Meethi Zindagi
میٹھی زندگی سب کے لئے

Self Management Handbook

SETUP

Structured Education For Type 1 Diabetes Understanding In Pakistan

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TYPE 2 DIABETES

Introduction

This book has been written specially for adults with type 1 diabetes, to help them in understanding their diabetes and manage it well. The book can be used by family members for children with type 1 diabetes to aid them in basic understanding of the condition. However, children may have different manage--ment target as compared to adults. They may also need to check blood sugars more often and carbohydrates may impact their blood sugar levels differently.

The book has been written in easy and understandable language to ensure that everyone, whatever their educational background may be, can understand the content. An Urdu version of the book is also available for those who feel more comfortable reading in the native language. A softcopy of the book can be downloaded from www.meethizindagi.org/publications.

The book covers most important topics that are of interest to the type 1 diabetes community to manage their daily lives. This book should not be used as an alternative to medical guidance and support from your healthcare team. It is designed to support your healthcare team in educating you and empowering you to manage your diabetes in a better way. You will only be able to take good care of yourself if you understand your condition, empower yourself for daily self-management and be in frequent contact with your health care team.

Structured Education for Type 1 Diabetes Understanding in Pakistan is designed to be used as a guiding book for educational workshops conducted by Meethi Zindagi. Fill the form on our website www.meethizindagi.org/getinvolved for regular updates about events happening in your city to get hand-on experience on use of the book through structured workshops.

For getting further support, both educational and emotional, join our social media groups (details on back side of this page) to connect, get aware and feel empowered. You Are Not Alone! We Are Together in Living Beyond Diabetes!

What can this book do for you:

- ✓ Help you understand your condition.
- ✓ Learn how insulin works.
- ✓ Learn your management targets and tips to achieve them.
- ✓ Learn about various foods and their impact on your blood sugars.
- ✓ Learn how to calculate insulin doses for your meals.
- ✓ Inspire you to feel emotionally empowered with your condition.

Thank you.

Meethi Zindagi

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1 Types of Diabetes

1.1 Types of Diabetes

Type 1 Diabetes	**Type 2** Diabetes	**Gestational** Diabetes
10 %	90 %	Occurs During Pregnancy
Body Stops Producing Insulin	Produced Insulin Is Either Insufficient or Ineffective	High Blood Sugar Level Usually Ends After Giving Birth
Non-Preventable	Largely Preventable	Risk Can Be Reduced
	With	**60% Chances of Developing Type 2 Diabetes Later On**
	Exercise, Weight Management, Healthy Diet	

1.2 Type 1 diabetes

- Type 1 diabetes can occur at any age. However, it mostly occurs in children & teenagers.
- In type 1 diabetes, there is no insulin production by the pancreas (insulin producing factory of the body). Insulin is the most vital hormone in the body which helps convert carbohydrate from food into energy.
- Type 1 diabetes is an autoimmune disorder in which the body's immune system attacks its own insulin producing cells in pancreas and results in complete cessation of insulin production. This is an irreversible process. Once the pancreas' insulin producing cells stop producing insulin, current science has no way of reviving them to start producing insulin again.
- As there is no insulin production in the body, we need to inject it from external sources. Insulin has no other replacement.
- Type 1 diabetes does not result from unhealthy eating or lack of exercise. However, a person with type 1 diabetes should be careful to lead a healthy lifestyle as it assists in managing blood sugar levels.

1.3 Type 2 diabetes

- Type 2 diabetes is more common in the people above the age of 30. However it may occur at any age, even in children.
- In type 2 diabetes the pancreas produces enough insulin but the body is unable to utilize the insulin efficiently hence raising blood sugar levels. Many a times the pancreas is producing insulin in large amounts (more than normal production) to bring the blood sugar levels down. However since the insulin does not work properly, the blood sugar level stays on the higher side.
- The main risk factor to develop type 2 diabetes is being overweight which is usually a result of unhealthy eating habits and lack of exercise.
- Family history and hormonal problems are also important risk factors.
- Type 2 diabetes can be managed with lifestyle modification alone or in combination with tablets. Some people with type 2 diabetes may need insulin after a few years of having it.

1.4 Gestational diabetes

- Another fairly common type of diabetes is the diabetes that occurs in women during pregnancy.
- High blood sugar first appears when the woman is pregnant and usually disappears once the woman gives birth to the child. This is called gestational diabetes.
- Quite commonly, women who develop diabetes during their pregnancies, also develop type 2 diabetes some years later in life.
- Women with gestational diabetes may be prescribed lifestyle changes or insulin during pregnancy.
- In some cases type 1 or type 2 diabetes may be detected first time during pregnancy (usually in the first trimester) and does not go away even after the birth of baby. In such a case it is not called gestational diabetes.
- Gestational diabetes can be managed with lifestyle changes with or without insulin &/or tablets.

Comparison Between Types of Diabetes

	Type 1 Diabetes	Type 2 Diabetes	Gestational Diabetes
Usual age of onset	Children or teenagers	Adults above 30 years	2nd/3rd trimester of pregnancy
Onset of symptoms	Rapid	Slow	Slow, usually un-noticeable
Body weight	Thin , Rapid weight lose	Normal or overweight	Normal or overweight
Insulin production	Very Little or none	Normal or excessive	Normal or overproduction
Prevalence	5-10%	90%	7% - 13% of all live births
Cause	Autoimmune pancreas infection	Family history, unhealthy lifestyle or hormonal problems	Unhealthy lifestyle, gaining too much weight during pregnancy
Management	Insulin	Lifestyle changes with or without tablets &/or insulin if required	Can be managed with lifestyle changes with or without insulin &/or tablets if required
Tests for Diagnosis	Same tests as for type 2 diabetes. Additional Tests (if recommended by the doctor) · Blood tests to check for antibodies (Anit-GAD) · Urine or blood ketones tests · C-peptide test	Diabetes is diagnosed at an HbA1C of greater than or equal to 6.5% Or Fasting blood sugar level of 126mg/dl or higher Or Random blood sugar greater than 200mg/dl	Oral Glucose Tolerance Test (OGTT) conducted between 24-28 weeks of pregnancy, by drinking a special liquid and getting blood sugar tested every hour for 2-3hours

Common Onset Ages of Different Types of Diabetes

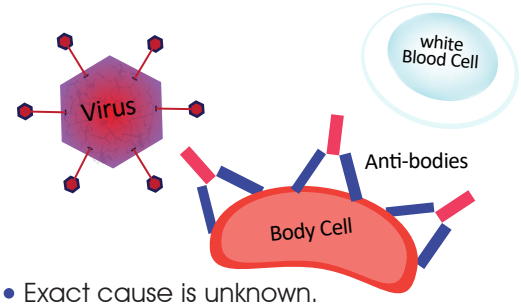
Type 1 Diabetes

Type 2 Diabetes

Gestational Diabetes

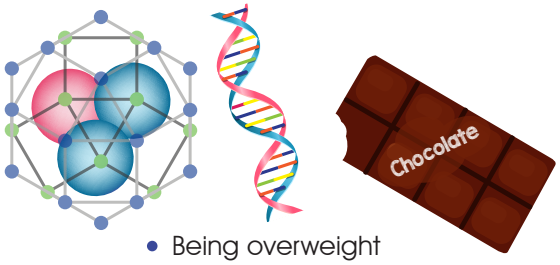
Common Causes of Type 1 Diabetes & Type 2 Diabetes

Type 1 Diabetes



- Exact cause is unknown.
- Usually body's immunesystem attacks its own insulin producing cells in pancreas.

Type 2 Diabetes



- Being overweight
- Unhealthy eating
- Lack of exercise
- Family history
- Hormonal problems

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1- https://www.diabetes.org.uk/

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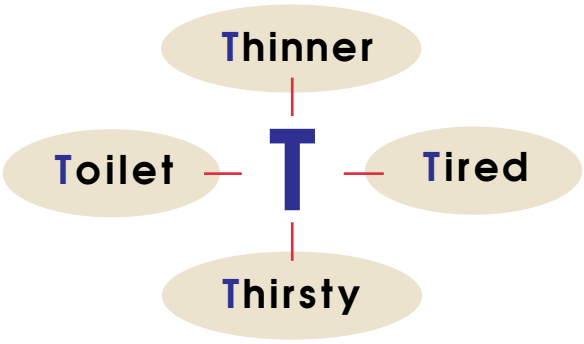
2 Symptoms of Types 1 Diabetes

2.1 Symptoms of Type 1 Diabetes

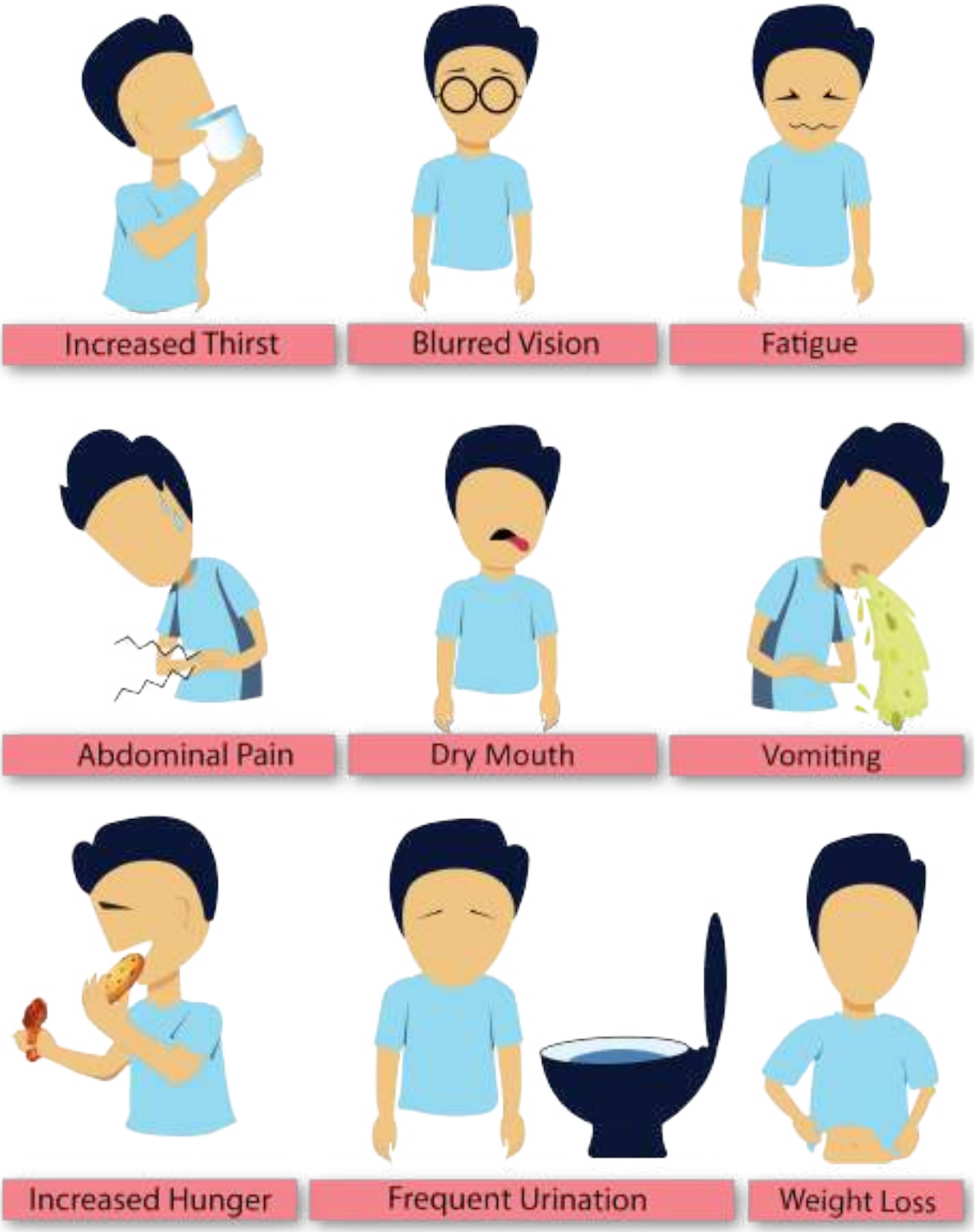
- Insulin is a hormone that acts like a key to open the lock of cells of the body for glucose (sugar) to enter into body cells from the blood stream. Read chapter 4, Insulin For Life, for details.
- Body cells use glucose for energy.
- Lack of insulin in type 1 diabetes results in glucose staying in the blood hence rising sugar levels.
- Body tries to get rid of excess glucose by excreting it through the kidneys.
- Glucose attracts and carries water out of the kidneys as well resulting in excessive urination and dehydration which causes increased thirst.
- As body cells are deprived of their main energy supply (glucose) hence body starts to burn and use fats as an alternate energy source which results in weight loss.Therefore most common type 1 diabetes symptoms are the four T's : Tired, Thirsty, Thinner & Toilet.

Many people with type 1 diabetes are diagnosed after they land into the life-threatening condition of Diabetic Ketoacidosis DKA.
Early recognition of the symptoms can lead to timely diagnosis and treatment. Create awareness about the symptoms of type 1 diabetes & save lives.

Symptoms of Type 1 Diabetes



Symptoms of Type 1 Diabetes



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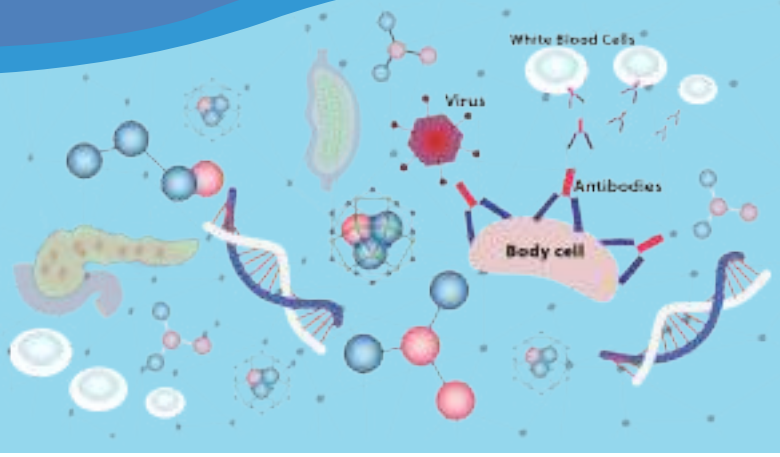
Causes of Type 1 Diabetes & Genetic Risk

3



3.1 Causes of Type 1 Diabetes & Genetic Risk

- It is proven by research that type 1 diabetes is not caused by unhealthy diet or lack of exercise hence try not to blame yourself for it or let anyone else blame you as well. Like people do not choose to have cancer it just happens.
- Type 1 diabetes is caused by “autoimmunity” where the body`s immune (defence) system which usually defends us against various infections and other illness starts to, for reasons not entirely known, act against the body itself. The main target in type 1 diabetes for the immune system is to attack the insulin producing beta cells of the pancreas (insulin producing factory in the body) hence resulting in total lack of insulin production. This is an irreversible process & hence type 1 diabetes is a condition that remains for entire lifetime.
- Whilst type 1 diabetes can occur at any age it is mostly observed to occur either between the age of 4-6 years or 10-14 years. However, even people 50 or 60 years old may be diagnosed with type 1 diabetes.
- The risk of a mother with type 1 diabetes genetically passing this on to her baby is 1- 4%.
- The risk of a father of passing type 1 diabetes to his children is 3 - 8%.
- The risk of passing type 1 diabetes of passing to next generation is much lower than that of type 2 diabetes.
- If both parents have type 1 diabetes, the chances of passing it on their children rises to 10% - 20%.
- The risk of siblings developing type 1 diabetes is between 1 to 5 % however it is much higher if your sibling is an identical twin.
- The chances that the first degree relatives of a person living with type 1 diabetes will also develop the condition are upto 5 percent.

Chances of Family Members Having Type 1 Diabetes

If only father has type 1 diabetes

1 in 17
Chances of children having type 1 diabetes

The chances are **doubled**
If father developed type 1 diabetes **before the age of 11 years**

If both parents have type 1 diabetes

1 in 10 - 1 in 14 Chances of children having type 1 diabetes

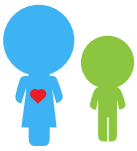
If only mother has type 1 diabetes

Chances of children having type 1 diabetes

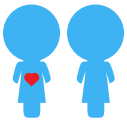
1 in 25 chances if mother is **younger than 25 years** at the time of pregnancy

1 in 100 chances if mother is **older than 25 years** at the time of pregnancy

If you have type 1 diabetes

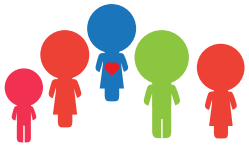


≈ 5 % Chances of your **sibling** having type 1 diabetes



≈ 50 % Chances of your **identical twin** having type 1 diabetes

≈ 5 % Chances of your **1st degree relatives** having it.



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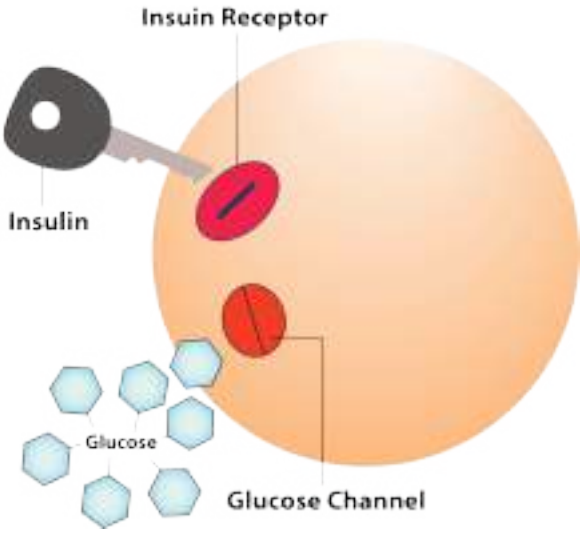
Insulin For Life 4

4.1 Insulin For Life

- With type 1 diabetes you will need insulin for life. Even omitting insulin for a few days can make you feel unwell and expose you to develop the potentially life-threatening complication of Diabetic Ketoacidosis (for reference please see chapter no. 12: Ketoacidosis).

