



Daffodil
International
University

Internship Report
On
Nutritional Management of Diabetic Patient

Submitted

To

The Head

Department of Nutrition & Food Engineering
Faculty of Allied Health Sciences
Daffodil International University
Daffodil Smart City, Ashulia, Savar, Dhaka.

Supervised

By

Professor Dr. Md. Bellal Hossain

Associate Dean
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Submitted

By

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Date of Submission:

LETTER OF TRANSMITTAL

Date:

The Head
Department of Nutrition and Food Engineering
Faculty of Allied Health Sciences
Daffodil International University
Daffodil Smart City, Ashulia, Savar, Dhaka.

Subject: Submission of Internship Report.

Dear Ma'am,

I would like to thank you for the guidance and support you have provided me during the course of this report. Without your help, this report would have been impossible to complete for me. You have helped me immensely. Without your support, help, advice, I could not complete this report. It is a great pleasure and honour for me to have the opportunity to submit my project work report on Nutritional Management of diabetic patients. I got the opportunity to work in BIRDEM general hospital for 30 days. It's difficult to complete this report without your supervision. To prepare this report I collected what I found in patients to make my report as reliable as possible. I have concentrated my best effort to achieve the objectives of the report and hope that my endeavor will serve the purpose. The practical knowledge and experience gathered during report preparation will immeasurably help in my future professional life. I request you to excuse me for any mistake that may occur in the report despite of my best effort.

I would really appreciate if you enlighten me with your thoughts and views regarding the report. In addition, if you wish to enquire about an aspect of my report, I would gladly answer your queries.

Thank you again for your support and patience.

Yours Sincerely,

Nafisha Tasfia

Nafisha Tasfia
ID: 182-34-111
Department of Nutrition and Food Engineering (NFE)
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Letter of Authorization

Date:

The Head
Department of Nutrition and Food Engineering
Faculty of Allied Health Sciences
Daffodil International University
Daffodil Smart City, Ashulia, Savar, Dhaka.

Subject: Declaration regarding the validity of the Internship Report.

Dear Madam,

This is my truthful declaration that the “Internship Report” I have prepared is not a copy of any Internship Report previously made by any other students. Exactly what I understand and saw is formed here from my experience. I moreover declare that it will not be submitted to other individual in future. I also express my honest confirmation in support to the fact that the said Internship report has neither been used before to fulfill my other course related nor it will be submitted to any other person in future.

Sincerely yours,

Nafisha Tasfia

Nafisha Tasfia
ID: 182-34-111
Department of Nutrition and Food Engineering (NFE)
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Approval Certification

On the behalf of the university, this is to certify that Nafisha Tasfia bearing ID: 182-34-111, Program B.Sc. in Nutrition & Food Engineering is a regular student, department of Nutrition & food Engineering, Daffodil International University. She has successfully completed her Intern program of 30 days in BIRDEM General Hospital, Dhaka, Bangladesh.

Then she completed this report under my direction. We aware that Nafisha Tasfia completed her Intern report by observing our teacher. In addition, I ensure that his report is a worth of fulfilling the partial requirements of NFE program.



Supervisor

Professor Dr. Md. Bellal Hossain

Associate Dean

Faculty of Allied Health Sciences (FAHS)

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The Head

Department of Nutrition and Food Engineering

Faculty of Allied Health Sciences

Daffodil International University

Daffodil Smart City, Ashulia, Savar, Dhaka.

Approval Certification

This is to certify that Nafisha Tasfia bearing ID-182-34-111, Program B.Sc. in Nutrition & Food Engineering is a regular student department of Nutrition & food Engineering Faculty of Allied health Science, Daffodil international University. She has successfully completed her Internship program of 30 days in BIRDEM General Hospital. This internship work or any part thereof has not been submitted elsewhere for the award of any degree, diploma, associate ship or fellowship. I am also pleased to hereby certify that the data and finding present in the report are the authentic work of Nafisha Tasfia. During the period of her internship program with me she was punctual and hardworking.

I wish her every success in life.

Quamrun Nahar, PhD

Principal Research Officer, BIRDEM

Acknowledgements

At first all praises and gratitude to the almighty Allah for the good health and wellbeing that were needed to complete this project work. Now I would like to express my sincere gratitude and appreciation to **Professor Dr. Md. Bellal Hossain**, my internship supervisor for providing me with the wonderful guidelines to work in the research area of BIRDEM General Hospital, Bangladesh. Again my wishes for his expert guidance and mentorship, patience, understanding, support and encouragement at all levels to complete internship works through the dissertation for under graduation program. My special thanks to **Quamrun Nahar, PhD**, Principle Research Officer, BIRDEM General Hospital Dhaka for providing me with the wonderful guidelines to work in the research area of BIRDEM General Hospital. Without her help, support and supervision, it would not possible to complete my internship. With due respect and admiration, I must express my heartiest gratitude to Joint Director (administration) Md. Ashfaqur Rahman sir for accepting this internship and allow me to complete my internship from BIRDEM General Hospital. And lastly, I would like to express my special thanks to all the patients for their cooperative support. Their encouragement during the bad times and their enthusiasm during the good times gave me constant inspirations in future life.

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Introduction

Diabetes mellitus, commonly known as diabetes, is a group of metabolic disorders characterized by a high blood sugar level (hyperglycemia) over a prolonged period of time. Acute complications can include diabetic ketoacidosis, hyperosmolar hyperglycemic state or death. Serious long-term complications include cardiovascular disease, stroke, chronic kidney disease, foot ulcers, damage to the nerves, damage to the eyes and cognitive impairment. Diabetes is due to either the pancreas not producing enough insulin or the cells of the body not responding properly to the insulin produced. Insulin is a hormone which is responsible for helping glucose from food get into cells to be used for energy. In 2014, 8.5% of adults aged 18 years and older had diabetes. In 2019, diabetes was the direct cause of 1.5 million deaths and 48% of all deaths due to diabetes occurred before the age of 70 years. Between 2000 and 2016, there was a 5% increase in premature mortality rates from diabetes. In high-income countries the premature mortality rate due to diabetes decreased from 2000 to 2010 but then increased in 2010-2016. In lower-middle-income countries, the premature mortality rate due to diabetes increased across both periods. By contrast, the probability of dying from any one of the four main noncommunicable diseases (cardiovascular diseases, cancer, chronic respiratory diseases or diabetes) between the ages of 30 and 70 decreased by 18% globally between 2000 and 2016. Diabetes is a serious, chronic disease that occurs either when the pancreas does not produce enough insulin (a hormone that regulates blood glucose) or when the body cannot effectively use the insulin it produces. Raised blood glucose, a common effect of uncontrolled diabetes may over time lead to serious damage to the heart, blood vessels, eyes, kidneys and nerves. More than 400 million people live with diabetes. Diabetes mellitus, commonly known as diabetes, is a metabolic disease. The hormone insulin moves sugar from the blood into our cells to be stored or used for energy. With diabetes, our body either doesn't make enough insulin or can't effectively use the insulin it does make.

