(N)	15 min to 3 hours	8 hours	12 to 16 hours
Long-acting	Levemir Lantus	Insulin detemir Insulin glargine	1 hour	Peakless	24 hours

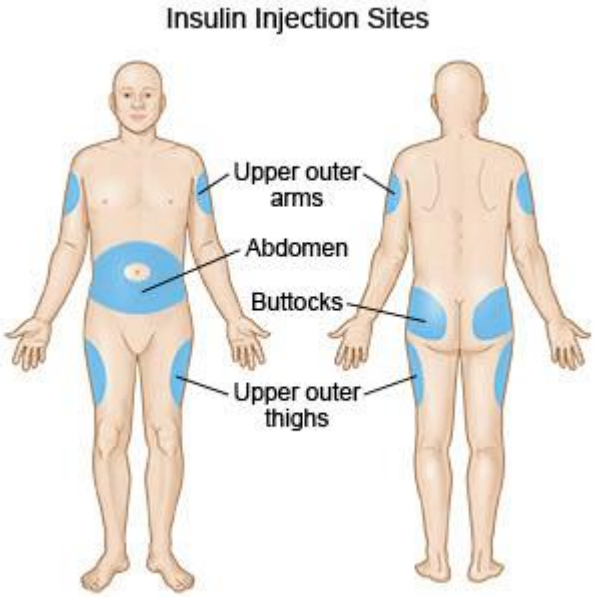
It is important to remember that long acting Insulins such as Glargine rarely cause Low blood sugar as they act over a long period of time. Therefore, it is not essential to eat something after taking Glargine and so this Insulin is often administered before going to bed (after dinner). Also, not all oral medications act by increasing the production of Insulin, and therefore these medicines never cause Low blood sugar at all.

Costs of some commonly used Insulins-

Short acting Insulin- Insulin Aspart (Novolog)- Rs. 450/vial
Long acting Insulin- Insulin Glargine (Lantus)- Rs. 700/vial
Mixture of short and long acting Insulin- Humulin 70/30 OR Novolin 70/30-Rs. 190/vial

Where does a person inject insulin?

Inject insulin into the fat layer just under the skin. If the insulin is injected into the muscle, it gets absorbed into the blood stream too fast. You can inject insulin into your stomach, outer upper arm, buttocks, hip, and the front and side of the thigh. Insulin is absorbed quickest when it is given in the abdomen. A different spot should be used each time an injection is given. This helps prevent changes to the skin such as lumps, swelling, or thickened skin. One should not inject insulin into areas where there are skin changes. It may not be absorbed well in these areas.



What are the types of insulin syringes?

Insulin syringes come in different sizes depending on the dose of insulin a patient needs. It is important to use the correct size syringe to make sure the patient is getting the right dose of insulin. The following are general guidelines:

- If your dose is 50 to 100 units, use a 1 mL syringe.
- If your dose is 30 to 50 units, use a 1/2 mL syringe.
- If your dose is less than 30 units, use a 3/10 mL syringe.

How to draw up 1 type of insulin into a syringe?

If the patient uses only 1 type of insulin at a time, the following needs to be done:

- **Gather the insulin supplies:** Get the insulin bottle, syringe, and alcohol pads. Check the insulin label to make sure it is the right kind of insulin. Short-acting insulin should be clear with no particles. Do not use the insulin if there are clumps or particles in it.
- **Gently mix intermediate or long-acting insulin:** These must be mixed before they are given. Turn the bottle on its side and roll it between the palms of the hands. **Do not shake the bottle** because shaking can make the insulin clump together. One does not need to mix the short-acting insulin.
- **Prepare the insulin bottle:** If the insulin bottle is new, remove the cap. Clean the top of the insulin bottle with an alcohol pad before you put a needle into it.
- **Pull air into the syringe:** Remove the cap from the needle. Pull back the plunger on the syringe to draw in an amount of air that is equal to one's insulin dose. Push the needle into the bottle top and inject the air into the bottle. Leave the needle in the bottle. This helps to keep the right amount of pressure in the bottle and makes it easier to draw up the insulin.
- **Draw up the insulin into the syringe:** With the needle still in the bottle, turn the bottle and syringe upside down. Pull the plunger to fill the syringe with just a little more than the insulin dose you need.
- **Check the syringe for air bubbles:** If you see any bubbles, tap the syringe with your finger to make them rise to the top. Slowly push in the plunger just enough to push out the air and the extra insulin.
- **Remove the needle from the vial:** Carefully lay the syringe down so that the needle does not touch anything. This is to prevent the needle from getting dirty.