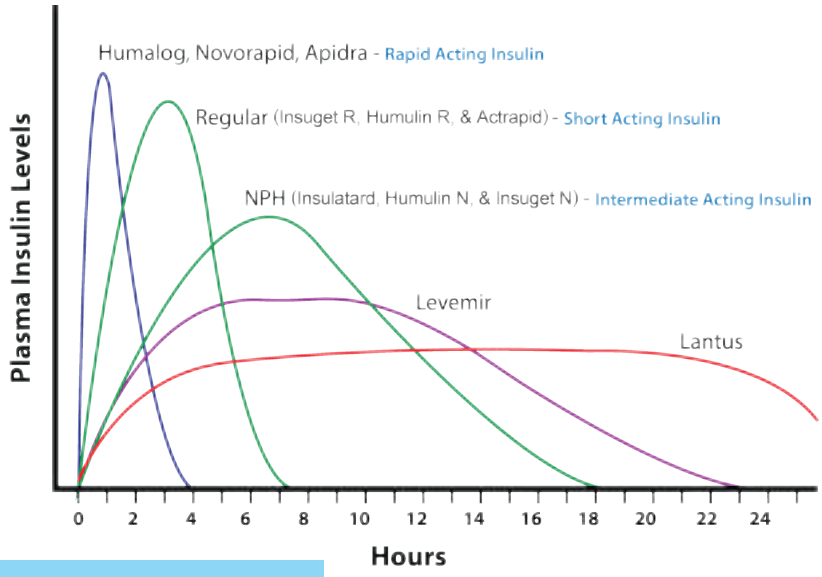
4.2 How does insulin work?

- In order to understand how insulin works it is important to know about its interaction with glucose.
- Glucose is a sugar that comes from carbohydrates.
- When we eat carbohydrates, it's broken into glucose in blood stream, some of the glucose is utilized by cells to provide energy and rest of it is stored in liver for backup energy supply.
- The glucose is taken from the blood into cells with the help of insulin. Insulin basically acts as a carrier of glucose to the cell.
- If there is no insulin then the level of glucose in blood will tend to increase.



4.3 Life with insulin

- One can lead a very happy, contented & healthy life with insulin.
- There are the certain schedules to be followed and continuous monitoring is required and targets to be achieved. Your diabetes specialist will assist you in achieving this.
- Insulin is not a cure. It is a support for life.



4.4 Types of insulin

Bolus/Rapid Acting Insulin Usually taken at each meal-time	Humalog, Novorapid, Apidra	Onset: 3- 15 mins Peak: 30 to 90 mins Duration: 3-5 hours
Short Acting Insulin Also known as regular insulin, usually taken twice a day	Humulin R, Actrapid, Insuget R	Onset: 30 mins Peak: 2- 4 hours Duration: 5-8 hours
Intermediate Acting Insulin Usually taken twice a day	Humulin N,Insulatard, Insuget N	Onset: 1-2 hours Peak: 4-12 hours Duration: 8-24 hours
Basal/Long Acting Insulin Usually taken once or twice a day & provides background cover	Lantus , Levemir Basagine	Onset: 2 hours Peak: No/small peak Duration: 14-24 hours
Ultra-long-acting* Usually taken once a day and provides background cover *They give 2 peaks as per combination	Tresiba, Toujeo	Onset: 1-6 hours Peak: No/small peak Duration : 36-40 hours
Pre-mixed Insulin* Usually taken twice a day *Produces similar response as Basal/long acting Insulins but for more time period	Humulin 70/30, Humalog Mix 50, Mixtard 30, Novomix 30	Is a mixture of Rapid Acting or Short Acting Insulin with Intermediate Acting insulin.

References:
1- https://www.ispad.org/
2- UCSF Medical Center, Diabetes Education Online Modules.

Honeymoon Phase of Type 1 Diabetes

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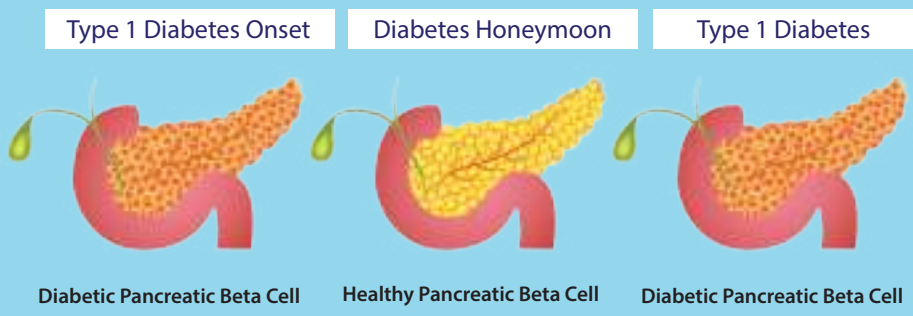
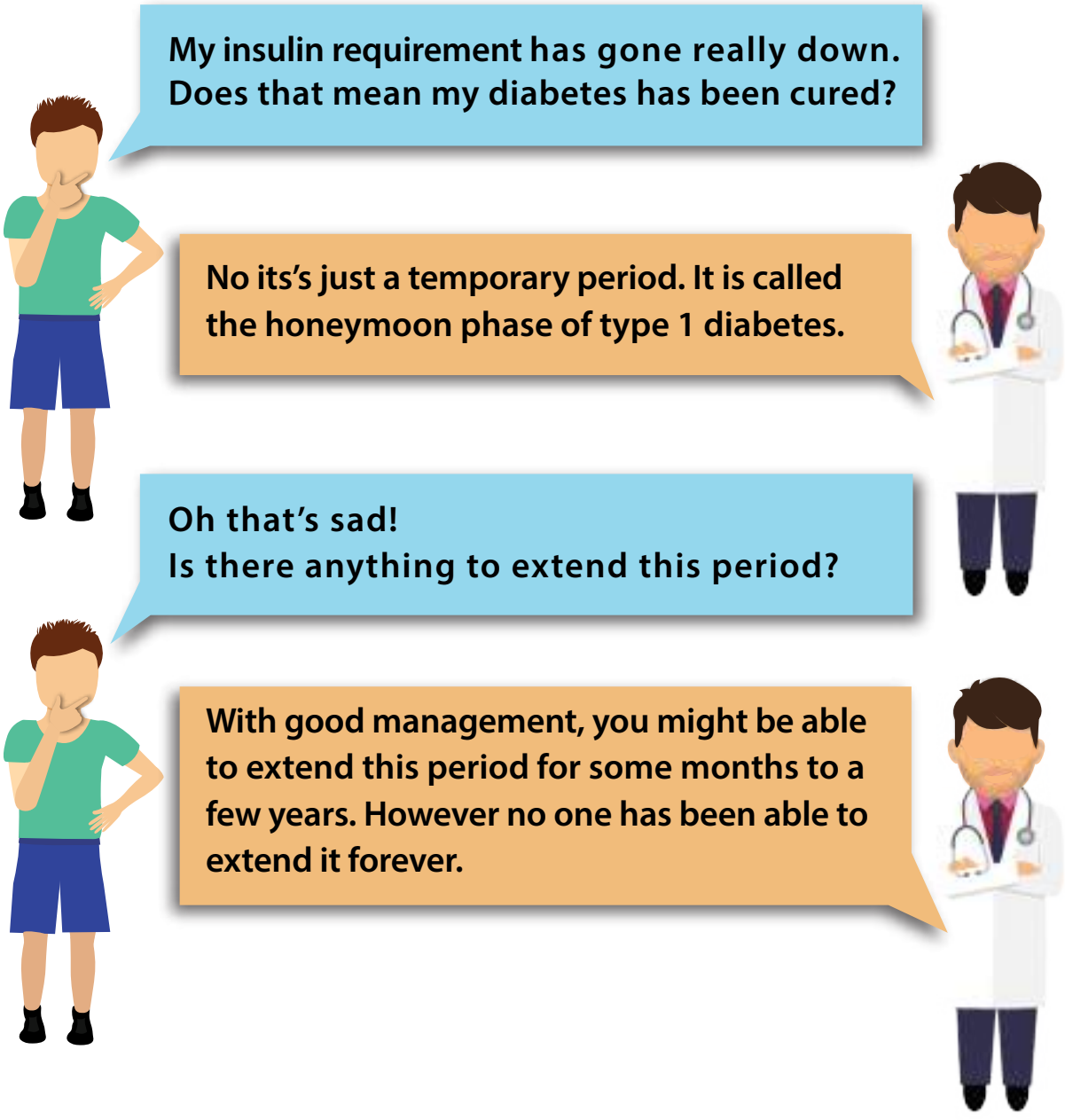


5.1 Honeymoon Phase of Type 1 Diabetes

- Diabetes honeymoon is the period shortly after the newly onset diabetes type 1 during which there is temporary recovery of pancreatic beta cell function and insulin secretion.
- A few weeks or months after the diagnosis of type 1 diabetes, due to reasons not entirely known, some people may start to experience frequent episodes of low blood sugar (hypoglycaemia). It has been shown that this may result due to some temporary regeneration of insulin producing beta cells of the pancreas.
- During this phase, people with type 1 diabetes should monitor their blood sugar levels more frequently and may have to reduce the dose of their insulin significantly.
- You should maintain close liaison & follow up with your diabetes specialist during this phase.
- This phase can last from few months to few years but this phase is transient and does eventually pass away.
- Going into honeymoon phase does not mean that you do not have type 1 diabetes anymore, or that you do not need to start insulin therapy ever again. Neither can you be managed with tablets! That will just not work!
- Do not stop your insulin altogether during this phase as if insulin is stopped the sugar levels may rise sharply over days and can result in a potentially life-threatening condition Diabetic Ketoacidosis (Ref: Chapter 12: Ketoacidosis).
- With proper maintenance of blood sugar levels in honeymoon phase, some insulin producing cells of the pancreas can be preserved.
- Remember that the key to good management during honeymoon phase is frequent blood sugar checking and a close contact with your doctor.
- The only way to know that honeymoon phase has ended is when you start observing that your blood sugar readings are going higher and out of range.

- Once honeymoon phase is over, another such phase will not occur in the life of a person with type 1 diabetes.
- Over the years of living with diabetes, you will gradually learn some effective ways of diabetes management.
- You may also have improved insulin sensitivity due to better lifestyle or hormonal changes due to age and other factors. This may result in lowering of your insulin requirements. This should not be mistaken for a honeymoon phase.
- Never stop using insulin on your own, assuming it's a honeymoon period. That could be dangerous and lead to Diabetic Ketoacidosis (DKA). Make sure you are in liaison with your doctor.



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6 Blood Glucose Monitoring & Targets in Type 1 Diabetes

6.1 Blood Glucose Monitoring & Targets in Type 1 Diabetes

- Blood glucose monitoring & achieving targets for people with type 1 diabetes is vital because of the following reasons:
  - To feel healthy
  - To avoid infections caused by raised blood glucose level
  - To prevent complications

6.1.1 Blood glucose targets

- Whilst most people with type 1 diabetes should strive to achieve the following targets however your diabetes specialist may individualize your targets for you.
  - Fasting & before meals-72-126 mg/dl
  - After meals-90-180 mg/dl
  - Bedtime-up to180 mg/dl

6.1.2 Frequency & timing of blood glucose monitoring

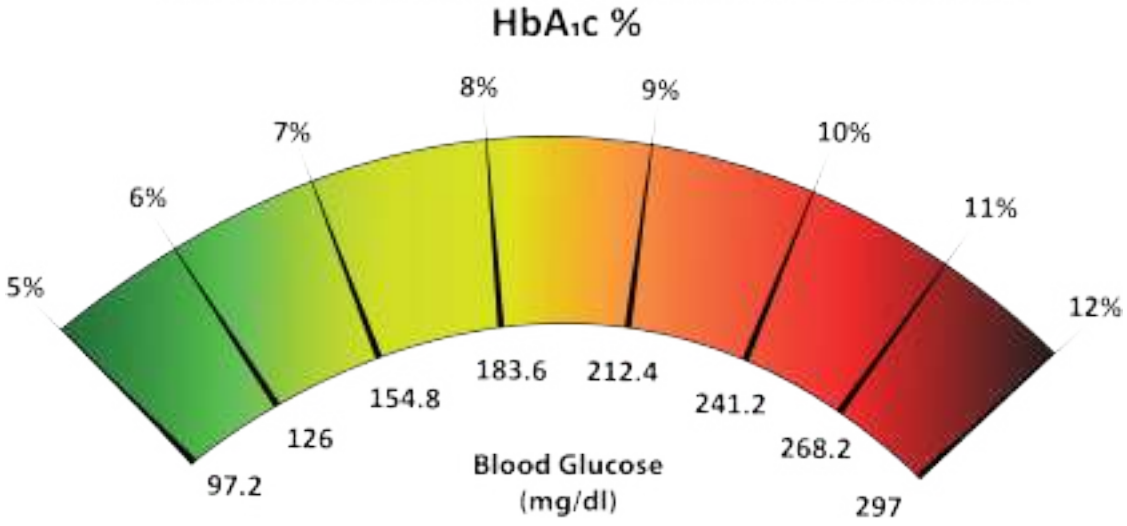
- This is individualized for every person with type 1 diabetes and is mutually decided between the person & his/her diabetes specialist.
- The frequency & timing depends on many factors like stability of diabetes, variation in day to day blood glucose levels, hypoglycaemia, ability to recognize hypoglycaemia and other health problems.
- Generally speaking, most people with type 1 diabetes need to check blood sugar levels around four times a day.

6.2 HbA1c as an indicator of blood sugar level management

- Also known as glycated haemoglobin, glycosylated haemoglobin or haemoglobin A1c, this blood test gives an insight into average blood sugar levels.

- Glucose gets attached to red blood cells in the blood circulation. HbA1c measures the amount of glucose that has attached to hemoglobin (an iron containing component of red blood cell) over the lifespan of red blood cells which is on average about four months.
- The lesser the amount of glucose attached to red blood cells, lower will be HbA1c & the lesser will be the long-term risk of developing complications.

HbA1c as an indicator of blood sugar level management:



6.2.1 Target HbA1c

- Try to achieve & maintain your HbA1c up to 7%.
- If you can safely achieve HbA1c below 7% that's even better in context of preventing long term complications.
- Your diabetes specialist may set an individualized HbA1c target for you.
- It is best to have your HbA1c tested at least twice a year. Getting it done every 3-4 months would assist you & your diabetes specialist even more to fine tune your diabetes management.
- A low HbA1C does not always mean good blood sugar management. It may mean that you have had a lot of hypos which have kept average blood glucose over the past months on the lower side. Make sure that you correlate your HbA1c test with your daily blood sugar level trends to get a complete insight into your overall diabetes management.

Relationship between HbA1c and estimated average blood glucose levels

HbA1c %	Estimated average blood glucose level mg/dl
6%	126 mg/dl
7%	154 mg/dl
8%	183 mg/dl
9%	212 mg/dl
10%	240 mg/dl

References:
1- https://www.ispad.org/
2- http://www.diabetes.org/

7 Diet for Type 1 Diabetes

7.1 Diet for Type 1 Diabetes

- Your diet is critically important in the management of type 1 diabetes.
- To effectively manage HbA1c and achieve stable blood sugars, it is important for you to understand how to balance food intake, physical activity, and insulin. Making healthy food choices every day has both immediate and long-term effects.
- With education and practice, it is possible for you to eat well and manage diabetes.
- Many factors affect how well your diabetes is managed. Many of these factors are under your control, including how much and what is eaten, how frequently the blood sugar is monitored, physical activity levels and insulin dose.

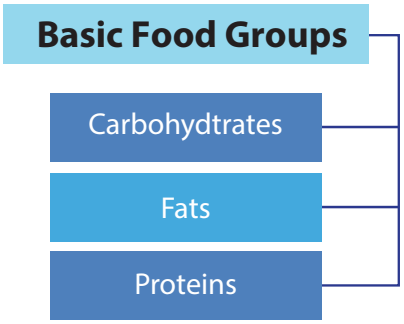
7.1.1 Type 1 diabetes & meal timing

- Consistently eating at around the same times everyday is important for some people, especially those who take insulin twice daily. If a meal is skipped or delayed, you are at risk for developing low blood sugar level.
- People who use intensive insulin therapy (multiple daily insulin injections or basal - bolus therapy) have more flexibility around meal timing. With these regimens, skipping or delaying a meal does not usually increase the risk of low blood sugar level.
- The one-word answer to what you can eat with type 1 diabetes is “Anything”.
- However, please ensure you monitor your blood glucose levels & adjust your insulin dose accordingly.

7.2 Tips for healthy eating with type 1 diabetes

- Stick to your usual foods.
- An occasional treat is fine, just watch your portion size.
- Avoid sugary drinks and fruit juices. They usually put blood glucose levels up very high and very quickly.
- Instead, drink water, sugar-free and diet soft drinks. Tea and coffee are fine to take in moderation.
- Remember that foods labelled 'diabetic' or 'suitable for diabetics' usually have high amounts of fat.
- Foods labelled 'sugar free' are not necessarily 'carb free'. Read the nutrition label before delving into it!
- Include some carbohydrates with each meal as without carbohydrates, your insulin may cause blood glucose levels to drop too low.
- Healthier sources of carbohydrates include whole grains, vegetables, fruit, pulses, and nuts.