- Diabetes caused 1.5 million deaths in 2012.
- Higher-than-optimal blood glucose was responsible for an additional 2.2 million deaths as a result of increased risks of cardiovascular and other diseases, for a total of 3.7 million deaths related to blood glucose levels in 2012.
- Many of these deaths (43%) occur under the age of 70.

- In 2014, 422 million people in the world had diabetes – a prevalence of 8.5% among the adult population.
- The prevalence of diabetes has been steadily increasing for the past 3 decades and is growing most rapidly in low- and middle-income countries.
- Associated risk factors such as being overweight or obese are increasing.
- Diabetes is an important cause of blindness, kidney failure, lower limb amputation and other long-term consequences that impact significantly on quality of life.

Type 1 diabetes (previously known as insulin-dependent, juvenile or childhood-onset diabetes) is characterized by deficient insulin production in the body. People with type 1 diabetes require daily administration of insulin to regulate the amount of glucose in their blood. If they do not have access to insulin, they cannot survive. This is an autoimmune disease. The immune system attacks and destroys cells in the pancreas, where insulin is made. It is currently not preventable. It's unclear what causes this attack. About 10 percent of people with diabetes have this type. Symptoms include excessive urination and thirst, constant hunger, weight loss, vision changes and fatigue. Type 2 diabetes (formerly called non-insulin-dependent or adult-onset diabetes) results from the body's ineffective use of insulin. Type 2 diabetes accounts for the vast majority of people with diabetes around the world. Symptoms may be similar to those of type 1 diabetes but are often less marked or absent. As a result, the disease may go undiagnosed for several years until complications have already arisen. For many years type 2 diabetes was seen only in adults but it has begun to occur in children.

Type 1

The exact causes of type 1 diabetes are unknown. It is generally agreed that type 1 diabetes is the result of a complex interaction between genes and environmental factors though no specific environmental risk factors have been shown to cause a significant number of cases. The majority of type 1 diabetes occurs in children and adolescents.

Type 2

The risk of type 2 diabetes is determined by an interplay of genetic and metabolic factors. Ethnicity, family history of diabetes and previous gestational diabetes combine with older age, overweight and obesity, unhealthy diet, physical inactivity and smoking to increase risk.

Gestational diabetes

Risk factors and risk markers for GDM include age (the older a woman of reproductive age is the higher her risk of GDM) overweight or obesity; excessive weight gain during pregnancy, a family history of diabetes, GDM during a previous pregnancy, a history of stillbirth or giving birth to an infant with congenital abnormality and excess glucose in urine during pregnancy. Diabetes in pregnancy and GDM increase the risk of future obesity and type 2 diabetes in offspring.

Origin of the report

For the students of Nutrition and Food Engineering of Daffodil International University has mandatory internship program. It is the final phase of a student's educational pursuit. This internship program is the completion of our bachelor's degree and our promising future. So as a student of Nutrition and Food Engineering we have to choose a reputed organization related to hospital or industry for training which required to properly comprehend a topic gained in formal qualifications. So, as I am interested in hospital sector for this reason I choose BIRDEM General Hospital for my internship program. In the functional world of current nourishing wellbeing, there is indeed a massive difference between scholastic training and the implementation of theoretical study. So, this practical works can help me to fulfill the lacking of the knowledge. This report focuses on a requirement of the B.Sc. in Nutrition and Food Engineering program. The topic of my report is 'Nutritional Management of Diabetic Patients where the main purpose is to observe their management system, patients' handlings, and nutritional problem solving which can help me in my near future.

Overview of BIRDEM General Hospital

BIRDEM (Bangladesh Institute of Research and Rehabilitation in Diabetes, Endocrine and Metabolic Disorders) a multi-sectoral health care center, educational and research institute at Shahbagh in Dhaka. This central institution of the diabetic association of Bangladesh (DAB) was established in 1980 on a government plot and financed by the government, and accommodated in three large multi-storied buildings. The hospital, housed in a 15-storied building, now provides for 542 beds of which 80 are meant for poor diabetic patients on gratis. On an average, about three thousand patients attend and have their check-ups every day. It is one of the largest health-complexes in Bangladesh providing almost all types of clinical and diagnostic facilities. The hospital maintains almost all branches of clinical medical science with skilled manpower and improved apparatus. The in-patient departments have taken the characteristics of almost a general hospital, although diabetic and other endocrine patients are always given priority. BIRDEM maintains a separate research department with fulltime manpower. The research activities are conducted in collaboration with various national and international research organizations. The founder of BIRDEM, Professor Mohammad Ibrahim (1911-1989) was very much interested in social works, like social rehabilitation of patients. In the mid-fifties, he first thought of diabetes care in this country. He understood it very well that diabetes might not be cured; but persons affected would be able to maintain productive and respectful life. He thought the matter as a socio-medical care. Although the real extent of the problem of diabetes in the country was not evident, he could foresee the present picture at that time and organized a group of social workers, philanthropists and professionals. With the help of them he established the Diabetic Association of Bangladesh (then East Pakistan) on February 28, 1956. The chief executive of the BIRDEM is its Director General working under a Board of Management nominated by the National Council of Diabetic Association of Bangladesh. The hospital unit of the BIRDEM has recently been renamed as BIRDEM General Hospital thereby to change the current public idea that it provides exclusively diabetic medicare. [Siddique Mahmudur Rahman and MKI Quayyum Choudhury]

Mission:

- To give complete medical care including rehabilitation to all diabetic individuals regardless of gender, socioeconomic status or financial status.
- To provide all the Bangladeshis with reasonable BADAS medical treatment through self-sustaining institutes by expending these services.
- To establish medical products and best quality foods for the all diabetic patients.
- To make high quality specialist manpower (physicians, technicians, research scientists, associate employees and nurses)
- To establish medical care management throughout a comprehensive and integrated management system.