How to draw up 2 types of insulin into a syringe?

If the patient uses 2 types of insulin at one time, the following needs to be done:

- **Gather the insulin supplies:** Get the insulin bottle, syringe, and alcohol pads. Check the insulin label to make sure it is the right kind of insulin. Rapid and short-acting insulin should be clear with no particles. Do not use the insulin if there are clumps or particles in it.

- **Determine the total amount of insulin you need:** Add the number of units of each type of insulin together.

- **Gently mix intermediate or long-acting insulin:** Turn the bottle on its side and roll it between the palms of your hands. **Do not shake the bottle** because shaking can make the insulin clump together. You do not need to mix the short-acting insulin.

- **Prepare the insulin bottles:** If the insulin bottle is new, remove the cap. Clean the top of both insulin bottles with an alcohol pad before you put a needle into them.

- **Prepare the syringe:** Remove the cap from the needle. An amount of air that is equal to each insulin dose should be injected into each bottle. This helps to keep the right amount of pressure in the bottle and makes it easier to draw up the insulin.

- **Inject air into the intermediate or long-acting insulin bottle:** This insulin should be cloudy. Pull back the plunger on the syringe to draw in an amount of air that is equal to your long-acting insulin dose. Push the needle through the top of the long-acting insulin bottle and inject air into the bottle. **Do not** draw out the insulin into the syringe yet. Remove the still empty syringe and needle from the bottle.

- **Inject air into the short-acting insulin bottle:** This insulin should be clear. Pull the plunger back to draw in enough air to equal your short-acting insulin dose. Push the needle in through the top of the short-acting insulin bottle and inject air into the short-acting insulin bottle. Leave the needle in the bottle.

- **Draw up the short-acting insulin:** Short-acting insulin should be drawn up in the syringe before the long-acting insulin. With the needle in the short-acting insulin bottle, turn it upside down. Pull the plunger to fill the syringe with just a little more than the insulin dose you need.

- **Check for air bubbles:** If you see any bubbles, tap the syringe with your finger to make them rise to the top. Slowly push in the plunger just enough to push out the air and the extra insulin. Tiny air bubbles are not dangerous, but they will decrease the amount of insulin in the syringe.

- **Remove the needle from the vial:** Recheck your dose.

- **Draw up the intermediate or long-acting insulin:** Insert the needle into the bottle of long-acting insulin. Turn the bottle upside down and pull the plunger to draw the long-acting insulin. Because the short-acting insulin dose is already in the syringe, pull the plunger to the **total** number of units you need. Do not draw extra insulin at this point because you should not inject mixed insulin back into the bottle.

- **Check for bubbles:** If you see any bubbles, tap the syringe with your finger to make them rise to the top.

- **Remove the needle from the bottle:** Carefully lay the syringe down so that the needle does not touch anything.

Exercise tends to increase the ability of Insulin to do its work, therefore increasing the transport of sugar from the blood to the body parts. So people who exercise and take Insulin are at a high risk of Low blood sugar if they take Insulin and exercise (especially if they don't eat well after taking Insulin). It is therefore important to eat one's normal meal within 20 minutes of taking Insulin.

MYTHS ABOUT DIABETES

Insulin will harm you. Doctors often hear a patient say, "I don't want to be on insulin because as soon as Grandma went on insulin she died." Insulin is a lifesaver, but it's also difficult to manage for many people. It's crucial to test your blood sugar many times a day when you're on insulin to avoid low blood sugar reactions that will harm you. People who die on Insulin die despite the beneficial effects of Insulin, not because of Insulin.