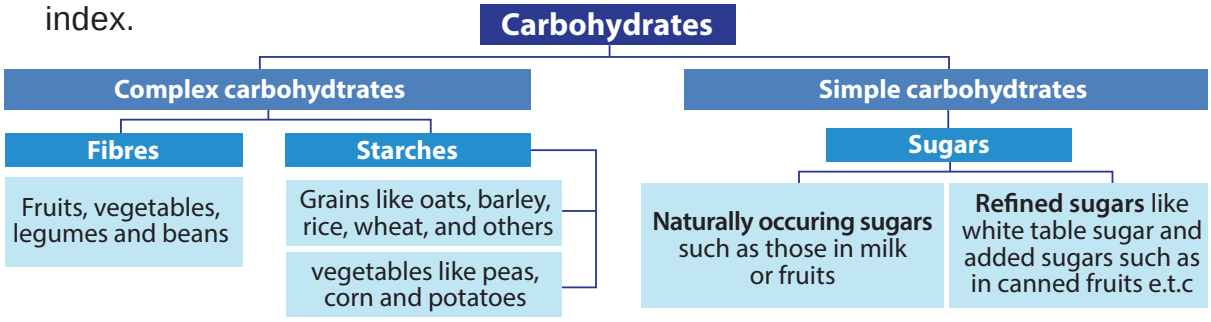
7.3 Food groups



- To learn how different foods impact your body, you need to know the various food groups and their effect on blood sugar levels.
- There are three basic food groups: carbohydrates, fats and proteins. Many foods contain two or more food groups. Each food group in a meal will have a different impact on your blood sugar levels. You will learn more about this in this chapter and chapter no. 8 (Carbohydrates & Carbohydrate Counting).

7.3.1 Carbohydrates

- There are three main types of carbohydrates: Starches (or complex carbohydrates), sugars and fibres. Carbohydrates are often called 'carbs'.
- When you eat carbs, your body breaks them down into simple sugars, which are absorbed into the bloodstream. So the sugar level rises in your blood.
- Different foods containing carbohydrates may be broken down at different speeds. Some may be broken down faster than others.
- The speed with which the carb is digested and absorbed into the blood stream to raise blood sugar level is known as glycaemic index (GI).
- Glycaemic Index is a number between 0-100. Carbs with low glycaemic index will raise your blood sugar level more slowly than those with high glycaemic index.



Starches

- These are complex carbohydrates. They are broken down by your body into simple sugars before absorption into the bloodstream. They absorb slower than refined or simple sugars.

Sugars

- These are simple carbs which digest and cause a blood sugar rise pretty quickly.
- Refined sugar such as white table sugar, or added sugar, such as in canned fruits, candies, sugary drinks etc. are simple carbs. Simple carbs or sugars also occur naturally in more nutritious foods such as milk and fruits.

Fibres

- These pass through your digestive system without being fully digested. They are contained in indigestible parts of plants. They do not affect your blood sugar levels. They have a very important role in keeping your digestive system healthy. Fiber helps to make you feel full after eating.
- The ideal amount of carbohydrate intake is uncertain. However, monitoring carbohydrate intake (basic or advanced carbohydrate counting, discussed in detail in Chapter 8) is important in people with type 1 diabetes.
- Carbohydrate intake directly determines post meal blood sugar, and appropriate insulin adjustment for identified quantities of carbohydrate is one of the most important factors that can improve blood sugar management.

7.3.2 Proteins

- Protein is one of the three main nutrients, along with carbohydrate and fat. Proteins are found in meat, chicken, fish, eggs, milk and dairy products, beans, nuts, etc.
- If you do not eat enough carbohydrates, then proteins are broken down as glucose by the digestive system and used for energy.
- Other than providing energy it has some more important functions too. It helps the body to grow new tissue, therefore helping to build muscle and repair damage.
- Proteins do not affect blood glucose levels directly as they need 2-4 hours to be digested and converted to glucose. The amount of protein turning into glucose after digestion is assumed to be around 50%.
- Hence proteins generally do not count towards the insulin you have to take for a certain meal.
- However, it is important to understand that proteins do digest after a few hours and raise your blood sugar levels a little. They can be used for stabilizing blood sugars after meals or during night time for people having night time lows, or those who cannot have mid-meal snacks in the daytime.

7.3.3 Fats

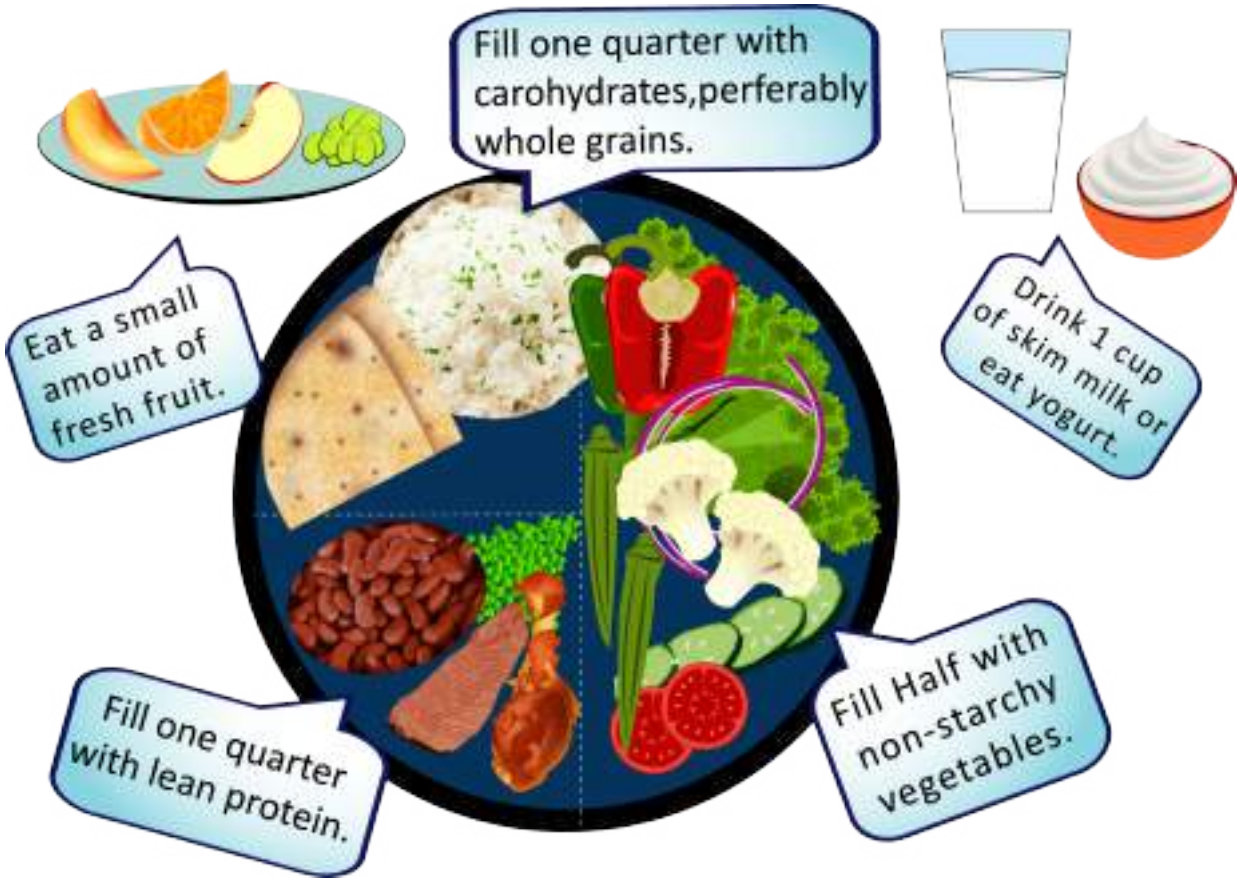
- Along with protein and carbohydrates, fats are one of the main nutrients.
- Fats have important functions in the body. Apart from providing energy dense nutrition, they protect our organs, keep us warm, keep our skin and hair healthy, help the body absorb vitamins from foods, produce hormones, build cells and help our body cells to function properly.
- Fat quality is more important than the fat quantity. Saturated fat and trans-fat contribute to heart disease while mono-unsaturated and poly-unsaturated fats

do not contribute to heart diseases.

- It is important to choose healthy mono-unsaturated and poly-unsaturated fats (vegetable oils, fish, nuts) in our diet and reduce the use of unhealthy saturated and trans-fats (red meat, full fat milk and cream, skin on chicken, eggs, etc.).
- The fat we eat does not directly raise our blood sugar levels. Its effect on blood sugar levels is slow and minimal.
- It is approximated that around 10% of the fat we eat is converted into glucose in 8-10 hours after eating. Like proteins, fats can be used for stabilizing blood sugar levels for long periods.

7.4 My plate

- Eating a balanced and healthy diet is important for everyone. Every food group needs to be present in the meals, in moderation.
- My plate is a simple and effective way for meal planning. It gives you the flexibility in food choices but changes the portion sizes to include larger portions of non-starchy vegetables and a smaller portion of starchy foods. Try new foods within each food category when you get used to my plate concept.



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8 Carbohydrates & Carbohydrate Counting

8.1 Carbohydrates & Carbohydrate Counting

- Carbohydrates are the main source of energy for our bodies.
- Types of carbohydrates were discussed in Chapter 7. In this chapter, we will discuss how to properly manage carbohydrate portions in your meal and take insulin dose according to the carbohydrate count in the meal.
- Everyone needs to include some carbohydrate-containing foods. The amount of carbohydrate that you need to eat depends on your age, weight, current blood sugar level, activity level and whether you are trying to reduce, gain or maintain your weight.
- If you are trying to lose weight, while maintaining good blood sugar levels, your dietician may advise you to use a low-carb diet.
- However, not everyone with diabetes needs to restrict carbs in their meals.
- With carb counting and dose adjustment knowledge, you should aim at staying healthy, maintaining a healthy body weight, and keeping your blood sugar levels, HbA1C, cholesterol, and other blood tests in range.
- If you have a healthy weight, you may be able to include more healthy carbs in your meals and adjust insulin doses accordingly. You may also be able to enjoy occasional treats if you learn to implement carb counting knowledge.
- However, always remember that eating healthy most of the time is important for everyone, whether they have diabetes or not.

8.2 Which foods have carbohydrates?

- Carbohydrates are simple sugars or starches found in food. Foods that contain carbo--hydrates include:

Cereals	Fruits and Vegetables	Dairy Products
Bread	Potato	Milk
Chapattis/Roti/Naan	Potato products, e.g. crisps, chips	Yoghurt
Rice	Fruits	Ice Cream
Pasta	Fruit Juice	
Noodles	Beans, Pulses, lentils	
Biscuits	Corn, peas	
Cakes/Pastry/scones		
Pan cakes		
Flour		
Sugar		
Honey		

8.3 Why count carbohydrates?

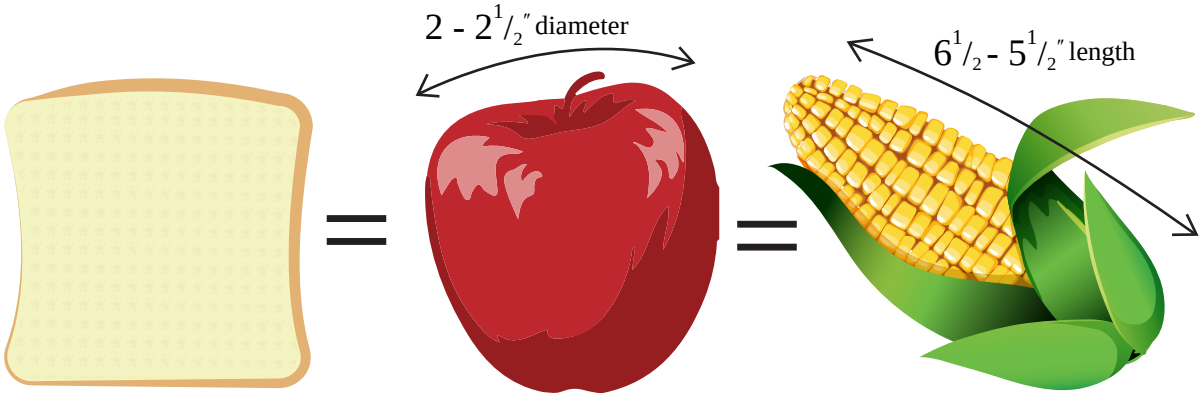
- Carbohydrate counting, or "carb counting," helps many people with diabetes, manage their food intake and blood sugar levels.
- It's most often used by people who take insulin twice or more times a day.
- Carb counting may give you more choices and flexibility when planning meals. It involves counting the number of grams of carbs in a meal and matching that to your dose of insulin. With the right balance of physical activity and insulin, carb counting can help you manage your blood sugar levels.
- It is important that you are able to identify foods that contain carbohydrates.

8.4 Effect of different types of carbohydrates on blood sugar levels

- Rate of absorption of starches and sugars is different in your body. This is called "Glycaemic index" as discussed in Chapter 7.
- Pure fruit juice raises your blood sugar level more quickly than whole fruits; fruits have fibre which is digested slowly.
- Sugar and sugar added products like canned fruit, sugary drinks, candies, etc. raise your blood sugar levels quickly.
- Beans, lentils, milk etc. are digested more slowly and raise your sugar after some delay.
- Whole grains, such as whole wheat, brown rice, etc. take more time to digest and raise blood sugar levels as compared to flour and white rice. Flour has a higher GI than whole wheat.
- Foods having a combination of fats, proteins and carbs produce a gradual rise in your blood sugar. One such example is pizza. Fats slow down the digestion process and absorption of glucose in blood from carbohydrates.

8.5 Carbohydrates servings/portion

- 1 serving of carbohydrate is equal to 15 grams of carbohydrate. Any food containing 15 grams of carbs is called one carb serving or one carb portion.

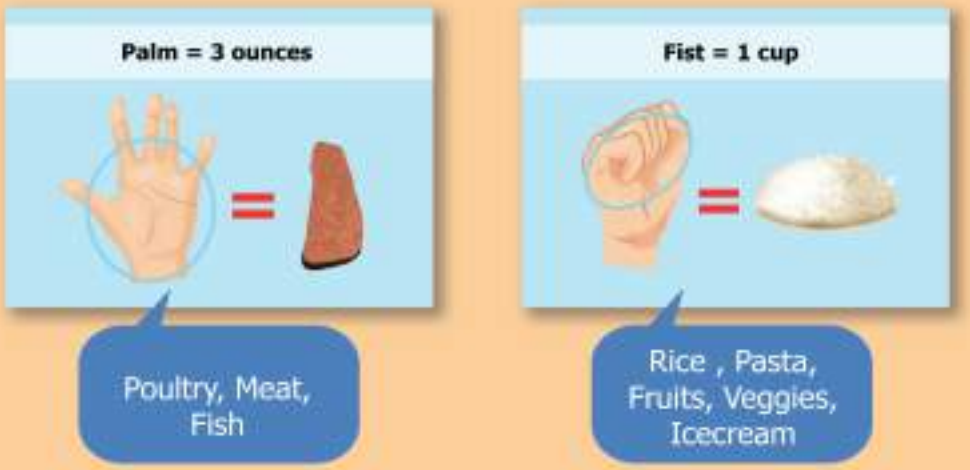


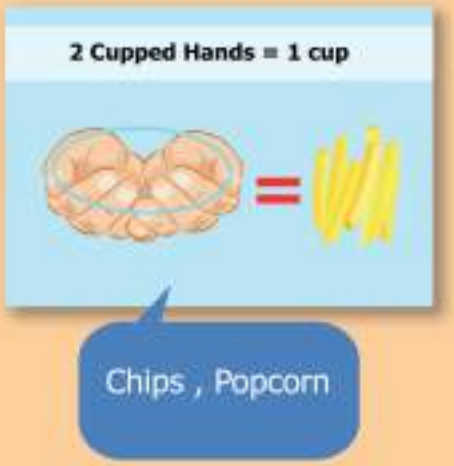
- On average, most adult females need 30-60 g of carbs in a meal, and 15-30 g of carbs in a snack.
- On average, most adult males need 60-75 g of carbs in a meal and 15-30 g of carbs in a snack.
- However, these limits can be individualized by your dietician and you for your routine meals or according to situation and your life goals. For example if you need/want to reduce weight, the dietician may advise to go with lower limits. With the help of your doctor, you would be adjusting your insulin dose for lower amounts of carbohydrate intake. The opposite will be true if you wish/need to gain weight. There are no hard limits.
- 15g of carbohydrates on average raise blood sugar by 54 - 81 mg/dl.
- However, it may vary from person to person depending on factors including your weight, your age, when did you last take your fast acting or regular insulin, when did you last eat, the type of food you took, the time of the day and your activity level in the last hour.
- Therefore, you must use a mix of these guidelines based on averages and your personal experience. There is no “one-size-fits-all” when it comes to carb counting and insulin dosing.
- You can try a personal test to know how much your blood sugar rises by eating 1 carb portion (or 15 g of carbs). Keep a diary of all the factors mentioned above (time of the day, hours since last insulin dose, hours since last meal, type of meal, time since last activity and intensity of activity). It will help you understand your body’s responses to various foods.

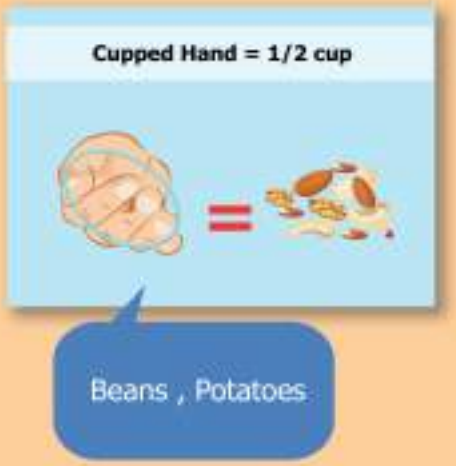
8.6 How to count carbohydrates?

- Carb counting requires you to be able to measure or estimate the amount of food you are eating. Measuring cups, spoons and food scales can be helpful to estimate the amount of food.
- Once the amount of food is known, you can use this book, various apps or verified online resources to check the amount of carbs in that food.
- You may also be able to use your hand based estimates for determining food portions (see a handy guide for portion sizes on on subsequent pages).
- Always use verified apps, books or websites.
- Learn to read food labels. Most packaged foods have carb amount mentioned on the package.