Vision:

- “No diabetic individuals shall die unfeed, untreated or unemployed in Bangladesh”
- “Medical care will be provided with all individuals at a reasonable cost”



Services and Facilities

The clinical services of BIRDEM provide comprehensive diabetic care free of charge to all the registered diabetic patients. The fund collected by 'Cross financing' system i.e through medical care and diagnostic service to other patients, is spent for imparting free medical service to the diabetic patients. The patients are entitled to get medical supervision, consultations, diabetic education (which includes basic knowledge on overall health), advice on nutrition, social support and rehabilitation, if necessary. Insulin, oral hypoglycemic agents, and medicines are supplied free or at subsidized cost.

There other services are-

- Indoor Service
- General Ward
- Cabin
- ICU
- CCU
- HDU
- OT/ Post-Operative
- Medical Emergency
- Surgical Emergency
- Radiology and Imaging
- Blood Bank



Activities

I worked in the indoor section. In the indoor section every types of patient I met. As my topic is diabetic patient with complications with electrolyte imbalance, CKD and stroke. So I met mostly these types of patient. When rounding the wards, I met the patients and interacted with them to know their current situations, their nutritional needs, complications and took those data. And also monitor their diet chart.



Objective

General Objective:

The ultimate goal is to complete the requirements of our department in order to receive my bachelor's degree. As I am interested in health sector and willing to gather my practical knowledge by working in hospital so this is the main reason for choosing this institute. By doing practical works it can help to enhance my limited knowledge.

Specific Objective:

- To learn more about the operational activities of the health sector.
- To enhance the limited knowledge knowing more about the health system.
- To understand more about the diabetes and their chronic complications.
- To know more about the nutritional diet chat according to their compilations.
- To learn about patients handling and their observation techniques.

Complications of Diabetes

When diabetes is not well managed, complications develop that threaten health and endanger life. Acute complications are a significant contributor to mortality, costs and poor quality of life. Abnormally high blood glucose can have a life-threatening impact if it triggers conditions such as diabetic ketoacidosis (DKA) in types 1 and 2 and hyperosmolar coma in type 2. Abnormally low blood glucose can occur in all types of diabetes and may result in seizures or loss of consciousness. It may happen after skipping a meal or exercising more than usual or if the dosage of anti-diabetic medication is too high. Over time diabetes can damage the heart, blood vessels, eyes, kidneys and nerves and increase the risk of heart disease and stroke. Such damage can result in reduced blood flow which combined with nerve damage (neuropathy) in the feet increases the chance of foot ulcers, infection and the eventual need for limb amputation. Diabetic retinopathy is an important cause of blindness and occurs as a result of long term accumulated damage to the small blood vessels in the retina. Diabetes is among the leading causes of kidney failure.

There are three types of Diabetes:

1. Type 1 diabetes
2. Type 2 diabetes
3. Gestational diabetes

Complications of type 1 diabetes

Insulin is essential for people with type 1 diabetes. We cannot live without a source of exogenous insulin. Without insulin, people with type 1 diabetes have very high blood sugar levels. This leads to increased glucose in the urine and excessive loss of water and electrolytes in the urine. Insulin deficiency also results in an inability to store fat and protein along with depletion of existing fat and protein stores. This dysregulation leads to the process of ketosis and the release of ketones into the blood. Ketones acidify the blood, a condition called diabetic ketoacidosis (DKA). Symptoms of diabetic ketoacidosis include nausea, vomiting, and abdominal pain. Without medical attention, people with diabetic ketoacidosis can quickly go into shock, coma, and even death.

Diabetic ketoacidosis can be caused by infection, stress, or trauma, all of which can increase insulin requirements. is a clear risk factor for Emergency treatment of diabetic ketoacidosis usually includes intravenous fluids, electrolytes, and insulin in a hospital intensive care unit. Dehydration can be very serious, and it is not

uncommon for people with diabetic ketoacidosis to drink 6-7 liters of water. Antibiotics are given for infections. Treatment can rapidly reverse abnormal blood sugar levels, ketone production, acidosis and dehydration can be reversed rapidly and patients can recover remarkably well.

Complications of type 2 diabetes

Stress, infections and medications such as corticosteroids can also cause blood sugar levels to rise rapidly in people with type 2 diabetes. A rapid rise in blood glucose levels in type 2 diabetics with dehydration can lead to an increase in blood osmolarity (hyperosmolarity). The condition can worsen and lead to coma (hyperosmotic coma). Hyperosmotic coma usually occurs in elderly patients with type 2 diabetes. Like diabetic ketoacidosis, hyperosmotic coma is an emergency. Immediate treatment with intravenous fluids and insulin is critical to reverse the hyperosmotic state. Unlike people with type 1 diabetes, people with type 2 diabetes do not usually develop ketoacidosis as well as diabetes.

Cause of Diabetes

Any type of diabetes is caused by too much glucose circulating in the bloodstream. However, the causes of high blood sugar levels depend on the type of diabetes.

Causes of Type 1 diabetes: This is an immune system disease. Our body attacks and destroys insulin-producing cells in the pancreas. Without insulin to allow glucose to enter cells, glucose accumulates in the bloodstream. Genes may also be involved in some patients. Viruses can also cause immune system attacks.

Cause of Type 2 diabetes and prediabetes: Our body's cells are not allow insulin work in the way it needs to get glucose into our cells. Our body's cells have become insulin resistant. Our pancreas cannot produce enough insulin to overcome this resistance. Glucose levels in the bloodstream rise.

Gestational diabetes: Hormones secreted by the placenta during pregnancy make our body's cells more resistant to insulin. Our pancreas cannot produce enough insulin to overcome this resistance. There is too much glucose in our bloodstream.

Signs and Symptoms of Diabetes

9 early signs and symptoms of diabetes

1. Early symptoms of untreated diabetes are associated with elevated blood sugar levels and loss of glucose in the urine. High levels of glucose in the urine can lead to increased frequent urination and dehydration.
2. Fluctuations in blood sugar levels cause blurred vision.
3. Relative or absolute insulin deficiency ultimately leads to weight loss.
4. Extremely high blood sugar levels can lead to lethargy and coma.
5. The weight loss of diabetes occurs despite an increase in appetite.
6. Dehydration also causes thirst and increased water consumption.
7. Some untreated diabetes patients complain of fatigue.
8. Nausea and vomiting can also occur in patients with untreated diabetes.
9. Frequent infections (such as infections of the bladder, skin, and vaginal areas) are more likely to occur in people with untreated or poorly-controlled diabetes.