Diabetes means your body doesn't produce enough insulin. This is true for children who develop diabetes (also called Type 1 Diabetes), where the pancreas stops producing insulin completely. Adults who develop Diabetes (also called type 2 diabetes, often written as DM or DM2), which is the most common type of diabetes, usually have sufficient insulin, at least when they are first diagnosed. Their problem is that the insulin doesn't work properly. It fails to help the cells in their bodies to absorb sugar from the food they eat. Eventually, after many years, their pancreas may stop producing enough insulin, so they will need injections of Insulin.

Diabetes means having to give yourself shots, and I can't stand needles. Only people who are on injectable medications (Insulin) need to deal with needles. Today there are insulin pens that don't require you to inject yourself and blood sugar meters that make drawing blood nearly painless. Plus, there are many new oral medications that control diabetes without needles or risk of low blood sugar reactions.

I know when my sugar is high or low. You can't rely on how you're feeling when it comes to your blood sugar level. You may feel shaky, lightheaded, and dizzy because your blood sugar is low, or you may be coming down with the cold. You may urinate a lot because your sugar is high, or because you have an infection. The longer you have diabetes, the less accurate those feelings become. The only way to know for sure is to check your blood sugar.

People with diabetes can't eat sweets. There is no reason type 2 diabetics can't eat sweets in small amounts as part of their healthy meal plan. When eaten in small portions or on special occasions, diabetics can eat whatever they want. The problem is that most of us eat too much of what we like. Diabetes doesn't mean you can never have a sweet again, just a smaller piece, and you'll have to be careful about what you eat with that piece of sweet (mithai). One mithai a couple of times of a month is OK, but not every night.

Insulin cures Diabetes. Taking insulin helps manage diabetes, but doesn't cure it. Insulin helps get sugar out of the bloodstream and into the cells, where it can be used for energy. This helps keep blood sugar levels under control, but taking insulin doesn't correct the underlying cause. If a person taking Insulin stops taking it, blood sugar levels will rise again.

Many people in my family have Diabetes, I will get it too. Just because several of your family members are diabetic, it doesn't mean you will definitely get it. Nevertheless, you are definitely at higher risk of developing diabetes and hence, you should bring in healthier lifestyle changes- food, exercise and regular blood tests. Despite all this, if you still turn out to be diabetic, don't

lose hope! Diabetes is a serious disease, but most essentially, it is also controllable. Don't let this disease hinder you from living a long and satisfying life!

On the other hand, if you are among the lucky few without a family history of diabetes, don't ever let your guard down. Factors like weight, eating habits and lifestyle are also known to play a role in the disease. Who knows? When it comes to your family, you could be first in line!

People with Diabetes cannot cut toe nails- The general advice on toenail cutting applies to everyone. People with diabetes must keep their nails healthy by cutting them along the shape of the end of their toes. Nails should not be curved down the sides, or too short. It is safest to trim nails with nail cutters and to use a nail file to trim the corners of the nails.

I don't have a family history of diabetes, so it is unlikely that I will get it- Some people are born with a greater chance of developing diabetes than others. However, plenty of people diagnosed with the disease don't have a family history of diabetes. Your weight and lifestyle can be factors in whether you develop diabetes.

I am already doing a lot of housework which is equivalent to exercise- It depends on the type of housework as not all housework is equal to exercise. Activities such as cooking do not require much effort and cannot be considered exercise. However, activities such as washing utensils, washing clothes or cleaning the house can be counted as moderate exercise.

Medicines once started will be for lifelong- It's true that medicines for Diabetes do not cure the disease, but the idea behind taking these medicines is to decrease suffering from the complications of Diabetes or dying an early death due to Diabetes. Often, when people have become old (example turn 75 or 80 years old), doctors will decrease their medicines or stop them altogether as they have already lived a full life, and dying from the disease would be more acceptable. However, if you feel you are still young and are not prepared to die, then remember that these medicines prevent a lot of people from dying in their 50s and 60s.