A Handy Guide To Portion Size



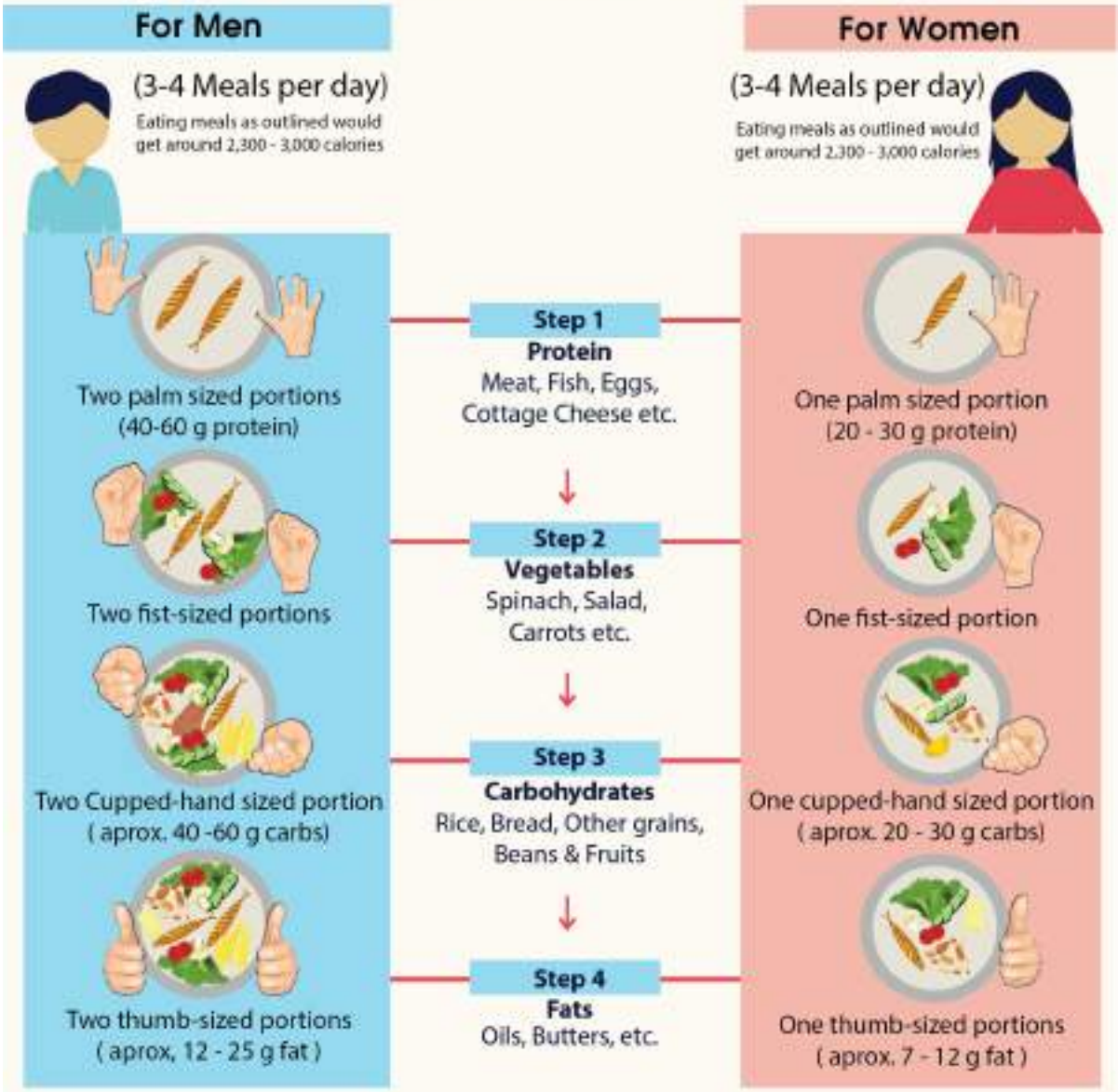




Your Hand Is All You Need

Your hand is proportionate to your body, it's size never changes & its always with you, making it the perfect tool for measuring food and nutrients (minimal counting required).

Here is How To Use This Method To Build Your Plate



You may need to customise your plan by adding / reducing some portions as per your personalized goals.

Average Adult Hand Portion	Approximate serving size	Use
Clenched fist	1 cup	Used to measure pasta, rice, Fruit, vegetables, potatoes, etc.
Cupped handful	½ cup	Used to measure nuts, raisins
2 cupped handfuls	1 cup	Used to measure salads, Mixed dishes (stew, curry, soups)
A thumb	1 tbsp	Used to measure cheese or fat portions
Tip of thumb	1 tsp	Used to measure butter or fat portions
Palm of hand	3 oz	Used to measure meat portions. Protein portion from meat equals the size of the palm of your hand

8.7 Basic carb counting

- Basic carb counting can be used by beginners.
- Basic carbohydrate counting has two levels.

8.7.1 Level 1: Using exchange lists and carb servings

- Basic carb counting uses exchange lists and carbohydrate servings i.e. 15 grams of carbohydrates = 1 carbohydrate serving.
- This approach works if you take meals with approximately the same amount of carbohydrates every day. Foods having the same amount of carbs are identified e.g. if you are eating a piece of bread that has 15g carbs you can substitute it with a roti (size of a 6" plate).
- People using mixed insulin must take meals at the same time every day containing same amount of carbs and fixed insulin doses. They can benefit from this method.
- People who have trouble being consistent with meals can use advanced carb counting explained below.
- Exchange lists and carbohydrate counts of Pakistani foods are provided on subsequent pages.
- Apps can also be used for exchange lists.

8.7.2 Level 2: Insulin dose per extra carb portion

- The second level of basic carbohydrate counting introduces an increase of 1 unit of insulin for every 15g of additional carbohydrates taken. For example, suppose you normally eat a slice of bread which has 15g of carbs and take 2 units of rapid/bolus/regular/short acting insulin with the meal. If you want to eat 2 slices of bread on a certain day, your meal will equal 30g of carbs and you'll take 1 extra unit of rapid/bolus/regular/short acting insulin for the additional 15g of carbs.
- Please remember that this is just a general guideline for adults and may not exactly fit you.

- To individualize your insulin dose per extra carb portion, you need to test your body needs by trying 15g foods, noting down your pre and 1.5-2 hours post meal levels and insulin dose.
- A safe way to start (especially if you have a low body weight or have been recently diagnosed) would be 1 unit for 2 carb portions (or 30 g of carbs), 1 unit for $1^1/_2$ carb portions (approx. 22.5 g of carbs) and so on. This will greatly reduce your risk of hypo while testing your personalized needs. In the end, you may find out that you need a unit for 1/2 extra carb portion (approximately 7.5 g of carbs) OR a unit for $1^1/_2$ extra carb portion (22.5 g extra grams of carbs) per meal.
- Carefully noting down what insulin dose worked for you would help you understand exactly how many extra units of insulin you need for an extra carb serving.

8.8 Advanced carb counting

- Advanced carbohydrate counting gives you more flexibility in meals, i.e. times and amount of food taken at each meal can be changed.
- Insulin to carbohydrate ratio (ICR) & insulin sensitivity factor (ISF) are used for calculations of the insulin dose for each meal.
- Some important facts to note are:
  Advanced carb counting does not work with pre-mixed insulin.
  Please refer to Chapter 4: Insulin for Life, to determine your insulin type and use the correct formulas for calculations.
- Total daily dose (TDD) is the total insulin used in the day.
  TDD= basal/intermediate acting insulin + bolus/short acting insulin.

8.8.1 Insulin sensitivity factor (ISF)

- ISF shows how much will the blood sugar level drop (in mg/dl) by 1 unit of bolus/short acting insulin. It is used for correcting your blood sugar level when It is off-target. It is calculated by:

Insulin Type	Insulin Sensitivity Factor	Example
If you use short acting insulin	$\frac{1500}{\text{(Total Daily Units of Short Acting Insulin)}}$	See Example 1
If you use fast acting/rapid acting insulin	$\frac{1800}{\text{(Total Daily Units of Fast Acting Insulin)}}$	See Example 2

Example # 1

Suppose that you take 30 units of short acting insulin in the full day.
*Your **ISF** is 1500 ÷ 30 = 50*
This means 1 unit of short acting insulin will drop your blood sugar level by approximately 50mg/dl.

Example # 2

Suppose that you take 8+10+12 units of rapid acting/bolus insulin before meals, which is a total of 30 units per day.
*Your **ISF** is 1800 ÷ 30 = 60*
This means that 1 unit of rapid acting insulin will drop your blood sugar level by approximately 60mg/dl.

8.8.2 Insulin to carbohydrate ratio (ICR)

- ICR shows how many grams of carbohydrates can be covered by one unit of short/fast acting/bolusinsulin.

Example # 3

Suppose that you take 8 units of short and 12 units of intermediate acting insulin before breakfast, and you use 10 units of short acting and 18 units of intermediate acting insulin before dinner.
*Your **TDD** is 8+12+10+15 = 45 units of insulin.*
***ICR** = 450 ÷ 45 = 10*
This means 1 unit of short acting insulin will cover 10g of carbs in your meal.

Example # 4

Suppose that you take 8 + 12 + 10 units of fast acting insulin before the three meals, and you take 24 units of basal insulin before dinner.
*Your **TDD** is 8+12+10+24 = 54 units of insulin.*
***ICR** = 500 ÷ 54 ≈ 9*
This means 1 unit of short acting insulin will cover 9g of carbs in your meal.

8.8.3 Meal dose calculation – step by step procedure:

- To calculate dose of insulin for a meal in advanced carbohydrate counting the steps are given below:

***Step 1:** Check current blood sugar level = _____ mg/dl*
***Step 2:** Know your target blood sugar level for this time = _____mg/dl*
***Step 3:** If your blood sugar is above or below target, calculate correction dose as follows:*

***Correction dose** = (current blood sugar level – blood sugar target)÷(insulin sensitivity factor (ISF))*
Note: If your current blood sugar level is lower than target, the correction dose will be a negative number.

***Step 4:** Count the carbohydrates in your meal.*

Step 5: *Calculate the insulin for meal:*
Insulin for meal*=(carbohydrates (g) in meal)/(insulin to carb ratio (ICR))*
Step 6: *Calculate* ***the total insulin dose*** *= correction dose + insulin for carbohydrates.*
Note: If your current blood sugar was low and the correction dose was a negative number, it will be subtracted from the insulin required for the meal.

Example # 5

Suppose that you have an ***ISF*** *= 30 and ICR = 10. You want to eat a meal. Your blood sugar level before meal was 208mg/dl . Your target blood sugar level before meal = 120mg/dl.*
Step 1: *Current blood sugar level = 208 mg/dl*
Step 2: *Target Blood sugar level = 120 mg/dl.*
Step 3: *Calculate* ***Correction dose*** *=(208-120) ÷ 30 = 3*
(You have to subtract your target blood glucose from your current blood glucose to check how many mg/dl above target you are 208-120=88, your sugar is 88mg/dl above target, now divide 88 with your ISF. 88 ÷ 30 = 3 approximately. This means you need 3 units of bolus/short acting insulin to bring your blood sugar down to 120mg/dl
Step 4: *Count the carbs. You can use exchange lists given at the end of this chapter or a verified app/book or website for this.*
Suppose that you want to eat a meal containing 50g of carbs.
Step 5: Insulin dose of meal *= carbs in meals ICR = 50 ÷ 10 = 5*
You need 5 units of bolus short acting insulin for your meal.
Step 6: Calculate the total insulin dose *= correction dose + insulin for carbohydrates = 3 + 5 = 8 units*
So you would need to inject 8 units of bolus/short acting/ fast acting/regular insulin before the meal to bring blood sugar level to the correct target and also cover the carbs in the meal.

8.8.4 Do not expect perfection!

- The ICR and ISF calculations are starting points. Your actual ISF and ICR may vary and will be recalculated often based on insulin dose adjustments. ISF and ICR may even vary during times of the day due to activity and hormonal levels. Noting down your blood sugar levels and meals is the key to effective dose adjustment through advanced carb counting. Use a standard log sheet for the purpose.

8.9 Reading food labels

- Most packaged foods have food labels conveying nutritional information. It is important to learn how to read food labels on packaged foods.
- You will find different terminology on the food labels. The terminology and their meanings are listed below:

8.9.1 Servings per pack/container

- This is an estimate of the number of meal servings in the package. Do not confuse this with carb servings. It is not always necessary that each pack will only have one serving. The nutrition label shown has 5 servings in the pack (highlighted with an orange arrow).

8.9.2 Serving size

- It is the amount of food in one serving.This value may be in grams, cups, pieces, etc.
- The nutrition label shown has 4 biscuits (weighing 30g) in each serving, (highlighted with a yellow arrow).
- **Fun fact!** This would mean that there area total of 5 x 4 = 20 biscuits in the pack!

Nutritional Information of a biscit

Servings Per Pack: **5**

Serving size: **4** Biscuits (**30g**)

Nutrition	Quantity / 100 g	Quantity / Serving
Energy	1985 KJ / 474 Cal	661 KJ / 158 Cal
Protein	5.7 g	1.9 g
Carbohydrate	72.8 g	24 g
Sugar	0.0 g	0.0 g
Fibers	0.1 g	< 0.1
Fat	18.5 g	6.2 g
Saturated	8.5 g	2.8 g
Trans Fat	0.0 g	0.0 g
Cholesterol	0 mg	0 mg
Dietary Fiber	4.8 g	1.4 g
Total Sodium	365 mg	121 mg

8.9.3 Total carbohydrate

- This is the amount of total carbs in the mentioned amount. It includes sub-categories, like sugars, fibres, etc. included in the total carbohydrate count. Remember that it is the total carbs you need to account for in your meal, and not the sugars alone.
- The total carbs in nutrition label shown (highlighted with the green arrow) has two values. Carbohydrates per 100g of food (the first value) are not the amount of carbs in one serving. It is the experimentally measured value.
- The carbohydrates per serving are the amount of carbs in one serving size. In the picture, it is shown to be 24g of carbs. This means that if you eat 4 biscuits in the pack, they will contain a total of 24 g of carbs.

- If there are more than 5g of fiber in one serving of food we subtract half of the fiber from the total carbohydrates, as fiber is not completely digested. The amount of sugars listed under the total carbohydrate are the direct sugars which will absorb into blood stream quickly and can cause a spike in blood sugar levels. These are already included in the total carbs and do not need to be counted separately.

8.10 Carbohydrate counts of Pakistani foods

- Carbohydrate counting with Pakistani foods is difficult due to variety in nutrients in our recipes. Some common foods having 15 grams of carbs, and their portion sizes are given in the table below:

Food	Serving size	Food	Serving size
Roti	1 piece (6-inch diameter)	Chicken nuggets	6 pieces
Bread	1 piece	Nimko	1/2 cup
Pancake or waffle	1 piece (4-inch diameter)	Chinese chow Mein	1/2 cup
Dalia (cooked)	1/2 cup	Naan	1/4th piece
Rice (cooked)	1/3 cup	Lassi (low fat, artificial sweetener)	1 cup
Pasta (cooked)	1/3 cup		
Spaghetti (cooked)	1/3 cup	Carrot Halwa	1/3 cup
Corn (bhutta)	6 inch	Gulab Jamun	1 small
Dahi	3/4 cup	Kulfi	1/2 cup
Milk	1 cup	Ice cream	1/2 cup
Crispy tea rusk	2 pieces	Besan Laddoo or Barfi	1/2 piece
Kachori	3/4 inch square	Rasmalai	1 piece
Pakoras (mix vegetable)	3 pieces	Sooji Halwa	1/4 cup
Paratha	3 quarters of 1 piece ($^3/_4$th of 1 paratha, 6" diameter)	Biryani/pulao (containing meat)	1/2 cup
Puris	2 puris of 5 inches	Aloo sabzi	1/2 cup
Daal	1/2 cup cup cooked	Haleem (made with Wheat, Lentils, Meat)	1/2 cup
Aloo Gobhi	1 cup		
Nankhatai	1 small		

- The amount of carbs depends upon preparation and recipes, counted using exchange lists. Some examples are as follows.