Type 1 diabetes symptoms: Symptoms can develop rapidly over weeks or months. Symptoms begin at a young age - as a child, teenager, or young adult. Other symptoms include nausea, vomiting, abdominal pain, yeast infections, and urinary tract infections.

You might notice:

Unplanned weight loss: When the body can't get energy from food, it starts burning muscle and fat instead. You can lose weight without changing your diet. Find out which foods are high in trans fatty acid.

Nausea and vomiting. When your body burns fat, it makes ketones. These can build up the blood to dangerous levels, a potentially life-threatening condition called diabetic ketoacidosis. Ketones can make you feel sick to your stomach.

Type 2 diabetes and prediabetes symptoms: You may have no symptoms at all or you may not notice them because they progress slowly over years. Symptoms usually begin in adulthood but prediabetes and type 2 diabetes are on the rise in all age groups.

Yeast infections: Both men and women with diabetes can get these. Yeast feeds on glucose, so they are more active when glucose is abundant. Infections can grow in warm, moist skin folds such as:

- Between fingers and toes
- Under breasts
- In or around sex organs

Slow-healing sores or cuts: Over time, high blood sugar affects blood flow, causing nerve damage and making it harder for the body to heal wounds.

Pain or numbness in your feet or legs: This is another result of nerve damage.

Gestational diabetes: Symptoms are usually not noticed. Obstetrician will test for gestational diabetes between 24 and 28 weeks of pregnancy. You may feel a little thirstier than usual or pee more often.

Associated Risk Factor

Regular physical activity reduces the risk of diabetes and hyperglycemia and contributes significantly to overall energy balance, weight control and obesity prevention. These are all risks associated with future diabetes prevalence. Thus, the global target of a 10% relative reduction in physical inactivity is therefore strongly associated with the global target of halting the risk in diabetes. Diabetes can lead to blindness, kidney failure, lower limb amputation, and other long-term consequences that seriously affect quality of life if not managed properly. There are no global estimates of diabetes-related end-stage renal disease, cardiovascular events, lower extremity amputations, or pregnancy complications, but these conditions affect many people with diabetes.

Type 1 Diabetes

Type 1 diabetes is thought to be caused by an immune response where the body mistakenly attacks itself. This type usually begins in childhood. Your pancreas stops producing insulin. Risk factors for type 1 diabetes are not as clear as for prediabetes and type 2 diabetes. Known risk factors include:

- **Family history:** If you have parent, brother or sister with type 1 diabetes, chances are higher that you'll get it too. Anyone who has a mother, father, sister or brother with type 1 diabetes should get checked. A simple blood test can diagnose it.
- **Diseases of the pancreas:** They can slow its ability to make insulin.
- **Infection or illness:** Some infections and illnesses, mostly rare ones, can damage your pancreas.
- **Age:** Type 1 diabetes can get at any age but it usually develops in children, teens or young adults.

In the United States, White people are more likely to develop type 1 diabetes than African American and Hispanic or Latino people. Currently, no one knows how to prevent type 1 diabetes.

Type 2 Diabetes

The likelihood of developing type 2 diabetes depends on a combination of risk factors. Although we cannot change risk factors related to family history, age, race or ethnicity, we may be able to avoid some risk factors by maintaining a healthy weight and being physically active. In this type, the body cannot use the insulin, it produces. This is called insulin resistance. Type 2 usually affects adults but can occur at any point in life.

You're at risk for type 2 diabetes if you:

- **Impaired glucose tolerance:** Prediabetes is a milder form of type 2. It can be diagnosed with a simple blood test. If you have it, there's a strong chance you'll get type 2 diabetes.
- **Obesity or being overweight:** Research shows that this is a top reason for type 2 diabetes. Because of the rise in obesity among U.S. children, this type is affecting more teenagers.
- **Insulin resistance:** Type 2 diabetes often starts with cells that are resistant to insulin. That means your pancreas has to work extra hard to make enough insulin to meet body's needs.
- **Ethnic background:** Diabetes happens more often in Hispanic/Latino Americans, African-Americans, Native Americans, Asian-Americans, Pacific Islanders and Alaska natives. Some Pacific Islanders and Asian American people are also at higher risk.

- **Gestational diabetes:** If you had diabetes while you were pregnant, you had gestational diabetes. This raises your chances of getting type 2 diabetes later in life.
- **Sedentary lifestyle:** If you are physically active less than three times a week.
- **Family history:** You have a parent or sibling who has type 2 diabetes.
- **Polycystic ovary syndrome:** Women with polycystic ovary syndrome (PCOS) have a higher risk.
- **Age:** If you're over 45 and overweight or if you have symptoms of diabetes, talk to your doctor about a simple screening test.

If someone have non-alcoholic fatty liver disease, he/she may also be at risk for type 2 diabetes.

Type 2 diabetes can develop at any age, even in childhood. In addition to previous risk factors, children and adolescents are also at higher risk of developing type 2 diabetes if they are born with low birth weight or if their parents had gestational diabetes during pregnancy.

You can prevent or delay type 2 diabetes with proven lifestyle changes. These include weight loss if you are overweight, a healthy diet, and regular physical activity.

Prediabetes

You're at risk for prediabetes if you:

- Are overweight.
- Age 45 years or older.
- Have parent, brother or sister with type 2 diabetes.
- Physically active less than 3 times a week.
- Have ever had gestational diabetes or given birth to a baby who weighed over 9 pounds.
- Are an African American, Hispanic or Latino, American Indian or Alaska Native person. Some Pacific Islander and Asian American people are also at higher risk.

You can prevent or reverse prediabetes with proven lifestyle changes. These include weight loss if you're overweight, a healthy diet, and regular physical activity. The CDC-led National Diabetes Prevention Program helps make healthy changes that have lasting results. increase.