Remember, medicines are NOT addictive, the disease persists whether you take medicines or not. Taking medicines reduces your risk of problems, not taking the medicines out of fear only increases your chances of complications and death.

PART 4- BASIC COMMUNICATION SKILLS

This has been discussed in the first manual. We will revise some of the same material to see how they are applicable to our patients with Diabetes.

QUESTIONS FOR DISCUSSION

1) Will eating rice increase blood sugar levels?

2) Will fibre containing fruits such as apple, oranges and bananas increase sugar levels or can they be eaten safely?

3) Can a patient take Ayurveda/Homeopathic medicines in addition to allopathic medicines?

4) Patient says, 'I am afraid of going to the doctor as he might discover more problems?'. How will you answer that?

5) Patient says, 'I don't want any Diabetic medications as I will get addicted'. How will you answer that?

APPENDIX

List of all anti-hypertensive medications

Class of medication	Medication names
"- olol"	Atenolol, Betaxolol, Bisoprolol, Metoprolol, Nadolol, Propranolol, Timolol, Acebutolol, Penbutolol, Pindolol, Carvedilol, Labetalol
"-sartan"	Candesartan, Eprosartan, Irbesartan, Losartan, Olmesartan, Telmisartan, Valsartan
"-pril"	Benazepril, Captopril, Enalapril, Fosinopril, Lisinopril, Moexipril, perindopril, Quinapril, Ramipril, Trandolapril
"-dipine"	Amlodipine, Nicardipine, Nifedipine
Miscellaneous	Amiloride, Bumetanide, Clonidine, Chlorothiazide, Chlorthalidone, Diltiazem, Doxazosin, Eplerenone, Furosemide, Hydralazine, Hydrochlorothiazide, Indapamide, Isosorbide Mononitrate, Methyldopa, Minoxidil, Prazosin, Terazosin, Torsemide, Triamterene, Verapamil

List of commonly used diabetes Medications

Metformin	Glibenclamide	Gliclazide	Glyburide
Glimepiride	Insulin	Pioglitazone	Sitagliptin

List of all Diabetic medications

Type	List
Important	Metformin, Pioglitazone
"Gli-"	Glibenclamide, Gliclazide, Glimepiride, Glipizide, Glyburide
"-gliptin"	Alogliptin, Linagliptin, Saxagliptin, Sitagliptin, Vildagliptin
"-bose"	Acarbose, Voglibose
Injectables	Insulins (many types), Exenatide, Liraglutide, Pramlintide
Miscellaneous	Canagliflozin, Chlorpropamide, Colesevelam, Glucomannan, Miglitol, Nateglinide, Repaglinide, Rosiglitazone, Saroglitazar, Tolazamide, Tolbutamide

Insulins

Short acting Insulin- Regular, Lispro, Aspart, Glulisine

Intermediate acting Insulin- NPH

Long acting Insulin- Glargine, Detemir

Pre-mixed Insulin- NPH and Regular (70:30)

Other Heart Medicines

Aspirin

-statin

Atorvastatin, Fluvastatin, Lovastatin, Pitavastatin, Pravastatin, **Rosuvastatin, Simvastatin**

BLOOD SUGAR LOG

Targets for blood sugar	My usual results
Fasting & before meals: 70-130	
2 hours after start of a meal: below 180	

Date	Before Breakfast	Before Lunch	Before Dinner

Names of medications/dose/frequency-

1) _____/_____/_____

2) _____/_____/_____

3) _____/_____/_____

References-
1) http://southsidediabetes.com/patients/controlling-your-diabetes/ (Accessed on 10/10/2014)
2) http://www.diabetes.org/living-with-diabetes/treatment-and-care/blood-sugar-control/Low blood sugar-low-blood.html (Accessed on 11/05/14)
3) http://diabetes.niddk.nih.gov/dm/pubs/medicines_ez/insert_C.aspx (Accessed on 11/07/14)