Food	Serving size	carbs
Aloo Gosht	1 cup	22g carbs
Daal Gosht	1 cup	38g carbs
Karhi [(Punjabi made with Besan (chickpea flour)]	1 cup	22g carbs

8.11 Mobile apps for carbohydrate counting

- Some apps for carb counting are listed below. With variable ingredients, you can never be 100% sure about the carb count in the apps, books, online resources. However the estimates can help you get started.
- It is best to estimate the amount of individual ingredients in your daily food recipes and add the amount of carbs in individual foods to estimates the total carbs in the recipe. Remember, practice will make you perfect!
- Some helpful apps are listed below:
    - MyFitnessPal
    - Carb manager
    - Calorie, Carb & Fat counter
    - MyNetDiary
    - Carbs & Cals (paid app with much better reference values)

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9 Hypoglycaemia

9.1 Hypoglycaemia

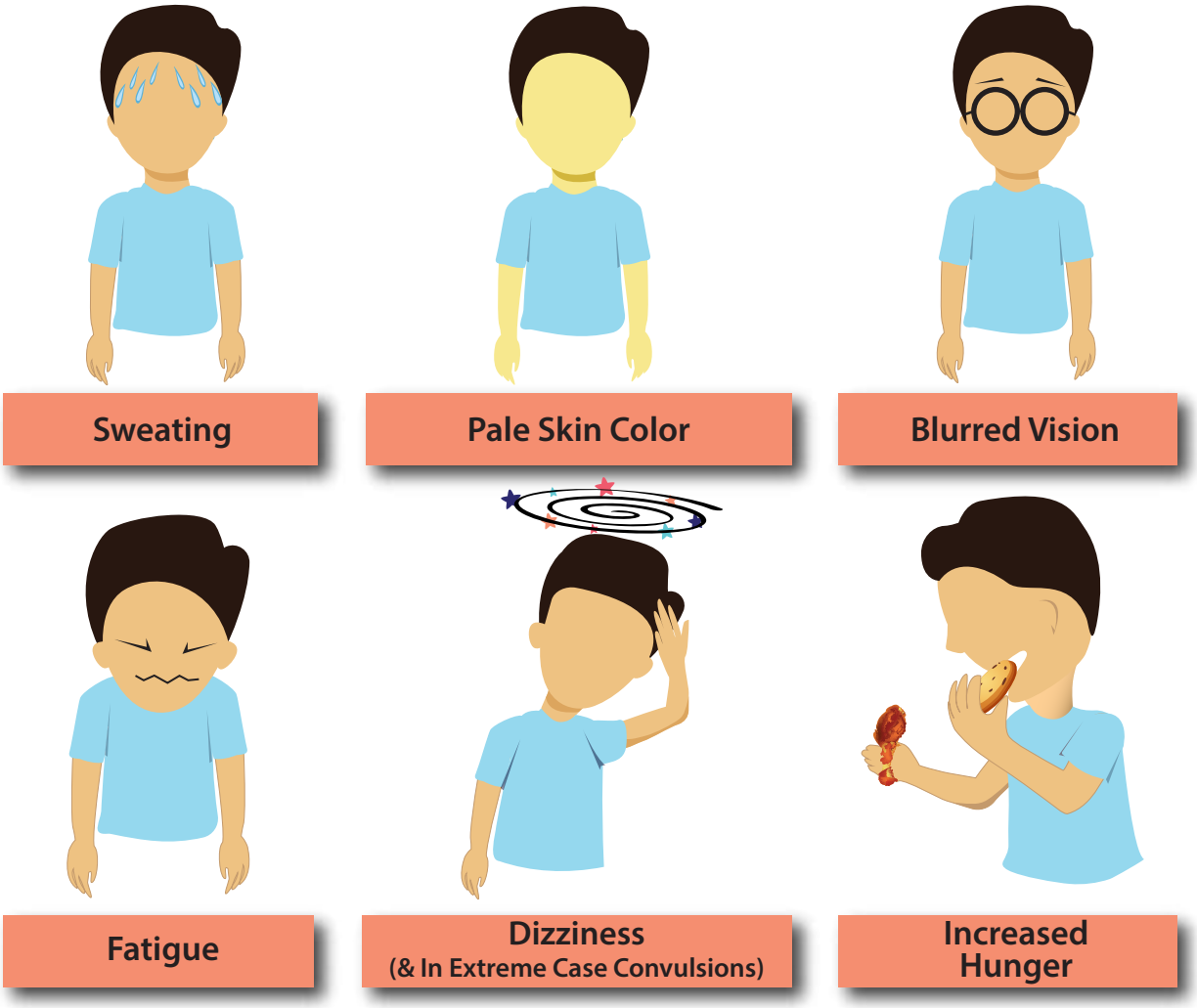
- When your blood sugar levels fall below 70mg/dl, the condition is called "hypoglycaemia".

Mild hypoglycaemia	55-70 mg/dl
Moderate hypoglycaemia	40-55 mg/dl
Severe hypoglycaemia	Below 40 mg/dl

9.2 Symptoms of hypoglycaemia

- If you are unable to recognize or ignore the early symptoms and do not treat the hypoglycaemia while it's mild, your sugar levels will fall further low and can result in:
  - Disorientation
  - Loss of concentration
  - Visual blurring
  - Aggressiveness
  - Difficulty in speaking
  - Fits
  - Loss of consciousness
- Symptoms in kids include cranky moods and constant crying, with demands to eat something immediately.

Symptoms of Hypoglycaemia



9.3 Causes of hypoglycaemia

- Hypoglycaemia can be caused:
  - If you did not have much food or took more insulin
  - If you had increased or unplanned physical activity
  - If you skipped a meal

9.4 Preventing hypoglycaemia

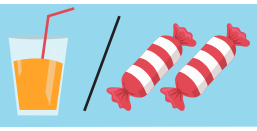
- You can reduce your chances of hypoglycaemia by checking your blood sugar regularly (people with type 1 diabetes are recommended to check their blood sugar levels 4-8 times daily, based on individual conditions, by their diabetes care specialist).
- Do not skip meals (people with type 1 diabetes may be recommended to eat small snacks in between meals. The need, frequency and portion size of the snack will be determined by their diabetes care specialists).
- Check your blood sugar level before exercise.
- Eat a snack containing carbohydrates (if blood sugar level is normal or low) before you exercise to reduce the risk of hypoglycaemia. Your doctor may

advise you to take a lower dose of insulin before strenuous activity.

- People having low blood sugars during the night time may be recommended bedtime snacks for preventing hypos during sleep by their doctors.

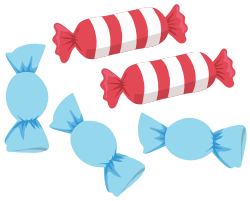
9.5 Treating hypoglycaemia

- The Rule of 15, described below, should be followed.

How To Treat Hypoglycaemia		
Step 1	Eat/drink 15g carbs	
Step 2	Check blood sugar after 15 minutes	
Step 3	If result is less than 70 mg/dl, repeat steps	

- Good hypoglycaemia treatment comes from the foods containing 15 g of fast acting carbohydrates (foods that are converted to sugar quickly in the body) such as:

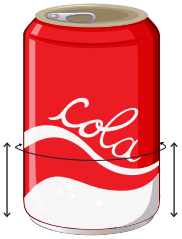
$^1/_2$ glass orange juice



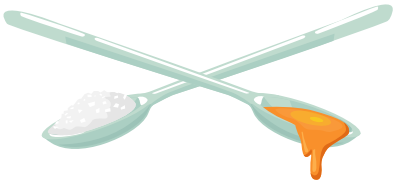
5-6 pieces of candy

3-4 glucose tablets

1 cup of milk



$^1/_3$ cola drink (non diet)



1 tablespoon of honey/sugar

2 tbsp of Glaxose D/ glucose powder (dissolved in a glass of water)

- Do not take foods such as meat, foods containing fats and vegetables for hypo treatment. Chocolate is also not a good hypo treatment as the fats in chocolate do not let it raise blood sugar level quickly.
- Recheck your blood sugar levels “15 minutes” after treatment. If blood sugar level is still below 70 mg/dl repeat your hypoglycaemia treatment as above and check your blood sugar level again in 15 minutes. Repeat these steps until your blood sugar is above 70 mg/dl. When your blood sugar levels are back to normal, having a snack with slow release carbohydrates/proteins/fats such as a sandwich/biscuit is necessary. This helps maintain your blood sugar levels after hypoglycaemia.

9.6 Treating a person who is unconscious or having fits

- Following are some instructions for your family and friends:

1- In such situations, do not put any food/drink in the person`s mouth as this can go into their windpipe which can do more harm. In such situation:
   - Take a muslin cloth and dip it in honey or water mixed with sugar.
   - Rub on the inside of cheeks or gums and as it’s immediately absorbed.
2- If the person is having fits and clenching teeth, do not put your finger inside his/her mouth as they may severely bite. Drip the honey or sugar water with a muslin cloth or teaspoon, drop by drop, carefully protecting your fingers from the teeth.
3- Call for help/ambulance in such situations as this person will need medical assistance.

- Always inform your diabetes care specialist if you ever :
  - Have severe hypoglycaemia when you needed help from someone else to manage it.
  - Have hypoglycaemia during the night.
  - Are unable to recognize hypoglycaemia.
  - Experience recurrent hypoglycaemia (hypos occurring again & again).
- Recurrent hypoglycaemia may cause hypo unawareness (when a person does not feel/recognize the symptoms).It can be dangerous. Frequent checking and preventing hypoglycaemia can improve hypo awareness.

References:
1- American Diabetes Association (ADA) and ES: Consensus statement on hypoglycemia and diabetes – A report(2013)
2. International Hypoglycaemia Study Group. Minimizing Hypoglycemia in Diabetes. Diabetes Care 2015; 38:1583.
3. Iqbal A, Heller SR. The role of structured education in the management of hypoglycaemia. Diabetologia 2018; 61:751.

Exercise & Type 1 Diabetes 10

10.1 Exercise & Type 1 Diabetes

- Physical activity should be an integral part of your treatment plan for type 1 diabetes. You will have important physical/mental health and social benefits with regular exercise.
- You should aim to get at least 30 minutes of exercise 5 days a week.

10.2 Effects of exercise

10.2.1 Hypoglycaemia (low blood sugar)

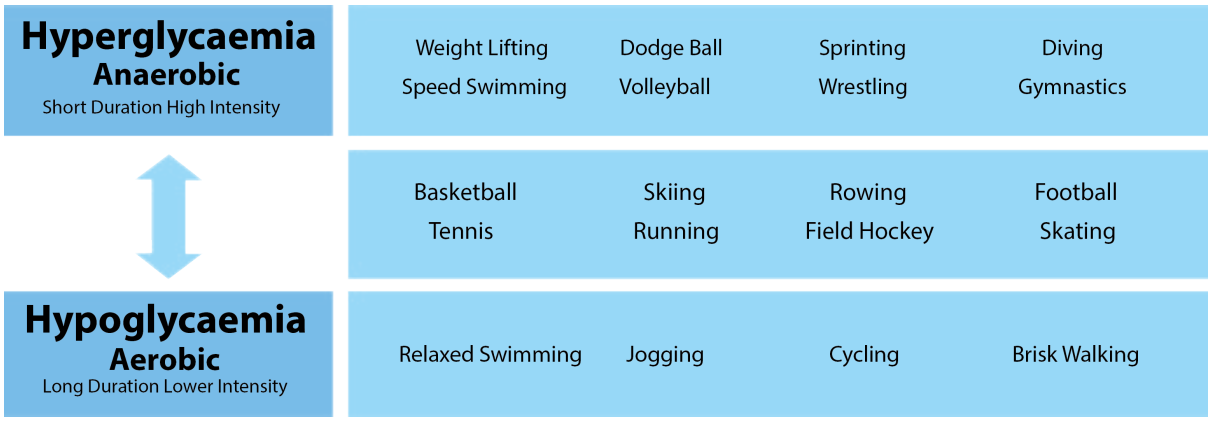
- Increased physical activity increases your risk for low blood sugar (hypoglycaemia), both during and after exercise (for up to about 12 hours). This is because exercise enhances insulin sensitivity, in a pattern that depends largely on the time of day, the type and duration of exercise performed.

10.2.2 Hyperglycaemia (high blood sugar)

- Although exercise typically causes a decrease in your blood glucose concentration, it can also cause an increase in blood glucose if the exercise is of very high intensity for a short duration. Hyperglycaemia can occur during high-intensity exercises such as sprinting, hockey and football. Hyperglycaemia during exercise is particularly undesirable as it can cause dehydration which impairs exercise performance and place you at risk for metabolic deterioration and ketoacidosis.
- To learn how different types of activity affect you, you should check your blood sugar before, during, and after an exercise session.
- With type 1 diabetes you can engage in a wide variety of sports & physical activities, with minimal restrictions, but with careful management to avoid the risks for hypo--glycaemia and hyperglycaemia that are outlined above. The following issues

should be specifically addressed before exercise:

- If your blood sugar level is below 100 mg/dl, take a 15g carbs snack before starting to exercise.
- If your blood sugar level is between 100 - 250 mg/dl, you are good to start exercising.
- Pay close attention to the type and duration of exercise.
- If your blood sugar level is above 250 mg/dl, do not exercise. If you have taken insulin recently, wait for your blood sugar to come down. Otherwise, take a bolus correction dose depending on your ISF (Ref: Chapter 8 - Carbohydrates & Carbohydrate Counting). If possible, test for ketones.



10.3 Dehydration

- Exercise causes a lot of salt & fluid loss from the body which can cause dehydration and raise blood sugar levels.
- Symptoms of dehydration can include muscle cramps, fatigue & headache.

10.4 Managing type 1 diabetes during exercise

- Always check the blood glucose before exercise.
- The maintenance of blood glucose level during exercise is very important for the provision of energy to muscles and for normal brain function. Carbohydrates are the predominant energy source utilized during high-intensity exercise. Thus you may need to eat carbohydrates before, during or after the exercise depending on the type and duration of activity.
- Reducing the insulin dose given prior to exercise reduces the risk for hypoglycaemia and the need for carbohydrates.

10.4.1 Extra carbohydrates consumption

- You generally need to consume extra carbohydrates before, during, and after exercise activity that lasts more than 60 minutes. The quantity and timing of the extra doses of carbohydrates depend on many factors, including the intensity and duration of the exercise.

- If no insulin adjustments are made by you before exercise, then additional carbohydrates are usually needed to prevent hypoglycaemia. The carbohydrate requirements vary widely, ranging from 15 to 40 grams of carbohydrates per 30 minutes of activity. At least a portion of this should be consumed about 15 to 30 minutes before the activity. The type of carbohydrate (fast-acting versus slow-acting) should also be considered; a rapidly absorbed simple carbohydrate (e.g. sugar, apple, grapes, orange juice) will appear in the blood stream within minutes of consumption, while a low glycaemic index meal or snack (apple, pear, peach and foods like biscuits, sandwich) will help to prevent hypoglycaemia for up to several hours because of its slow breakdown in the digestive system.

- Ensure adequate water intake during/after exercise to prevent dehydration.

10.5 Physical care

- Anyone may get slightly wounded or injured during exercise.
- With better blood sugar level management, the chances of wounds not healing are reduced.
- Clean the wound with alcohol swab and get a dressing if needed.
- Always wear comfortable shoes during exercise to protect your feet from injuries.

10.6 Physical activity in school

- Your participation in vigorous exercise during physical education classes and other active parts of the school day (e.g. recess, lunch break, after-school activities) can be associated with slight disturbances in blood glucose concentrations.
- You may fully participate in physical education classes and team sports provided that there is good communication and collaboration between you, your healthcare provider and parents, the school nurse, the physical education instructor or team coach.
- A diabetes care plan provided by you/your doctor should be in place & shall include specific instructions for teachers, instructors and coaches.

10.7 Your dietitian/nutritionist

- Your dietitian & diabetes specialist can help you find the balance between activity, food, and insulin. Learn about your reaction to different activities, keep a record of your activity and your blood sugar levels. Both you & your dietitian can use that data to suggest adjustments and refine your diabetes management plan.

References:

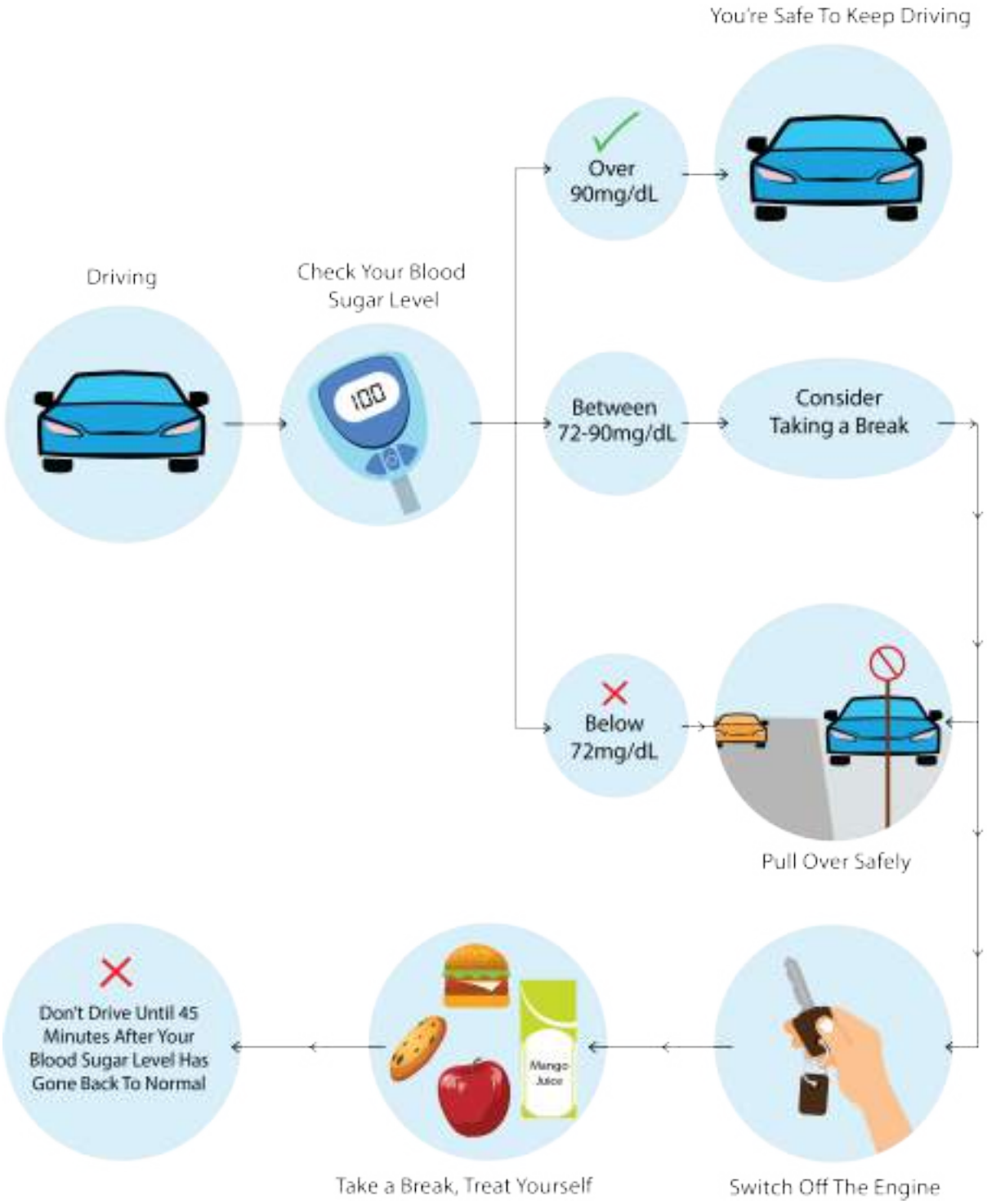
1- https://www.diabetes.org.uk/
2- http://www.diabetes.org/
3- http://www.runsweet.com/
4- Grant RW, et al. Standards of medical care in diabetes —2018. Diabetes Care. 2018;41:S1.
5- McCulloch DK. Effects of exercise in diabetes mellitus in adults. https://www.uptodate.com/contents/search. Accessed Nov. 9, 2018.