Gestational Diabetes

You're at risk for gestational diabetes (diabetes while pregnant) if you:

- **Obesity or being overweight:** Extra pounds can lead to gestational diabetes.
- **Age:** The older you are when you get pregnant, the higher your chances are.
- **Glucose intolerance:** Having glucose intolerance or gestational diabetes in the past makes you more likely to get it again.
- **Family history:** If a parent or sibling has had gestational diabetes, you're more likely to get it.
- **Ethnic background:** Nonwhite women have a greater chance of developing it. Are an African American, Hispanic or Latino, American Indian, Alaska Native, Native Hawaiian, or Pacific Islander person.
- Had gestational diabetes during a previous pregnancy.
- Have given birth to a baby who weighed over 9 pounds.
- Have a hormone disorder called polycystic ovary syndrome (PCOS).

Gestational diabetes usually goes away after birth but it puts you at an increased risk of type 2 diabetes. Babies are more likely to become obese as children or teenagers and later develop type 2 diabetes.

Making lifestyle changes before conception may help prevent gestational diabetes. These include weight loss if you are overweight, a healthy diet, and regular physical activity.

Diagnosis and Early Detection

Early diagnosis is the starting point for successfully managing diabetes. The longer you have diabetes without diagnosis and treatment, the more likely it is that your health will deteriorate. Therefore, easy access to a basic diagnosis of diabetes is important and the diagnosis should be available in primary health care settings. People with type 1 diabetes often have symptoms that prompt them to see a doctor, such as thirst, weight loss, and polyuria. Type 2 diabetes often has no symptoms, and some people seek medical attention for complications such as vision loss, heart attack, and gangrene of the hands and feet. Type 2 diabetes develops slowly and often goes undetected for very long periods when the disease is present.

Current treatment of diabetes does not prevent all complications but the progress of complications can be slowed by early interventions. Early detection is key in diabetes because early treatment can prevent serious complications. Diabetic care often focuses on treatment of the condition. While treatment is important, early detection increases the potential for effective changes early in the disease process. People with diabetes should have periodic, comprehensive eye examinations. Timely laser photocoagulation and good control of blood glucose can prevent or delay the onset of irreversible vision loss, though this is not always accessible or available in low- and middle-income countries. Measurement of urine protein will reveal early kidney damage and the progression to kidney failure can be slowed by essential drugs routinely used to treat hypertension. Kidney failure is treated by dialysis or a kidney transplant. Proper footwear and regular examination of feet for signs of neuropathy, impaired blood flow and skin changes can prevent foot ulcers that often lead to gangrene and limb amputation. Rehabilitation services such as physiotherapy and occupational therapy can help minimize the impact of complications on people's functioning.

A blood test can determine if a person has diabetes. Doctors commonly use two tests to check for diabetes.

Diabetes is diagnosed by measuring glucose in a blood sample taken while the patient is in a fasting state or 2 hours after a 75 g oral load of glucose has been taken. Diabetes can also be diagnosed by measuring the level of glycated hemoglobin, known as hemoglobin A1c (HbA1c), even if the patient is not fasting. The glycated form of hemoglobin is measured to determine average 3-month blood glucose levels. This blood test takes about a minute and usually gets the results in 2-3 days. A normal HbA1c is less than 5.7%. Pre-diabetes is 5.7-6.4%. A score of 6.5% or higher is classified as diabetes. HbA1c reflects average blood glucose level over the past few weeks, not the current blood glucose level (reflected by fasting and 2-hour blood

glucose readings above). However, this test is more expensive than a blood glucose test.

Another way health care providers use blood tests to determine if you have diabetes is the fasting blood sugar or fasting blood sugar (FBS) test. This blood test measures the basal (base) level of sugar in the blood. The test is usually done in the morning when the patient has not eaten or drank anything for more than 8 hours of her. This test takes about 10 minutes and results are available immediately. A normal FBS is 70-100 mg/dl (3.9-5.6 mmol/l). Your doctor may repeat the fasting blood glucose test or order additional tests to check for abnormal blood glucose readings.

Blood Sugar Control

High blood sugar, also known as hyperglycemia, is associated with diabetes and prediabetes. Prediabetes is when blood sugar levels are high but not high enough to be classified as diabetes. Blood sugar levels are an important number in the management of diabetes. Many foods are broken down into blood sugar which is used as an energy source for the brain, heart, and muscles. Blood sugar comes from the food we eat or is made in the liver and transported to the bloodstream (transported to all organs and cells) and cells where it is converted to energy. Hyperglycemia is defined as a distribution of fasting plasma glucose in a population that is higher than the theoretical distribution that minimizes health risks. Once blood sugar problems are identified, doctors and patients can take steps to prevent permanent damage to the heart, kidneys, eyes, nerves, blood vessels, and other vital organs.

Our bodies normally control blood sugar levels by producing insulin, a hormone that allows cells to use circulating sugar in the blood. Insulin is the most important regulator of blood sugar levels. However, several factors can interfere with blood sugar control and lead to hyperglycemia.

Internal causes of hyperglycemia are when the liver produces too much glucose, the body produces too little insulin, or the body cannot use insulin effectively. The latter is known as insulin resistance. External factors include diet, certain medications, a sedentary lifestyle and stress.

Blood sugar control is especially important for diabetic, as chronically high blood sugar levels can lead to life-threatening complications in the limbs.

Blood sugar levels that are higher than optimal even if below the diagnostic threshold for diabetes, are a major source of mortality and morbidity. The diagnostic criterion for diabetes is fasting plasma glucose ≥ 7.0 mmol/L – a diagnostic point selected on the basis of micro-vascular complications such as diabetic retinopathy.

Causes of low blood sugar

Low blood sugar, also called hypoglycemia has many causes including taking too much insulin, missing a meal, exercising more than normal, drinking alcohol and taking other diabetes medicines. Blood sugar below 70 mg/dL is considered low. In patients with diabetes, the most common cause of low blood sugar is excessive use of insulin or other glucose-lowering medications, to lower the blood sugar level in diabetic patients in the presence of a delayed or absent meal. When low blood sugar levels occur because of too much insulin, it is called an insulin reaction. Sometimes, low blood sugar can be the result of an insufficient caloric intake or sudden excessive physical exertion.

Blood glucose is essential for the proper functioning of brain cells. Therefore, low blood sugar can lead to central nervous system symptoms such as:

- Shaking.
- Nervousness or anxiety.
- Sweating.
- Hunger.
- Irritability or confusion.
- Dizziness.