11 Driving with Type 1 Diabetes

11.1 Driving With Type 1 Diabetes

- Driving, apart from being a pivotal mode of transportation can be a source of leisure & pleasure,which you have every right and liberty to enjoy with type 1 diabetes, just like everyone else.
- There are no medico-legal restrictions in Pakistan or even worldwide in context of driving with type 1 diabetes. However you must declare that you have type 1 diabetes to the licensing authority at the time of applying for your driving license.
- For your own safety & for the safety of others on the road, you must follow some precautions whilst driving.
- The main risk associated with driving with type 1 diabetes is the risk of low blood sugar (hypoglycaemia). During hypoglycaemia the brain/body functioning is disturbed temporarily which can affect the ability to drive properly/safely and if not recognized and treated can result in an accident.
- Test your blood sugar level before driving especially before long journeys.
- During long journeys take periodic stops and test your blood sugar levels.
- If whilst driving you start to experience symptoms of low blood sugar (hypoglycaemia), stop and pull over your car to the side. It is best to turn your car engine off, test & treat your low blood sugar.
- Always keep your blood sugar testing meter and something with you in the car to treat your hypoglycaemia (see section on hypoglycaemia).
- Only restart your drive after your blood sugar has normalized (by retesting on your meter) and you feel well.

- If you have hypo unawareness and do not recognize many symptoms of low blood sugar then it is advised that you should not drive as you may be at high risk of having an accident. Consult your diabetes care specialist to work with you in restoring your awareness of hypoglycaemia.



References:
1- https://www.gov.uk/diabetes-driving
2- http://www.diabetes.org/

12 Ketoacidosis

12.1 Ketoacidosis

- Minor illness like cold/flu & diarrhoea is part & parcel of everyone`s life. However, health of people with type 1 diabetes can deteriorate more than others during any illness. This is due to the fact that they lack insulin of their own. Insulin is a key hormone that prevents formation of certain toxic substances in the body during illness, called “ketones”. The insulin injection dose required by the body may be higher during illness. High blood sugar levels during an illness can result in accumulation of ketones leading to a potentially serious medical condition called “Diabetic Ketoacidosis” (DKA).
- Diabetic Ketoacidpsis,is condition that may be handled at home in its milder stages. However, the more severe form of Diabetic Ketoacidosis may require hospitalization.

12.2 Symptoms

- Symptoms to look out for include:
  - General feeling of being unwell
  - Thirsty
  - Light headed
  - Feeling of throwing up
  - Vomiting
  - Abdominal pain
  - Diarrhoea

If untreated or diagnosis/treatment of this condition is delayed it, can result in significant harm.

Treatment

1. Drink plenty of water
2. Test blood sugar every 3-4 hours
3. Test for ketones in urine or blood
4. Do not stop insulin
5. Take plenty of rest. Do not exercise!
6. Rush to hospital if you feel unwell and report Diabetic Ketoacidosis.

12.3 Sick day rules

- Diabetic ketoacidosis can be prevented and/or recognised early in which case it can be treated in time to prevent complications. Some measures that you can take yourself to prevent this complication include the following:
- During any illness like cold/flu or diarrhoea etc. you should monitor your blood sugar levels more frequently than usual.
- Try to drink plenty of water to prevent dehydration.
- Even if you do not feel like eating or are vomiting, do not stop taking your insulin.
- Rather if you are running high sugar levels you may need to take extra dose/units of insulin.
- You can test for ketones in your blood or urine using ketone strips. People with type 1 diabetes should test for ketones whenever their blood sugar levels are running high.
- You are the best judge of your body. Irrespective of how high your blood sugar levels, if you start to vomit and feel unwell which is not responding to the above mentioned measures, then you will need to contact your diabetes specialist or nearest hospital immediately. The hospital would run some urgent blood tests to assess if you have developed or are developing Diabetic Ketoacidosis. If yes, you will need drips of salt based fluids and insulin which is the standard worldwide treatment of Diabetic Ketoacidosis. If you do not have this, your diabetes care specialist will suggest changes to your insulin dose, prescribe some other appropriate medications and discharge you to go home.
- You may develop Diabetic Ketoacidosis away from home, like on a school /college/family trip, etc. Hence it is highly recommended that you carry some sort of medical information alert (in the form of either a bracelet/card in wallet or necklace) stating that you have type 1 diabetes, so that if you are not able to help yourself in an emergency situation people around you can help you an/or seek immediate medical attention.

References:
1- Laffel LM, Limbert C, Phelan H, et al. ISPAD Clinical Practice Consensus Guidelines 2018: Sick day management in children and adolescents with diabetes. Pediatr Diabetes 2018; 19 Suppl 27:193.

13 Storing Insulin & Travelling With It

13.1 Storing Insulin & Travelling With It

13.1 Storing insulin

- At homes, in schools or in offices, unopened insulin has to be stored in a fridge between 2°C to 8°C.
- Insulin should never be kept in the freezer, or placed directly on ice. If your insulin freezes, do not use it even when it defrosts.
- Never place insulin in front of a heater as it can denature insulin.
- People who do not have fridges or electricity can store insulin in clay pots.
- When using clay pots or traditional home-made insulin coolers, make sure that the water inside the pot/ cooler does not reach the top of the insulin vial or the needle of pen.
- In cooler areas in winters, it can be kept in a cool cupboard, away from the sun.
- According to insulin manufacturers, opened insulin can be kept at room temperature (20-25°C) for up to 6 weeks.
- Please note that it is painful to inject cool insulin, so keep it out for 5-10 mins before injecting.
- Before injecting, cloudy insulin should be gently rolled between hands for about 20 cycles until the solution becomes milky white in an even consistency.

Home Made Insulin Cooler

Step 1
Take a clay pot

Step 2
Put Insulin pen/ Syring/Insulin vial in a glass jar

Step 3
Pour some water in the clay pot

Step 4
Now put the jar inside the clay pot

Step 5
Cover the pot and keep at a cool place.

- Do not shake or rattle insulin. It can effect its dosage accuracy or degrade it.

13.2 Travelling with insulin

- When it comes to travelling with insulin, we need to plan how to keep insulin cool while travelling.
- As explained above, insulin can be kept at room temperature, away from the sun, during travel. However, it is best to be more careful and use the methods described below.

- The quickest and the most readily available option in case you do not have formal insulin carrying equipment is to wet a hand towel in cold water, wring it and wrap around the insulin pen/vial. Put this in a plastic bag and place inside your bag, away from the sun. Refresh the towel by dipping in cold water every 1-2 hours. Though this method is not very efficient, it can protect your insulin when you have nothing else.
- You may place insulin in a flask or box of cool water (carefully packing the vial or pen in a waterproof bag or a jar/bottle). Water will need replacement when the temperature goes higher.

- You can buy insulin cooling bags/ pouches (likes of Frio bags, also available at medical stores and online). These keep your insulin cool and safe and come in a range of sizes.
- All you need to do is to dip the inner gel pouch in cold water for around 5-20 mins (depending on the size of the bag). Then place insulin inside the inner gel pouch. The insulin and inner pouch are then covered with the outer pouch. In hot temperatures of Pakistan,such bags can provide the required cooling for 6-8 hours. Similar to the hand towel approach, you can dip them again in cold water to re-activate them.
- If you travel a lot in your car, you may consider buying a mini / portable car fridge. These portable fridges can be fitted into a car's dashboard and run on power from the engine. Though the best solution for long travel durations, these are a bit expensive too!

- Those who are using pumps are also suggested to use pump wallets similar to cooling bags.
- It is advised to always carry your short acting or rapid acting insulin with you, even if you are travelling for a short time. An emergency situation should not leave you without your insulin and glucometer.

  For longer travels, always keep some extra supplies with you.

13.3 Air travel

- Never place your insulin in checked-in luggage. Insulin must be carried in in your handbag.
- Keep your doctor's prescription handy.

13.4 What if insulin goes bad?

- If your insulin has gone bad, it will not bring your blood sugar level down. However, there will be no adverse reaction on your body if you injected it.
- If your insulin has spots, floating particles, stains or colour changes, it has gone bad. Clear insulin may become cloudy which is another sign of insulin going bad.

References:
1- Bahendeka, S., Kaushik, R., Swai, A.B. et al. EADSG Guidelines: Insulin Storage and Optimisation of Injection Technique in Diabetes Management. Diabetes Ther 10, 341–366 (2019).
2- Gill G, Price C, English P, Eriksson-Lee J, 2002. Traditional clay pots as storage containers for insulin in hot climates. Trop Doct 32: 237–238.
3- www.diabetes.org.uk
4- www.diabetes.org

14 Complications of Improperly Managed Diabetes

14.1 Complications of Improperly Managed Diabetes

- Type 1 diabetes can be associated with short & long-term complications. Long term complications may be prevented by maintaining optimal diabetes management and, if occurring, can be detected early with periodic screening by your diabetes specialist.

14.1.1 Short term complications

- Hypoglycaemia (Ref: Chapter 9: Hypoglycaemia).
- Diabetic Ketoacidosis: (Ref: Chapter 12: Ketoacidosis).

14.1.2 Long term complications

- Long term complications can occur if diabetes management remains sub-optimal persistently for several years.

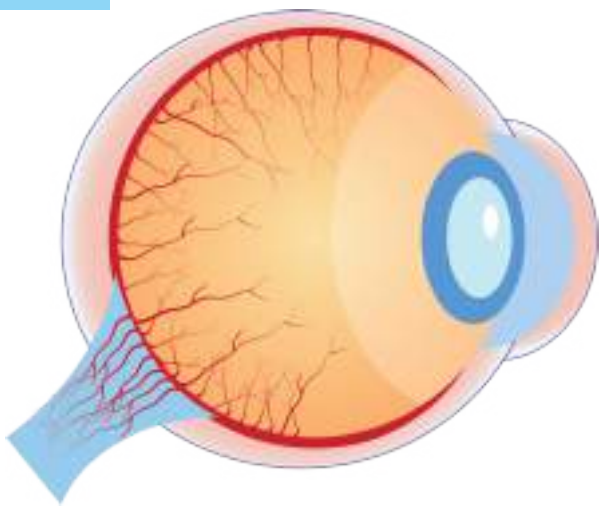
14.2 Eyes (retinopathy)

- Diabetic retinopathy is damage to the retina (the 'seeing' part at the back of the eye).
- Retinopathy can cause vision impairment, leading to complete blindness if not treated on time.
- Good blood sugar management and annual retinopathy screening can prevent you from the severity of eye damage.
- Smoking also plays a major part in the eye damage so, if you do smoke, stopping it will be extremely helpful.
- As retinopathy frequently has no symptoms until it is well advanced, you may not be aware of changes to the retina until your vision starts impairing.

14.2.1 Why are people with diabetes more at risk?

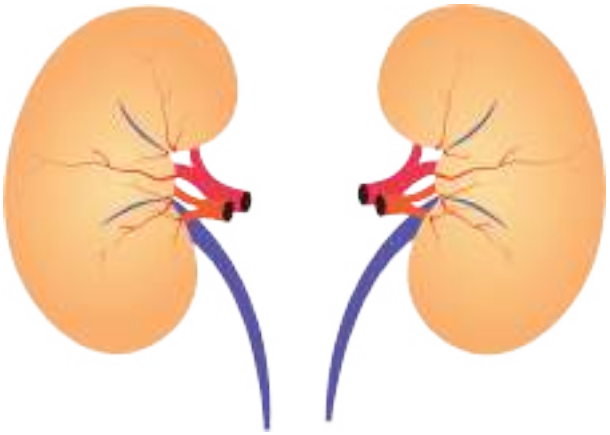
- Retinopathy is caused because the blood capillaries in eyes and the proteins present there are being exposed to excessive sugar over long periods of time.

14.2.2 How does my specialist check for retinopathy?



- Your eyes in general along with back of the eye examination (called Retinoscopy / Fundoscopy) needs to be undertaken once a year by an eye specialist.
- Annual examination will detect retinopathy early and therefore increase the chances of minimal and more effective treatment.
- In case of any eye complications, your eye care specialist may advise retinal examination every few months.
- The Opthalmologist may give your some eye drops to dialate your eyes before examining them through a machine. In this case, make sure you are accompanied by someone who can drive you home, as it will be difficult for you to see properly (especially in sunlight) for a few hours.

14.3 Kidneys (nephropathy)



- The kidneys regulate the amount of fluid and various salts in the body, helping to control blood pressure. They also release several hormones.
- Kidney disease (nephropathy) is when the kidneys start to fail. If the kidneys start to fail, they cannot carry out their jobs so well.
- In the very early stages, there are usually no symptoms and you may not feel unwell. As kidney disease progresses, the kidneys become less and less efficient and the person can become very ill.
- This happens as a result of the build-up of waste products in the blood, which the body cannot get rid of. There are changes in blood pressure and in the fluid balance of the body. This can lead to swelling, especially in the feet and ankles.

14.3.1 Why are people with diabetes more at risk?

- Kidney disease is caused by damage to small blood vessels. This damage can cause the vessels to become leaky or, in some cases, to stop working, making the kidneys work less efficiently.
- Keeping blood glucose levels as near normal as possible can greatly reduce the risk of kidney disease developing as well as other diabetes complications. It is also very important to keep blood pressure controlled.

14.3.2 How does my specialist check for kidney disease?

- As part of your diabetes review you should have a blood and urine tests done regularly.
  - **Microalbumin Urea** – once every year
  - **Serum Creatinine** – once every year
- Your urine will be checked for tiny particles of protein. These appear during the first stages of kidney disease, as the kidneys become 'leaky' and lose protein.
- At this stage, kidney disease is reversible and can often be treated successfully, so this test is very important. The blood test will measure how well the kidneys are working and what the severity of the kidney disease is.

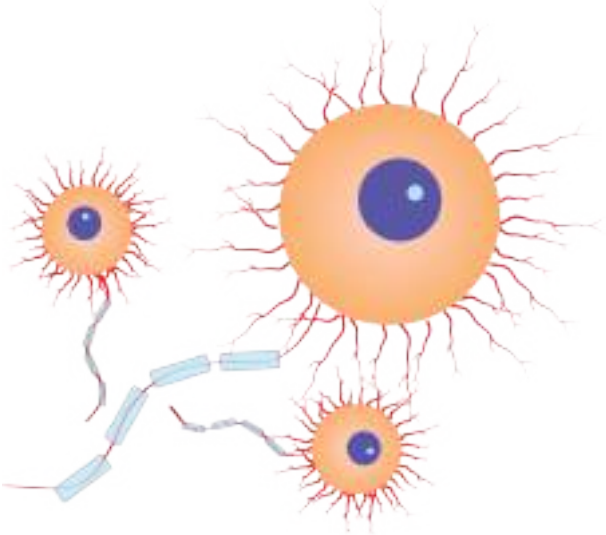
14.3.3 How does my specialist check for kidney disease?

- Your specialist is likely to prescribe a common treatment (tablet) that will not only lower blood pressure but also help protect the kidneys from further damage.
- These medications are sometimes used in people who have normal blood pressure, due to their protective effect on the kidneys.

14.3.4 What can I do to look after my kidneys?

- Attend all your diabetes appointments.
- Keep your blood sugar levels and blood pressure levels on target meticulously.
- Have your urine and blood test to measure kidney function at least once a year.
- Quit smoking.
- Eat healthy and keep active.

14.4 Nerves (neuropathy)



- Neuropathy is one of the long-term complications which affects the nerves. Nerves carry messages between the brain and every part of our body, making it possible to see, hear, feel and move. Nerves also carry signals to parts of the body that we are not aware of such as the heart, causing it to beat, and the lungs, so we can breathe.
- So, damage to the nerves can cause problems in various parts of the body. Diabetes can cause neuropathy as a result of high blood glucose levels damaging the small blood vessels which supply the nerves.

This prevents essential nutrients reaching the nerves. Neuropathy mainly affects the nerves in the feet and the legs, but people can also develop this type of neuropathy in their arms and hands.

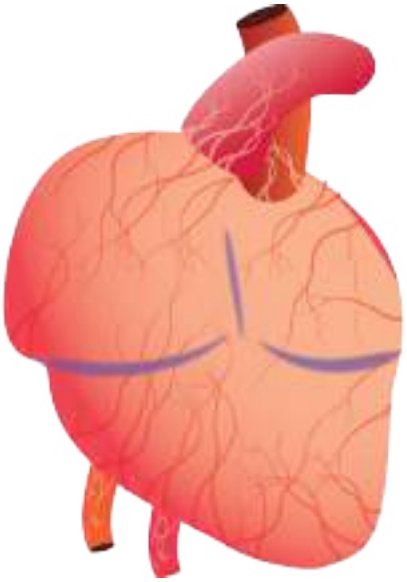
14.4.1 Symptoms

- Tingling and numbness.
- Loss of ability to feel pain.
- Loss of ability to detect changes in temperature.
- Loss of coordination – when you lose your joint position sense.
- Burning or shooting pains – these may be worse at night time.
- The main danger of sensory neuropathy for someone with diabetes is loss of feeling in the feet, especially if you do not realize that this has happened. This is dangerous because you may not notice minor injuries.
- There are many effective treatments available to relieve the symptoms caused by neuropathy.

14.4.2 Steps you can take to avoid neuropathy

- Keep your blood glucose levels within your target range.
- Examining your feet daily.
- Having your feet checked by your diabetes specialist at least once a year.

14.5 Cardiovascular disease



- Damage to the heart and blood vessels is collectively known as cardiovascular disease and people with diabetes have a higher chance of developing it.
- The term cardiovascular disease includes heart disease, stroke and all other diseases of the heart and circulation.
- Your major blood vessels consist of arteries which carry blood away from your heart, and veins which return it. Blockage of an artery leads to the part of the body it supplies being starved of the oxygen and nutrients it needs. This is the cause of heart attack or strokes (affecting the brain).
- Narrowing of the blood vessels can affect other parts of the body, such as the arms or legs.This is called peripheral vascular disease which may produce intermittent claudication (pain in the calf muscle while walking/exercising).

14.5.1 What causes cardiovascular disease?

- Blood vessels are damaged by high blood glucose levels, high blood pressure, smoking or high levels of cholesterol.
- This is a gradual process and takes years to decades. So, it is important for people with diabetes to manage these levels both short and long term.

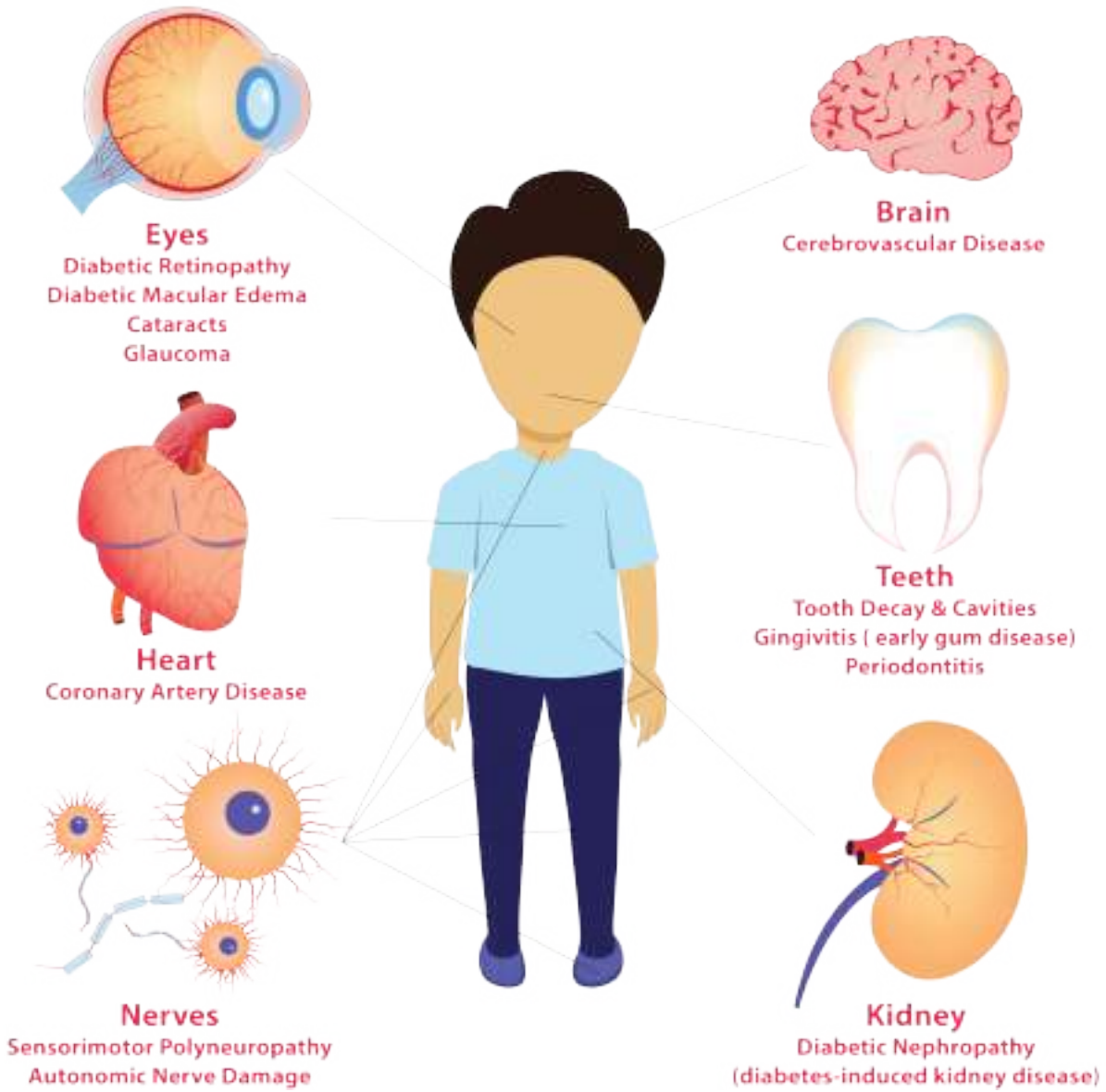
14.5.2 Steps you can take to help prevent cardiovascular problems

- If you smoke, stop smoking.
- Eat a healthy, balanced diet.
- Be more physically active.
- If you are overweight, try to get down to a healthy weight.
- Take your insulin & other medications as prescribed.
- Get your HbA1c, blood pressure and blood cholesterol checked at least once a year and aim to keep to the target agreed with your specialist.

14.5.3 How does my specialist check for cardiovascular disease?

- Lipid profile or cholesterol levels must be checked once in an year as your routine diabetes review.

Complications of Improperly Managed Diabetes



14.6 List of regular complications screening tests

Test Name	Recommended Frequency	Sample	Test for
HbA1C	Once every 3 months	Blood (fasting not needed).	Average blood sugar levels over last 3 months
Fundoscopy / Retinoscopy (Examination of eyes)	At the time of diagnosis. **If normal:** once every year. **If an issue is detected:** every 3 - 6 months or as decided by your eye care specialist.	• Back of the eye (retina) is examined through a machine. • May require you to take some eye drops to dilate the pupil.	Eyes
Microalbumin Urea	Once a year	Urine	Kidneys
Serum Creatinine	Once a year	Blood	Kidneys
Foot Examination	Examine your feet daily. Once a year examination by doctor.	Feet are examined using mirror, hands, visual examination, or plastic filaments.	Nerves
Lipid Profile	Once a year	Blood (fasting is required)	Heart

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15 Ramadan & Type 1 Diabetes

15.1 Ramadan & Type 1 Diabetes

- Fasting during the holy month of Ramadan is one of the five pillars of Islam. However, Allah almighty has also granted exemption to certain groups of Muslims as below

أَيَّامًا مَّعْدُودَاتٍ ۚ فَمَن كَانَ مِنكُم مَّرِيضًا أَوْ عَلَىٰ سَفَرٍ فَعِدَّةٌ مِّنْ
أَيَّامٍ أُخَرَ ۚ وَعَلَى الَّذِينَ يُطِيقُونَهُۥ فِدْيَةٌ طَعَامُ مِسْكِينٍ ۖ فَمَن تَطَوَّعَ
خَيْرًا فَهُوَ خَيْرٌ لَّهُۥ ۚ وَأَن تَصُومُوا۟ خَيْرٌ لَّكُمْ ۖ إِن كُنتُمْ تَعْلَمُونَ

[Fasting for] a limited number of days. So whoever among you is ill or on a journey [during them] - then an equal number of days [are to be made up]. And upon those who are able [to fast, but with hardship] - a ransom [as substitute] of feeding a poor person [each day]. And whoever volunteers excess - it is better for him. But to fast is best for you, if you only knew. (Al Baqarah , 184)

- Whilst you are not labelled “ill” by having type 1 diabetes, fasting with type 1 diabetes has certain significant health risks associated which include:
  - Dehydration
  - Hyperglycaemia & Diabetic Ketoacidosis
  - Hypoglycaemia

- You must not fast with type 1 diabetes if you:
    - Have diabetes that is not well managed.
    - Have had severe low blood sugar (hypoglycaemia) within the three months prior to Ramadan (requiring assistance of another person).
    - Diabetic Ketoacidosis within 3 months prior to Ramadan.
    - Have history of recurrent low blood sugar levels (hypoglycaemia).
    - Cannot recognise your low blood sugar (hypoglycaemia).
    - Have any other on-going health problem.
    - Are unable to check your blood sugar frequently.
    - Have been advised by your doctor to not fast.
    - Have been unable to consult your doctor for dose adjustment during fasting before the start of Ramadan.
- If you do not fall into any category above then you may safely fast intermittently (once every few days) but this requires a comprehensive blood sugar monitoring & insulin dose adjustment plan mutually agreed between you & your diabetes specialist prior to start of Ramadan. Please do not fast without consulting your diabetes care specialist.
- You will require more frequent blood sugar monitoring during fasting. Following are the recommended timings for blood sugar monitoring during fasting :
    - Before Sehri
    - In morning when you wake up
    - At noon
    - Mid afternoon
    - Before Iftar
    - 2 hours after Iftar
    - Any time when there are symptoms of high or low blood sugars or if you feel unwell.
- If you are fasting you must break your fast if your blood glucose is less than 70 mg/dl or above 300 mg/dl or if you feel very unwell irrespective of your blood glucose level.
- Islamic scholars have confirmed that checking blood sugar level or taking insulin during fast does not break it.
- Ramadan has its own special cultural foods and meal timings during the whole month. Carb counting and insulin dose adjustment may be required during Ramadan even if you are not fasting as you might be having Sehri and Iftaar with your family.
- It is important to learn carb counting for learning to manage your blood sugars during Ramadan. Refer to chapter 8 for this purpose.
- You may need an extra shot of fast or short acting insulin, if you also take dinner after Iftaar.

People with type 1 diabetes may have significant risks associated with fasting. Do not fast without consulting your diabetes care specialist.

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Type 1 Diabetes & Pregnancy 16

16.1 Type 1 Diabetes & Pregnancy

Labour is only blind date where you know you will meet the love of your life

- Anonymous

- Millions of women with type 1 diabetes around the world have had healthy/ uneventful pregnancies to date & so will you.
- Having type 1 diabetes does not in any way means that you cannot or should not get pregnant.
- With optimal diabetes control before and during the pregnancy, your risk of miscarriage and the baby having any birth defect is minimized. However, this risk increases with worsening diabetes management.
- Ideally, you should start seeing your doctor some months before you plan to get pregnant. Your doctor may advise an eye examination and some tests for kidneys and heart before conceiving.
- Women with type 1 diabetes are advised to use contraception & hence avoid pregnancy until their diabetes control is optimised. Achieving HbA1c level of 6.5% or below minimises the risk of miscarriage & birth defects significantly prior to pregnancy.
- Worldwide, pregnant women with type 1 diabetes are advised to start taking folic acid (a vitamin vital for the growth of baby`s nervous system) at a dose of 5mg once a day, as soon as they plan to conceive. This minimizes the risk for the baby to develop a nervous system defect. The decision when to stop folic acid will be made by your diabetes care specialist.
- You will be required to monitor your blood sugar levels much more frequently during pregnancy, as maintaining stable/optimal blood sugar levels throughout pregnancy will be vital for your baby's health & growth.

- Internationally agreed safe blood sugar level targets during pregnancy are:
  - Fasting blood sugar level up to 95 mg/dl
  - 1-hour post meal blood sugar level up to 140 mg/dl
  - 2-hour post meal blood sugar level up to 120 mg/dl
- Expect your blood sugar levels to behave differently during pregnancy. Levels may drop frequently (hypoglycaemia) during the first three months and are likely to rise after the fourth month of your pregnancy. You would be required to adjust your insulin doses accordingly in liaison with your diabetes care specialist.
- High blood sugars early in the pregnancy (within the first three months) can cause birth defects and increase the risk of miscarriage or diabetes related problems. Later in the pregnancy, persistently high blood sugars can affect the growth and development of the baby or cause other complications.
- Use of insulin is safe for both baby and mother, in pregnancy as well as during breastfeeding.
- Throughout your pregnancy your diabetes shall be supervised by your diabetes care specialist, and your baby`s health and wellbeing be monitored by your gynaecologist with periodic physical examination and ultrasound scans. Your gynaecologist and diabetes care team (diabetes care specialist, educator, and dietician) should be in touch with each other to help you have a safe and successful pregnancy.
- You can have normal labour with type 1 diabetes. However, the decision by your gynecologist to go for normal delivery or Cesarean section (C-section) would depend on your own health, the baby's health, the baby's size and many other factors.
- Your blood sugars will drop after delivery, so be prepared to reduce your insulin in consultation with your diabetes care specialist.
- The baby in the mother's womb is exposed to high levels of glucose and other nutrients. Due to this the baby's pancreas produces a lot of insulin. Therefore there is a lot of insulin in the baby's blood which can cause the baby's blood sugar levels to drop right after birth. Due to this, your baby may be kept under observation for several hours after birth.
- Breast feeding has many proven benefits for the baby. You are encouraged to breastfeed your baby like any other woman however you have to adjust your inuslin dose accordingly as per your blood sugar levels.

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17 Self Empowerment

17.1 Self Empowerment

He who has a why to live can bear almost any how.

-Friedrich Nietzsche

- Suffering can be a source of transformation for the person going through it. However, the perception of the person largely determines the impact of the pain. When anyone is diagnosed with a chronic condition, such as diabetes, probability is quite high that he/she will land up being depressed. People with diabetes live in a society that does not understand their condition.
- Many people believe that people with diabetes cannot live a normal life. To make the situation worse, only few people understand that diabetes is not an unmanageable condition and life can be lived to the fullest.
- Empowering one-self with learning the basics of diabetes self-management can have a very positive impact your quality of life. Fear of hypoglycaemia, negative thoughts related to use of insulin and eating problems can be greatly reduced by learning the basics about diabetes. Physical wellbeing can reduce stress and lead to independence and improved emotional health.
- Family members and friends can be a great source of encouragement and help cope with the diagnosis as well as the longer lasting impacts of stigmatization.
- People with chronic conditions are often considered as useless and weak individuals.
- In order to prove themselves they have to cover extra miles. They are often pressurized not to disclose about their condition to anyone outside the limited family circle.
- At school or university, many people with diabetes are looked down upon by both their fellows and school administration. At workplace, many people undergo the stress of having to work harder to get recognition.

- Empowering one-self begins with acceptance. A word of encouragement can do wonders for anyone experiencing hardship.
- Diabetes is a fulltime job and there is no escape. The key is to get started. Let's thrive in the voyage of your self-empowerment!

If opening your eyes, or getting out of bed, holding a spoon or combing your hair is the daunting Mount Everest you climb today, that is okay.

-Carmen Ambrosio

17.2 Familiarizing one's self with diabetes; coping with why and what now!

- Right after diagnosis much noise will reach your ears. Fake quacks, herbal remedies and fake stories of magical cures are commonplace. And on the other side of the river you'll hear noises such as this is the result of some black magic, nazar and what not. The most important task here is to hold your nerves and focus towards your treatment. The sooner you realize that nothing else than insulin is the treatment, the better you'll feel about yourself.
- Diabetes management and other related concepts have already been mentioned in the previous chapters such as taking insulin shots, monitoring blood sugar levels, carb counting and HbA1c tests. Taking them as a part of your everyday life, will help you to move towards the next step on the ladder.

Only I can change my life. No one can do it for me.

-Carol Brunette

17.3 Acceptance

- Being diagnosed with chronic condition such as diabetes, requires a lot of endurance and resilience to accept. Initially an individual tries to be in denial which of course is natural. But once you learn that in order to be healthy both mentally and physically the acceptance of a new lifestyle is mandatory, is when you actually start living.
- Acceptance takes time so rather than forcing one's self against the hard wall, take it step by step.
- Acceptance covers both self-acceptance and social-acceptance. Firstly, a person with diabetes has to be accepted by family, friends, close relatives, teachers or colleagues. It is okay to be a slightly different person now and the margin to be different should be given.
- In social situations a person with diabetes might feel physical symptoms of hyperglycaemia, hypoglycaemia, etc. The first thing which makes a person cautious is social awkwardness. Considering the concerns of social awkwar--dness, necessary measures should be taken by the person and the close social circle. Social acceptance will helps in self-acceptance too.

17.4 Rediscovering one's self

- Social stigma, bullying and prevailing rumours about one's condition are enough to shatter a person's personality. It is commonly perceived that the life of a person with diabetes is full of challenges and hardships which is a myth.
- Just like any other medical condition, quality of life can be improved with healthy life style and proper diabetes management.
- Many people with diabetes report a drift in their personalities after being diagnosed with it. Change of perception, vision and goals have been witnessed.
- Rediscovering one's potential, one's true self and having a "why" to live can give an entire new dimension to live a happy life.
- There might be few limitations right after diagnosis, but knowing one's personality, discovering the meaning of life and passion to reach the sky could be the best motivation to breathe for.

When the unthinkable happens, the lighthouse is hope. Once we choose hope, everything is possible."

- Christopher Reeve

17.5 Perceived self-efficacy

- Taking shots 5 to 7 times a day, continuous glucose monitoring or pricking 8 times daily, lethargy, depression and fear of hypos, is a lot to take in and absorb. However one should not let it lower one's elf-esteem.
- "Why me? Why cannot I eat, sleep and do whatever I want and whenever I want?" This is the most conflicting question. Even after accepting ones condition, these questions might disturb you for the rest of your life.
- So take a deep breath and tell yourself that you're okay! Diabetes burn out is a normal condition which can hit you quite often and it has a direct relationship with your perceived self-efficacy.
- A healthy concept of efficacy can be attained with the help of positive self-image.
- Since diabetes will now accompany you for life, try to be like a good partner by listening and tending to the demands of your body. Then move forward. This behaviour will be instrumental in retaining positivity in your life.
- Try to weigh your ambitions, dreams and emotional immunity quite often. Avoid getting lost in the comfort zones which can may make one start avoiding challenges.
- Make a to-do list, but it should be practical and attainable. Achieve your targets, treat yourself on daily basis and at the end of the week calculate your score.
- Celebrate your wins! Focus on improving the scores where you lose. Take one day at a time.