Low blood sugar can be dangerous and should be treated as soon as possible.

What make blood sugar rise

Hyperglycemia is the technical term for high blood glucose. It happens when the body has too little insulin or when the body can't use insulin properly. Here are a few of the causes:

- Too much food, like a meal or snack with more carbohydrates than usual
- Dehydration
- Not being active
- Not enough insulin or oral diabetes medications
- Side effects from other medications, such as steroids or anti-psychotic medications
- Illness, stress, menstrual periods or short or long-term pain (these all cause your body to release hormones which can raise blood sugar levels)

What make blood glucose fall

Hypoglycemia is the technical term for low blood glucose (lows). It's when your blood glucose levels have fallen low enough that you need to take action to bring them back to your target range. Here are a few of the causes:

- Not enough food, like a meal or snack with fewer carbohydrates than usual, or missing a meal or snack
- Alcohol, especially on an empty stomach
- Too much insulin or oral diabetes medications
- Side effects from other medications
- More physical activity or exercise than usual

What are ketones

Ketones are a type of fuel. It produced when fat is broken down for energy. Our liver starts breaking down fat when there isn't enough insulin in the bloodstream to get blood sugar levels into our cells.

What is diabetic ketoacidosis

If you think your blood sugar is low, get it checked, even if you don't have symptoms. If too many ketones are produced too quickly, they can accumulate in the body and cause diabetic ketoacidosis (DKA). DKA is very serious and can lead to coma and death. Common symptoms of DKA include:

- Fast, deep breathing.
- Dry skin and mouth.
- Flushed face.
- Frequent urination or thirst that lasts for a day or more.
- Fruity-smelling breath.
- Headache.
- Muscle stiffness or aches.
- Nausea and vomiting.
- Stomach pain.

If you think you have DKA, test your urine for ketones. Check your ketone levels by following the instructions on your test kit and comparing the color of the test strips to the color chart in your kit. Call your doctor right away if you have high ketone levels. DKA requires hospital treatment. DKA is most common in people with type 1 diabetes and can be the first symptom of type 1 in those who have not yet been diagnosed. People with type 2 diabetes can also develop DKA, but this is less common.

How do carbs affect blood sugar

Carbohydrates in food cause a higher blood sugar level after we eat them than when we eat proteins or fats. You can eat carbohydrates even if you have diabetes. How much you can keep your blood sugar within your target range depends on your age, weight, activity level, and other factors. Counting carbohydrates in food and drink is an important tool for controlling blood sugar levels.

Treatment of high blood sugar

Talk to your doctor about how to keep your blood sugar levels within your target range. Your doctor may suggest the following:

- Be more active. Regular exercise can help keep blood sugar levels on track. Important: If ketones are present in urine, don't exercise. This can make blood sugar go even higher.
- Take medicine as per instruction. If blood sugar is often high, doctor may change how much medicine take or when take it.
- Follow diabetes meal plan. Ask doctor or dietitian for help if having trouble sticking to it.
- Check blood sugar as per direction of doctor. Check more often if you're sick or if you're concerned about high or low blood sugar.
- Talk to your doctor about adjusting how much insulin you take and what types of insulin such as short-acting to use.

What else can help manage blood sugar levels

Eating a healthy diet with plenty of fruit and vegetables, maintaining a healthy weight and getting regular physical activity can all help. Other tips include:

- Eat at regular times and don't skip meals.
- Track your food, drink and physical activity.
- Drink water instead of juice or soda.
- Choose foods lower in calories, saturated fat, trans fat, sugar and salt.
- Limit alcoholic drinks.
- Keep track of your blood sugar levels to see what makes them go up or down.
- For a sweet treat, choose fruit.
- Control your food portions (for example, use the plate method: fill half your plate with non-starchy vegetables, a quarter with lean protein, and a quarter with a grain or starchy food).

The role of glycemic control in preventing the development and progression of complications has been demonstrated in both type 1 and type 2 diabetes, and is particularly strong relationship between intensive glycemic control and neuropathy and diabetic retinopathy. In most people with diabetes, blood sugar levels can be adequately controlled with drugs. Blood sugar control and gestational diabetes require tight glycemic control, which is difficult to manage and monitor in primary care settings and requires more frequent referrals to higher levels of care.

Diabetes and Tuberculosis

Diabetes is a common known risk factor for tuberculosis and is associated with poorer tuberculosis outcomes while tuberculosis is associated with worsening glycaemic control. Since a number of countries have both a high and increasing diabetes prevalence and a substantial burden of tuberculosis. This interaction has significant implications for management of both diseases. Tuberculosis (TB) is a serious health threat, especially for diabetics. There are two tuberculosis-related diseases: latent tuberculosis infection and tuberculosis. People with latent tuberculosis are not sick because the body can fight the bacteria to keep them from growing. A tuberculosis patient is sick and has active tuberculosis because the body cannot stop the growth of the bacteria. People with diabetes who are also infected with tuberculosis are more likely to develop and contract tuberculosis.

People with untreated latent tuberculosis infection and diabetes are more likely than people without diabetes to develop tuberculosis. Without proper treatment, diabetes and tuberculosis increase health complications.

Treatment

Untreated latent tuberculosis infection can lead to tuberculosis disease. Tuberculosis can lead to illness and death if left untreated. Fortunately, there are treatment options for diabetics with either latent tuberculosis infection or tuberculosis disease. If a person is diagnosed with tuberculosis infection, further testing is required to rule out tuberculosis. People with either latent tuberculosis infection or tuberculosis disease can be effectively treated. Before starting treatment for tuberculosis disease or an latent tuberculosis infection, people with tuberculosis should talk to their doctor about other drugs they are taking, including diabetes drugs. Some drugs used to treat tuberculosis interact with drugs used to treat diabetes.