17.6 Setting goals

- Setting goals in life makes a person organized, practical and ambitious. Making goals not just includes long term goals; it also includes day to day things or short term goals.
- Completing an assignment, starting a new book, learning carb count or even enjoying "me-time" can be a great source of contentment for you.
- Diaries, to-do lists or simple reminders can be of great help.

- Besides this, try to plan for your future life too, while being rational. Long term goals such as where do you see yourself after 5 years in terms of education, finances, relationships and health keep you going and motivate you to aim higher.
- A broader vision in life will help you become a better human being, both on personal and social grounds.
- Start looking at different ways to give back to your society. Get involved in some social work or analyse what positive change you can bring to anyone's life by your presence. People with big dreams are strong when it comes to strength and determination in life.

Obstacles are those frightful things you see when you take your eyes off your goal.

Henry Ford

17.7 Getting started

- One of the biggest challenges in meeting any goal, whether it is related to productivity, waking up for a morning walk, changing a habit, exercising, becoming happier, or managing your diabetes, is getting started.
- It's important to start out with the right motivation, because a good start can build momentum that you can sustain for a long time. If you start out right, you have a much better chance of succeeding. Here are some tips for starting out:
    - Start small
    - One goal at a time
    - Examine your motivation
    - Look for a support group
    - Print it out, post it up

17.8 Sustaining motivation when you're struggling

- Another important aspect is staying motivated. It is to keep yourself going when you do not feel the same way as you did in the beginning. Perhaps some distraction or unexpected outcome has diverted you and your old goal is not as much of a priority anymore. Generally, after a disappointing follow up with one's doctor, terrible HbA1c or unstable blood glucose levels can trigger this state. The steps given below would help you to grip your impulse:

a) Hold yourself back

- When we start with a new exercise program, we are fully excited. It's not long before we learn that we do have limitations, and enthusiasm begins to wane. Well, a great motivator is the one who knows how to go slow with his/her energies and sustain it till the end.When you have so much energy at the beginning of a program, and want to go all out - HOLD BACK. Do not let yourself do everything you want to do. Only let yourself do 50-75 percent of what you want to do. And plan out a course of action where you slowly increase over time.

Never let the things you cannot do, prevent you from doing the things you can.

- Coach John Wooden

b) Just start

- There are some days when you might not feel like breathing anymore, sugar level fluctuations, bad HbA1c, continuous calculations of your carbs or merely a headache

because of a hypo you had last night, might leave you in a depressive state. Remember, do not give up. You are allowed to get some air, but instead of thinking about how hard it is, and how long it will take, tell yourself that you just have to start! Make a rule that whenever any irrational thought is going to hit your mind, you will mend it.

c) Stay accountable

- While not everyone wants or needs support beyond that offered by family and friends, turning to others outside one's immediate circle for help when needed is often very helpful. If you commit yourself through an online forum or to a support group, stay accountable to them. Getting connected to those who are going through the same drill every second of their lives, will make you feel less like an alien. Members of support groups often share experiences and provide guidance whether its day to day meal information, low carb diet, psychological issues they have been through or managing diabetes. It can be helpful just getting to talk with other people who are in the same situation. Besides this, support groups often provide opportunities to their members to meet in person and discuss their concerns with each other as well as qualified professionals. Recreational activities also play a vital role in boosting the morale. After committing to a support group, get back to it on regular basis! It helps to stay connected and accountable at the same time. The accountability helps in managing yourself really well, because no one wants to report a failure. And if anyone does, the support group helps them learn how to do better.

"I am not what happened to me, I am what I choose to become."

- Carl Gustav Jung

d) Think about the benefits

- Thinking about how hard something is a big problem for most people. But instead of thinking about how hard something is, think about what you will get out of it. For example, instead of thinking about how hard it is to manage your diabetes think of your good HbA1c and healthy living.

e) Find like-minded friends

- Staying motivated on your own is tough. But if you find someone with similar goals (running, carb counting, support group etc.), see if they'd like to partner with you. Find your support network, either in the real world or online, or both.

f) Read inspiring stories

- Where you'll be getting to know about the bad stories, you'll find good ones too. Try to meet such people who are good at managing their diabetes.

g) Build on your successes

- Every little step along the way is a success — celebrate the fact that you even started! And then did it for two days! Celebrate every little milestone. Then take that successfull feeling and build on it, with another baby step.

h) Chart your progress

- This can be as simple as marking an X on your calendar, or creating a simple spreadsheet, or logging your goal using some app. But it can be vastly rewarding to look back on your progress and to see how far you've come, and it can help you to keep going — you don't want to have too many days without an X! Now, you will have some bad marks on your chart. That's OK. Do not let a few bad marks stop you from continuing. Strive instead to get the good marks next time.

i) Use visualization

- Visualize your successful outcome in great detail. Close your eyes, and think about exactly how your successful outcome will look, will feel, will smell and taste and sound like. Where are you when you become successful? How do you look? What are you?

You either get bitter or you get better. It's that simple. You either take what has been dealt with you and allow it to make you a better person or you allow it to tear you down. The choice does not belong to fate, it belongs to you.

- Josh Shipp

17.9 Professional help

- Going out, talking to a family member or friend, vacationing or sometimes even taking a walk helps a lot in relieving emotional setbacks.
- One should seek consultation when there is an excess of emotional suffering (such as pessimism, weeping spells, disturbed sleep, bad eating habits, impaired socialization, mood tantrums and weight loss) may lead to destruction. If symptoms are not getting better over a course of time then it's time to call for help. Diabetes makes individuals prone towards stress, anxiety and depression. With the help of therapy (and medicine if needed), these can be managed to a large extent.

"We must accept finite disappointment, but never lose infinite hope."

- Martin Luther King Jr.

17.10 Be a warrior

- After the roller coaster ride of living with all the physical, emotional and social impacts of diabetes, there's a possibility that you'll become a WARRIOR.
- If ever given a choice, choose to be a FIGHTER and not a victim!

- Find a few troopers testimonials below and gear up to join the bandwagon!

- *"I was diagnosed with type 1 diabetes at age 5. It was considered a taboo back then and my family got to hear pity statement with constant reminders that my days in this world are numbered. Getting good health, education or even thinking of being married was like living in a fool's paradise. Fast forward to this day, here I am, graduated with Masters in Biotechnology, MPhil in Molecular Medicine, happily married and an active Diabetes Advocate! I am dedicated more than ever to help people with type 1 diabetes and tell the world, that diabetes does not define us, it's just a lifestyle to get along with!"* - ***Anum Anwar***

- *"Managing type 1 diabetes is not a science - it's an art which made me more fit and healthy as compared to others."* - ***Ezan Shahid***

- *"Diabetes is actually not a disease, rather it is a life style- a healthy life style which is easy to adopt if you know the tools and how they are used to manage diabetes."* - ***Muhammad Adnan Sabir***

- *"Diabetes does not stop me doing anything thing – I am achieving big things day by day and there is yet so much more to achieve."* - ***Sumair Ahmed***

- *"My sweet daughter Aima has type 1 diabetes. She is a brave kid. Gratitude is what I have learnt after her diabetes. For many years I could not handle her condition but now through the platform of peer support provided by Meethi Zindagi, I have learnt how to deal with it."* - ***Afsheen***

- *"My 18 months old daughter was diagnosed with type 1 diabetes in March 2018. I want people to understand that it is a medical condition, not a disease! Diabetes has given us all resilience to live for our goals and strength to achieve them."* - ***Amna Faizan***

- *"I have diabetes for the last 24 years. I'm living a happy and healthy life and I'm as healthy as anyone else"* - ***Sobia Sayed***

Never be bullied into silence. Never allow yourself to be made a victim. Accept no one's definition of your life, but define yourself.

- Harvey Fierstei

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Dr. Sana Ajmal

Diabetes Educator & Advocate
Founder & Executive Director, Meethi Zindagi

I was diagnosed with type 1 diabetes at the age of 15, in 1998. Mobile phone, internet and diabetes education had not seen light of the day in Paksitan yet. I found the initial few years very difficult as I could not understand what was wrong with my levels and how to manage them. I had accepted my condition as a medical and social challenge - both hard in their own ways!

My mother and doctor put in a lot of efforts into easing it out for me. A book that my doctor gave me for referencing was my lifeline. With their guidance, my HbA1c never crossed 6.5% in the first 15 years with type 1 diabetes.

I graduated as an Electrical (Telecom) Engineer from National University of Sciences and Technology (NUST) in 2007 and went on to pursue my Masters and PhD in Computer Engineeirng from Centre for Advanced Studies in Engineering (CASE). I wanted to show that diabetes can't stop me from achieveing my goals in life. I am also a Certified Diabetes Edcuator (CDE).

My passion for supporting the type 1 diabetes community compelled me to join International Diabetes Federation's (IDF) Young Leaders in Diabetes (YLD) program in 2011. I served as their Vice President and President-Elect before I decided it was time to give hope to the neglected Pakistani type 1 community, and thus I founded Meethi Zindagi.

I choose to live is the driving force behind Meethi Zindagi. Meethi Zindagi is a peer support and eduaction platform for people with type 1 diabetes and their families. Emotional well-being while living with type 1 diabetes, an often ignored and stigmatzied issue, is a strong component of all our projects and activities. Meethi Zindagi also provides support with insulin, test strips and other diabetes management accessories to the underpriveledged children with type 1 diabetes while requiring them to get school education. This booklet contains our learnings about the requirements from a stuctured type 1 diabetes education program, culturally tailored to suit local needs. Within SETUP, you will find your everyday questions answered. The booklet speaks to you as it is edited by your very own, who have gone through the same issues, confusions and questions in their daily lives with diabetes. The content of the booklet is reviewed by Pakistan Endocrine Society and provides hands on tools to you for leading a great life despite diabetes!

Dr. Atif Munir

Diabetologist & Endocrinologist
Clinical Advisor Meethi Zindagi

After graduating from King Edward Medical College Lahore, Pakistan in 2002 I went to United Kingdom for my specialization Medicine & subsequently Diabetes & Endocrinology. My love for the motherland always compelled me to return & serve my countrymen hence after spending ten years in UK I returned back in 2015. By this time, I had bagged qualifications like Membership of Royal College of Physicians UK, Membership of Royal College of Physicians Diabetes & Endocrinology UK, Certificate of completion of training Diabetes & Endocrinology UK, Fellowship of Royal College of Physicians London & Edinburgh.

Patient empowerment & peer support in managing chronic health condition like Diabetes has always been of special interest to me. In this context I was trained as a DAFNE dose adjustment for normal eating) doctor. DAFNE is the national structured education programme for people with type 1 diabetes in United Kingdom.

My passion for type 1 diabetes since returning to Pakistan was ignited by the fact that I gradually started to find out that type 1 diabetes was surrounded by myths, information being provided to people with type 1 was far from factual & evidence based & their clinical, nutritional & psychological management was being done in a way no different to people with type 2 diabetes which was a real disappointment. In this disappointment & despair I decided to take on a project which will demystify myths surrounding type 1 diabetes, empower people with type 1 diabetes and provide them the peer support for self-motivation. In my endeavour I met Meethi Zindagi which served as a catalyst in this effort.

The support from Pakistan Endocrine society has been a morale booster as well. So, my fellow Pakistanis with type 1 diabetes SETUP (Structured Education for Type 1 Diabetes Education in Pakistan) is a humble effort for my motherland & for all of you in return of what this country has given me. Pakistan Zindabad.

Rebecca Tariq

Consultant Clinical Dietitian

I graduated from College of Home Economics in 2002 and then did my masters and post-graduation in Clinical Dietetics in 2005. Like all the others, I was eagerly waiting for a vacancy in a hospital to practice what I was taught. To my surprise a sudden shifting of a senior dietitian to a distant place left me with the opportunity to join Children's Hospital & Institute of Child Health Lahore. 1st November, 2005 was the best day of my life, the day I joined this hospital. My first ever working place.

My appointment was for the diabetes clinic, where I was going to deal with children and teens with type 1 diabetes. Kids use to come to me from different areas and suburbs of Lahore. Their sparkling eyes carrying dreams to achieve were always encouraging for me to help them learn ways they can tackle with their diabetes. They were always loaded with so many stories of life. I use to listen to them as it was always encouraging for me to learn life from their point of view.

Teaching them with ideas regarding diet and physical activity was the challenging part. I used to tell them, "A day will come you will be the best dietitian for yourself". This always brought a smile on their faces, which was the best part of my nutritional therapy. During my experience in children`s hospital I came across so many achievers and yet so many to become. Life is challenging always and I use to tell each one of them that "you are the chosen one because Allah knows you will be the survivor". Last year I joined SETUP, with the hope that I, with the help of my team, will be able to develop information that will help many with type 1 diabetes across the country to achieve and maintain a healthy life and achieve what they want in life. My fellow type 1, you are the bright future of Pakistan inshaallah.

Annum Khan

Clinical Psychologist

I am a Mental Health professional since 2009, has been serving as a counsellor/trainer at National University of Science & Technology since 2012 providing care and implementing effective treatment plans for clients with varying mental health issues. I also teach & believe that every student must understand the importance of psychology in their everyday lives. I am a PhD scholar, specializing in developing an intervention for children with Autism. I have served as a clinical psychologist at different hospitals of Islamabad and an active member of Pakistan Psychological Association. I have received multiple international certifications including neurolinguistic programming from National Federation of Neurolinguistic Programming USA, Hypno-therapy from National Guild of Hypnotics USA. I attained proficiency in relaxation techniques and have successfully completed specialized trainings including Focusing, Eye Movement Desensitization and Reprocessing Psychological First Aid, Mindfulness and Reikhi.

Being a clinical psychologist, I have attended several trainings to master the art of therapy which includes Cognitive Behaviour Therapy, Gestalt therapy, Family therapy, Narrative Exposure therapy, Eidetic therapy and Applied Behaviour Analysis. I deal with diverse populations in one-on-one and group settings, motivate, communicate and advocate with to manage many types of personalities, diffuse stressful situations, proactively resolve issues and achieve challenging goals.

I have type 1 diabetes since 2015 however still trying to relish my life to the fullest. After diagnosis I started to work on the Psychological impact of chronic illnesses by in large and Diabetes to be more specific and offered individual & group counselling to the people with Diabetes. I have been associated with media since long and often try to spread awareness in this field through my shows. I have served as a Director Programs / Consultant Psychologist (Emotional wellness Centre) at Meethi Zindagi. Music, travelling, socializing, poetry and empathy keeps me zealous to live my life.

Maryam Alam Khatoon

Student of Nutrition & Dietetics

I have type 1 diabetes since 2009, actively managing my diabetes and motivated to help others via peer support. The diagnosis of type 1 diabetes was the turning moment of my life. Being diagnosed as a kid not knowing much about diabetes, aggravated by not having a single type 1 peer made me distressed, guilty and isolated along with a feeling a wide range of other emotions. My family and my doctor were my prime support. Over time, I developed acceptance and effective management of my diabetes with insulin and carbohydrate counting. For years now Alhamdolillah I am maintaining a great HbA1c with thus minimizing the risk of long-term complications with diabetes. I attribute this to constant monitoring, properly carbohydrate counting and taking my insulin on time.

Joining Meethi Zindagi took me out of isolation towards a splendid life despite type 1 diabetes. I want everyone like me to live life to the fullest. I am a student of Nutrition and Dietetics and have worked with Meethi Zindagi as a Peer Leader.

Peer support has such a positive impact on an individual. Although living with type 1 diabetes is a continuous struggle and challenge. Checking blood sugars calculating carbohydrates every time, packing strips and diabetes supplies before going out feels daunting. It becomes harder due to the mind-set of people in our society who perceive this as a self-inflicted disease which I have brought upon myself by eating sugar and sweets and not exercising. There is a lot of emotion that goes into managing diabetes. I sometimes feel that diabetes takes a toll on my body no matter how well I try to manage my blood sugar levels. I blame myself when things go wrong with my diabetes. People usually say: “this seems tough" or “we can't prick ourselves" but they don't realize that this is the only choice we have and insulin isn't a choice or solution it is my life support. However, I don't let this diabetes win over me. What people don’t know about diabetes is that it’s the leading cause of self-awareness, persistence, courage, understanding, compassion and empathy, and I overcame the fear of needles and have realized how strong I am to fight this battle with type 1 diabetes. Not escaping & realizing that diabetes is not a disease rather it is a lifestyle and it’s a part of me.

Everyone can give up, it’s the easiest thing in the world to do. But to hold it together is true strength. Don't let anyone tell you that you're a bad diabetic, they haven't walked in our shoes and they don't know how hard it is to manage. I have managed to go so well with diabetes as I have learned and accepted that type 1 diabetes is not about perfection it’s about the effort that brings real change. To my diabetes! you are a beautiful irony to me, the very thing that tried to destroy me but instead made me stronger.

About Us

Our Philosophy

Being a **health focused** organization, we understand that health is a human story. There is **so much more** to living with diabetes than just taking medicines, managing your lifestyle and getting blood tests done. A person living with diabetes must be at the **center of our health-care systems**. Therefore, we envision a **strong partnership** between care providers and people living with diabetes for **empowerment, peer support, awareness, health, education** and advocacy for the rights of those living with diabetes.

Our Vision

Great Life With Diabetes

Blood sugar levels cannot be **controlled**
But they can be **managed** well with
empowering education

Join us to learn more!

For questions & comments
Contact us
(details on back cover)

Call Us

For Donations

0332 8313214
0332 5554606

For Information

051 8313214

To Register A Child

0308 6770106

Mail Us

SETUP@meethizindagi.org
resource.gen.dept@meethizindagi.org

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