Diet for Diabetic Patient

Nutrition and physical activity are important parts of a healthy lifestyle when you have diabetes. Along with other benefits, following a healthy meal plan and being active can help you keep your blood glucose level, also called blood sugar, in your target range. To manage your blood glucose, you need to balance what you eat and drink with physical activity and diabetes medicine, if you take any. What you choose to eat, how much you eat, and when you eat are all important in keeping your blood glucose level in the range that your health care team recommends. Becoming more active and making changes in what you eat and drink can seem challenging at first. You may find it easier to start with small changes and get help from your family, friends and health care team. The sugar in your blood comes from certain foods called carbohydrates or "carbs." Foods that are high in carbs include candy and sweets, sodas, breads, tortillas, and white rice. The more carbs you eat, the higher your blood sugar level will be. Whether you have type 1 or type 2 diabetes, making the right food choices is an important way to keep your blood sugar at a healthy level. When you control your blood sugar, you lower your chance of having serious health problems from diabetes, such as vision loss and heart problems. Eating well and being physically active most days of the week can help you

- Keep your blood glucose level, blood pressure, and cholesterol in your target ranges
- Lose weight or stay at a healthy weight
- Prevent or delay diabetes problems
- Feel good and have more energy

The key to eating with diabetes is to eat a variety of healthy foods from all food groups, in the amounts your meal plan outlines.

The food groups are:

- **Vegetables**
 - **Non-starchy:** includes broccoli, carrots, greens, peppers, and tomatoes
 - **Starchy:** includes potatoes, corn, and green peas
- **Fruits**—includes oranges, melon, berries, apples, bananas, and grapes
- **Grains**—at least half of your grains for the day should be whole grains
 - includes wheat, rice, oats, cornmeal, barley, and quinoa

- examples: bread, pasta, cereal, and tortillas
- **Protein**
 - Lean meat
 - Chicken or turkey without the skin
 - Fish
 - Eggs
 - Nuts and peanuts
 - Dried beans and certain peas, such as chickpeas and split peas
 - Meat substitutes, such as tofu
- **Dairy—Nonfat or Low fat**
 - Milk or lactose-free milk if you have lactose intolerance
 - Yogurt
 - Cheese

Eat foods with heart-healthy fats, which mainly come from these foods:

- Oils that are liquid at room temperature, such as canola and olive oil
- Nuts and seeds
- Heart-healthy fish such as salmon, tuna and mackerel
- Avocado

Use oils when cooking food instead of butter, cream, shortening, lard, or stick margarine.

The high-carb foods and drinks you should limit include:

- Sugary foods, such as candy, cookies, cake, ice cream, sweetened cereals, and canned fruits with added sugar
- Drinks with added sugars, such as juice, regular soda, and regular sports or energy drinks
- White rice, tortillas, breads and pasta - especially those made with white flour
- Starchy vegetables, such as white potatoes, corn, and peas.

Diet Chart for Diabetic Patient

Diet Chart for Breakfast

Food Item	Quantity
Bread	3 pieces
Full cream milk	1 glass
Jam	25gm
Cornflakes	1 cup
Whole egg	1 piece
Chicken clear soup	2 cups
Fruit (Red apple)	1 piece

Diet Chart for Lunch

Food Item	Quantity
Rice	3 cups
Dal	2 cups
Veg1 (Mixed vegetable)	1 cup
Veg2 (Mixed vegetable)	1 cup
Fish curry/Chicken curry	1 large piece
Salad	1 cup
Curd	1 cup

Diet Chart for Dinner

Food Item	Quantity
Chapatti	3 pieces
Dal	2 cups
Mixed vegetable	1 cup
Salad	1 cup
Chicken clear soup	2 cups
Dessert	1 cup
Full cream milk	1 glass

Dietary modification for Gestational Diabetes

Patient during pregnancy

It is important for a woman who is pregnant to eat a balanced diet. This will help baby to grow strong and healthy. When a woman is pregnant, she needs to meet own nutritional needs and for her baby. Different types of food eat is more important than the amount of food. During pregnancy calcium, iron, protein and folate are examples of nutrients that are more important.

Foods are divided into five groups:

- Bread, cereals, rice, pasta, noodles
- Vegetables, legumes
- Fruit
- Milk, yoghurt, cheese
- Meat, fish, poultry, eggs, nuts, legumes

Each group provides different nutrients. Try to choose a variety of foods from each of the food groups. Some foods do not fit into the five food groups. These are not essential for body.

Diet chart for Gestational Diabetic Patient

Diet chart for Breakfast

Food item	Quantity
Full cream milk	1 glass
Egg	1 whole egg
Bread	3 pieces
Jam	25 gm
Fruit	Full 1 red apple
Soup	2 cups
Cornflakes	1 cup

Diet chart for Lunch

Food item	Quantity
Full cream milk	1 glass
Rice	3 cups
Dal	2 cups
Veg 1 (Mixed vegetable)	1 cup
Veg 2 (Mixed vegetable)	1 cup
Fish curry	1 large piece
Salad	1 cup
Curd	1 cup
Chicken clear soup	2 cups

Diet chart for Dinner

Food item	Quantity
Full cream milk	1 glass
Chapatti	3 pieces
Mixed vegetable	1 cup
Dal	2 cups
Chicken curry	1 large piece
Dessert	1 cup
Salad	1 cup
Chicken clear soup	1 cup

National Guidelines and Management Protocols

- Regular exams for early detection of complications: comprehensive eye examination 1, measurement of urine protein, and assessment of feet for signs of neuropathy.
- Medication to control cardiovascular disease risk.
- Standard criteria for referral of patients from primary care to secondary or tertiary care.
- Medication for blood glucose control – insulin or oral hypoglycaemic agents as required.
- Interventions to promote and support healthy lifestyles, including healthy diet, physical activity, avoidance of tobacco use and harmful use of alcohol.

Conclusion

Diabetes is a disease in which your body is not able to efficiently turn the food you eat into energy. Diabetes is a chronic condition which means it may not go away. It is a slow killer with no known curable treatments. However, its complications can be reduced through proper awareness and timely treatment. Three major complications are related to blindness, kidney damage and heart attack. It is possible, however, to reverse some of the effects of diabetes and go into a remission for those with Type 2 Diabetes. Your blood sugar levels are within the normal range and you have not required medication to manage your blood sugar for six months or more.

It is important to keep the blood glucose levels of patients under strict control for avoiding the complications. One of the difficulties with tight control of glucose levels in the blood is that such attempts may lead to hypoglycemia that creates much severe complications than an increased level of blood glucose. Researchers now look for alternative methods for diabetes treatment. Exercise reduces the severity of the disease and the long-term complications of diabetes. In effect, a well-planned and-regular exercise regimen can be very beneficial if made a part and parcel of everyday life, more so if one has diabetes. Exercise has the advantages of controlling the blood sugar levels without taking additional medications. Overall regular exercise cannot only help in better control of blood sugar but also helps with control of weight and blood pressure as it lowers the bad cholesterol and raises the level of good cholesterol in the blood. Exercise can reduce the risk of heart disease and nerve damage, the risks of which are higher with diabetes.

Lifestyle changes like a healthy diet, daily exercise, and weight management can improve the way your body uses insulin and can improve the prognosis for someone diagnosed with diabetes.

Case Study

Patient 01

Information about Patient

Name: Jannat Khanom
Address: Jamalpur
Admission date: 28.05.2022
Ward no.: 92
Bed no.: 928

Anthropometric parameters

Age: 44	Sex: F	Weight: 60	Height: 164	BMI: 22.3
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- Underweight
- **Normal**
- Over weight
- Obesity

Nutritional Status

- < 17
- 17-18.5
- **18.5 – 23**
- 23 – 25
- 25.1 – 29.9
- 30 – 39.9
- ≥ 40

Activity Level

- Very active
- **Active**
- Moderate worker
- Sedentary worker
- Ambulatory bed rest

Lab/Biochemical test (Blood)	Result	Lab/Biochemical test (Blood)	Result
Blood Glucose(F)		SBP	
Blood Glucose(ABF)		DBP	
HbA1c		Magnesium	
Albumin	22.4 g/L	Phosphate	
Total Protein	62.8 gm/L	Calcium	
HDL		Potassium	4.4 mmol/L
LDL	181 U/L	Sodium	138 mmol/L
Total Cholesterol		Serum Chloride	107 mmol/L
BUN		Hb	
Creatinine	1.0 mg/dl	Hematocrit	
Urea		ESR	
Amylase		SGOT	17 U/L
S.TCO2	20 mmol/L	SGPT	16 U/L
Uric Acid		Alk.Phos.	96 U/L
TG		Others	
Bilirubin	0.4mg/dl	Others	
Bicarbonate		Others	

Appetite:

- Excellent
- Good
- Fair
- **Poor**

Socioeconomic & Cultural factor:

- Religion : Islam
- Occupation : Housewife
- Living status : Middle class
- Rural/Urban : Urban

Nutritional status: Normal

Restrictions:

- **Yes**
- No
- If Yes

Calorie	Protein	Free sugar
Fat	Cholesterol	Na
K	Mg	Other

Patient 02

Information about Patient

Name: Rokeya Begum
Address: Dhaka
Admission date: 28.05.2022
Ward no.: 111
Bed no.: 1116

Anthropometric parameters

Age: 69	Sex: F	Weight: 56	Height: 139	BMI: 29
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- Underweight
- Normal
- **Over weight**
- Obesity

Nutritional Status

- < 17
- 17-18.5
- 18.5 – 23
- 23 – 25
- **25.1 – 29.9**
- 30 – 9.9
- ≥ 40

Activity Level

- Very active
- Active
- Moderate worker
- **Sedentary worker**
- Ambulatory bed rest

Lab/Biochemical test (Blood)	Result	Lab/Biochemical test (Blood)	Result
Blood Glucose(F)		SBP	
Blood Glucose(ABF)		DBP	
HbA1c	12.3%	Magnesium	0.9 mmol/L
Albumin	25.8 g/L	Phosphate	
Total Protein	59.9 gm/L	Calcium	7.7 mg/dl
HDL	19 mg/dl	Potassium	4.7 mmol/L
LDL	90 mg/dl	Sodium	129 mmol/L
Total Cholesterol	163 mg/dl	Serum Chloride	100 mmol/L
BUN		Hb	
Creatinine	1.3 mg/dl	Hematocrit	
Urea	69 mg/dl	ESR	
Amylase		SGOT	32 U/L
S.TCO2	19 mmol/L	SGPT	33 U/L
Uric Acid		Alk.Phos.	241 U/L
TG		Others	
Bilirubin	1.4 mg/dl	Others	
Bicarbonate		Others	

Appetite:

- Excellent
- Good
- Fair
- **Poor**

Socioeconomic & Cultural factor:

- Religion : Islam
- Occupation : Housewife
- Living status : Middle class
- Rural/Urban : Urban

Nutritional status: Over weight

Restrictions:

- **Yes**
- No
- If Yes

Calorie	Protein	Free sugar
Fat	Cholesterol	Na
K	Mg	Other

Patient 03

Information about Patient

Name: Fouzia Nilufa
Address: Dhaka
Admission date: 14.05.2022
Ward no.: 112
Bed no.: 1127

Anthropometric parameters

Age: 70	Sex: F	Weight: 60	Height: 150	BMI: 26.7
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- Underweight
- Normal
- **Over weight**
- Obesity

Nutritional Status

- < 17
- 17-18.5
- 18.5 – 23
- 23 – 25
- **25.1 – 29.9**
- 30 – 9.9
- ≥ 40

Activity Level

- Very active
- Active
- Moderate worker
- Sedentary worker
- **Ambulatory bed rest**

Lab/Biochemical test (Blood)	Result	Lab/Biochemical test (Blood)	Result
Blood Glucose(F)		SBP	
Blood Glucose(ABF)		DBP	
HbA1c	7.9%	Magnesium	0.95 mmol/L
Albumin	34.9 g/L	Phosphate	5.3 mg/dl
Total Protein	59.9 gm/l	Calcium	7.8 mg/dL
HDL	28 mg/dl	Potassium	4.6 mmol/L
LDL	282 mg/dl	Sodium	131 mmol/L
Total Cholesterol	395 mg/dl	Serum Chloride	100 mmol/L
BUN		Hb	
Creatinine	0.8 mg/dl	Hematocrit	
Urea	88 mg/dl	ESR	
Amylase		SGOT	85 U/L
S.TCO2	21 mmol/L	SGPT	68 U/L
Uric Acid		Alk.Phos.	390 U/L
TG		Others	
Bilirubin	5.5 mg/dl	Others	
Bicarbonate		Others	

Appetite:

- Excellent
- Good
- Fair
- **Poor**

Socioeconomic & Cultural factor:

- Religion : Islam
- Occupation : Housewife
- Living status : Middle class
- Rural/Urban : Urban

Nutritional status: Over weight

Restrictions:

- **Yes**
- No
- If Yes

Calorie	Protein	Free sugar
Fat	Cholesterol	Na
K	Mg	Other